YESAB

Yukon Environmental and
Socio-economic Assessment Board

Final Screening Report

Faro Mine Remediation Project

Project Number: 2019-0149

July 5, 2024
Executive Committee
Yukon Environmental and Socio-economic Assessment Board

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EXECUTIVE SUMMARY

The Executive Committee (EC) of the Yukon Environmental and Socio-economic Assessment Board (YESAB) is assessing the environmental and socio-economic effects of the Project pursuant to the *Yukon Environmental and Socio-economic Assessment Act* (YESAA). In accordance with sections 49 and 51 of the *Rules for Screenings Conducted by the EC*, the EC has completed the Final Screening Report.

This report, the Final Screening Report, contains the EC's final recommendations and supporting considerations of the Faro Mine Remediation Project (the Project) proposed by Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC, the Proponent). The EC recommends the Project be allowed to proceed without a review, subject to the specified terms and conditions

The Project

The Faro Mine is one of the largest contaminated mine sites in Canada and was once the largest open-pit lead-zinc mine in the world. The mine site was abandoned in 1998, leaving behind large amounts of tailings and waste rock. The Project consists of consolidating and covering ore, waste rock, and tailings; revegetation; diverting clean water away from contaminated sites through diversion channels; collecting and treating contaminated water; and adaptive management.

The Project is located near the Town of Faro on the Traditional Territory of the Liard First Nation (LFN), Ross River Dena Council (RRDC), and upstream from the Traditional Territory of the Selkirk First Nation (SFN).

The Assessment Process

YESAA directs the EC to determine if the Project will have significant adverse environmental or socio-economic effects in or outside Yukon and if these effects can be mitigated by terms and conditions and to provide a recommendation to the Project's Decision Bodies: Government of Yukon (YG), Natural Resources Canada (NRCan), CIRNAC, and Fisheries and Oceans Canada (DFO). YESAA requires that Decision Bodies consider the recommendation and issue a decision document prior to taking any action that would allow a project to proceed.

This report:

- Describes the Project and the screening process;
- Considers information relevant to the assessment and available to the EC;
- Characterizes potential project effects and determines if potential effects are significant; and
- Outlines terms and conditions that mitigate likely significant adverse environmental and/or socio-economic effects.

The EC has identified the following valued environmental and socio-economic components (VESECs) for the Project:

- Soils and vegetation
- Air quality
- Surface water quality
- Fish and fish habitat
- Aquatic health and productivity
- Atmospheric greenhouse gases
- General wildlife
- Moose
- Woodland caribou
- Thinhorn sheep
- Grizzly bear
- Small mammals
- Avian Wildlife
- Housing
- Public infrastructure
- Community services
- Health and emergency services
- Mental health and substance use services
- Community well-being
- Community personal and relational safety
- Occupational health and safety
- First Nation land use and sense of place
- Cultural keystone areas
- Heritage resources
- Indigenous economies
- Recreational and commercial land use
- Public trust

In addition to the effects-based assessment above on VESECs, the EC also took a holistic approach to assessing the Project and looked at the interconnections between VESECs in section 37 of this screening.

Conclusion of the Assessment

The EC determines that the Project will result in significant adverse effects to the following VESECs:

- Surface water quality
- Fish and fish habitat
- Aquatic health and productivity
- Atmospheric greenhouse gases

- Moose
- Woodland caribou
- Avian wildlife
- Housing
- Health and emergency services
- Mental health and substance use services
- Community personal and relational safety
- Public trust

These significant adverse effects can be eliminated, controlled, or reduced through the application of mitigation measures recommended by the EC. A full list of these mitigations can be found below. Consequently, the EC recommends the Project proceed under s. 58(1)(b) of *YESAA*.

Additionally, the EC recommends that additional monitoring take place to help inform the regulatory process, future assessments, aid in adaptive management, and reduce uncertainty in later stages of the Project. These recommendations are made under s. 110 of YESAA and are listed below.

The issuance of this document concludes the EC's assessment of the Project. Decision Bodies will issue a decision document accepting the recommendations or referring the recommendations back to the committee for reconsideration following consultation with affected First Nations.

SUMMARY OF TERMS AND CONDITIONS

1. The Proponent shall review and revise the water balance, water quality model, water management, and monitoring and adaptive management plans to respond to changing climate and hydrologic conditions, hydrogeological conditions, extreme events, social expectations, water treatment efficacy, industry best practices, and water quality and toxicity monitoring data as set out in the water license for the Project.
2. Effluent quality standards from the permanent water treatment plant shall be protective of receiving water conditions at the time of discharge (e.g., low flow), and the receiving environment downstream of the discharge(s) shall be monitored as identified in the Water Management Plan, Performance Monitoring Plan, and Aquatic Effects Monitoring Plan to ensure that water quality guidelines and site-specific water quality objectives as defined in the Adaptive Management Plan are met beyond any approved mixing zone(s).
3. Adaptive management and monitoring plans for the Project shall provide a clear framework to identify issues quickly and implement timely mitigation as required to meet remediation objectives.

   a. These plans shall include an Adaptive Management Initiative to monitor and confirm whether the site specific water quality objectives and low and moderate effect benchmarks are as protective as predicted during the assessment process.
   b. Adaptive management measures shall include appropriate monitoring with indicators and thresholds to identify adverse changes in surface water quality before they cause unacceptable effects, including constituents that may not currently be considered contaminants of potential concern. Additionally, adaptive management shall include proactive evaluation of mitigative options so that effective mitigations can be implemented in a timely manner when needed to stop or reverse adverse changes in surface water quality.
   c. The Proponent shall develop a broader adaptive management plan for surface water quality and quantity, with specific goals and objectives for these two surface water aspects and with monitoring frequencies appropriate to these objectives.
   d. The Proponent shall add an Adaptive Management Initiative to monitor water quality and quantity in the Faro Pit.
4. The Proponent shall assess magnesium and its effect on sulphate concentrations in effluent through predictive modelling and address it in future updates of the water quality and water balance models to be developed for the water licence application.
5. The Proponent shall include offsetting measures to address loss of overwintering habitats if groundwater flows to surface waters are predicted to cause a measurable decline in the amount of existing overwintering habitats.
6. The Proponent shall establish a Greenhouse Gas Emission Reduction Plan for the Project.
   a. The Greenhouse Gas Emission Reduction Plan will evaluate and implement alternative ways to reduce greenhouse gas emissions during the life of the project.
   b. This plan will be developed within three years of issuance of the Decision Document and be updated every 5 years.
   c. This plan will set out how the Proponent will make efforts to reduce emissions during the 15-year active remediation phase. Efforts to reduce emissions will be achieved through measures informed by best available technologies, best practices and emerging technologies.
   d. The Plan will reflect Federal and Territorial regulatory programs and commitments
7. The Proponent shall develop a Carbon Offsetting Plan.
   a. This plan will establish the actual annual emission values that are required to be offset.
   b. This plan will be developed within 5 years of the issuance of the Decision Document. Updates will be reflective of updates made to the Greenhouse

Gas Reduction Plan and informed by annual reporting from the emissions tracking, quantification and monitoring system.

c. The plan will detail how the carbon offset planning is informed by the *Draft Technical Guide Related to the Strategic Assessment of Climate Change: Guidance on Quantification of Net Greenhouse Gas Emissions, Impact on Carbon Sinks, Mitigation Measures, Net-Zero Plan and Upstream Greenhouse Gas Assessment*.
d. The plan will detail how carbon offset planning aligns with the Government of Canada's and the Yukon Government's legislated net-zero by 2050 targets.
e. The plan will detail possible carbon offsets within local communities, affected First Nations' Traditional Territories and Yukon as a whole.

8. The Proponent shall establish an emissions tracking, quantification and monitoring system.

    a. Emissions tracking, quantification and monitoring will be made publicly available through annual reporting. This information will be provided to the independent review body.

    b. The annual report will:
        i. Be carried out for the life of the Project;
        ii. Present data, including predicted emission values, actual emitted values and their sources, and annual projections and targets;
        iii. Present information pertaining to the Greenhouse Gas Reduction Plan and the Carbon Offsetting Plan and their implementation; and,
        iv. Present and discuss tracking and monitoring mechanisms, provide supporting data, and address any adaptive management approaches implemented to findings.

9. Every three years, an audit shall be conducted by the independent review body, as established by term and condition number 24, to examine the effectiveness of greenhouse gas emission reductions and offset planning and implementation by the Proponent. These audit reports shall be made readily and publicly available in a timely manner.

10. The Proponent, in collaboration with affected First Nations, the Government of Yukon and the Yukon Fish and Wildlife Management Board, shall develop a habitat plan specific to moose for the Faro Mine site maximum disturbance footprint. The habitat plan shall include, at minimum:

    a. The creation of effective browse for moose.
    b. Increases to percent cover and vigor of live seedlings.
    c. Consideration of vegetation community composition and how vegetation density objectives can be met to support continued efforts to diversify, manage, and support effective ecosystem restoration and the restoration of land use which supports First Nation values in relation to moose in the project area.

11. The Proponent, in collaboration with affected First Nations, the Government of Yukon and the Yukon Fish and Wildlife Management Board, shall develop a plan to address management of caribou. The plan shall include how operations on-site will be conducted when caribou are observed within the Faro Mine site maximum disturbance footprint (i.e. timing of high disturbance activities).
12. The Proponent, in collaboration with affected First Nations, the Government of Yukon and the Yukon Fish and Wildlife Management Board, shall develop a habitat plan specific to caribou for the Faro Mine site maximum disturbance footprint. The habitat plan shall include:
    a. The creation of effective browse for caribou
    b. Increases to percent cover and vigor of live seedlings
    c. Consideration of vegetation community composition and how vegetation density objectives can be met to support continued efforts to diversify, manage, and support effective ecosystem restoration and the restoration of land use which supports First Nation values in relation to moose in the project area.
13. The Proponent shall develop adaptive management in collaboration with affected First Nations and their representatives (e.g. Kaska Game Guardians) to address issues, trends, or problems areas related to the use of contaminated water storage facilities on the Faro Mine site for specific avian species identified by monitoring.
14. The Proponent shall provide to the Town of Faro and Government of Yukon, information on estimated numbers of employees wanting to access housing in the Town of Faro. This information will support the monitoring, tracking and planning by YG and Town of Faro in regards to numbers of housing units and potential impacts on housing stock available. The Proponent will make reasonable efforts to see that the Faro Mine Remediation Project housing needs do not adversely affect at-risk members of the community through reduction in accessible rental housing.
15. The Government of Yukon, working with the Town of Faro, and with input from the Proponent, shall establish comprehensive monitoring and tracking of housing availability and affordability in the Town of Faro.
16. The Proponent shall establish a comprehensive on-site emergency and first aid services facility to minimize use of off-site first aid and emergency requirements which will limit the need to use services and resources from the Town of Faro.
17. The Government of Yukon shall work with the Proponent to identify needs or funding gaps to support additional requirements in health and emergency services in the Town of Faro that may result from the use of these services by employees of the Project.
18. The Proponent shall provide on-site health services staff (nurses, First Aid Technicians, and/or Emergency Medical Technicians) that are trained in:

a. Mental Health First Aid and/or have formal mental health training to provide employees with access to mental health support services; and
b. use support or formally trained in counselling to provide employees access to appropriate services.

19. The Proponent shall ensure that management and human-resources staff complete training to recognize and support mental health issues in the workplace and be able to provide employees with access to appropriate services and resources, on and off-site.

20. The Proponent shall establish or provide private access to Employee Assistance Plan services:

    a. To provide access and ensure mechanisms are in place for employees (on- or off-site and on- or off-duty) and eligible dependants of employees to confidentially access Employee Assistance Plan services via in-person, phone, or online; and
    b. To ensure that on-site employees have the ability to utilize the Employee Assistance Plan services available (i.e., make available a private phone line or internet connection so employees can discreetly reach Employee Assistance Plan services).

21. The Proponent shall create a mentor program for Yukon First Nations employees to achieve the following goals:

    a. Develop a formal feedback process for First Nation employees to voice their concerns and address negative experiences that are resulting in mental health issues;
    b. Establish peer support program, aimed at positive mental health and addictions recovery; and
    c. Involve Ross River Dena Council, Liard First Nation, and Selkirk First Nation in further developing the program so that it meets the needs of First Nations employees.

22. The Proponent shall make efforts to reduce other stressors to First Nations employees by:

    a. Allowing First Nations employees schedule flexibility to facilitate participation in cultural practices or seasons;
    b. Establishing an elder-in-residence program; and
    c. Facilitating and supporting traditional land-use activities in proximity to the project site.

23. The Proponent shall develop and fund a community safety plan for the Project in consultation with the communities and the Government of Yukon for the community of Ross River, the Town of Faro, and the Town of Watson Lake and invite the following parties to participate in the development of a monitoring program to ensure that the Project's effects on personal safety are adequately monitored:

a. Yukon Status of Women Council;
b. Yukon Aboriginal Women's Council;
c. Liard Aboriginal Women's Society; and
d. Whitehorse Aboriginal Women's Circle.

24. The Proponent shall establish and adequately fund an independent review body within three years of the issuance of the Decision Document by the Decision Body:

    a. The independent review body shall, within one year, establish terms of reference to guide operations; and
    b. The independent review body composition shall include members nominated by each affected First Nation, as identified in the Devolution Transfer Agreement, the Government of Canada, and the Government of Yukon.
    c. The independent review body shall be an independent, transparent observer, reviewer and promoter of public awareness for the Project but will not have any decision-making, regulatory or compliance/enforcement authority; and
    d. The independent review body shall promote public awareness of the Project and disseminate information about the Project.

25. The independent review body shall be established to:

    a. Document remediation, monitoring activities, the Greenhouse Gas Reduction Plan and the Carbon Offsetting Plan and their results;
    b. Conduct an audit, every three years, to examine the effectiveness of greenhouse gas emission reductions and offset planning and implementation by the Proponent;
    c. Evaluate and provide commentary about adequacy of funding allocated to the Project, engagement, and ongoing studies;
    d. Based on information provided, provide recommendations to the Proponent to prevent risks and mitigate potential impacts at the Project;
    e. Review the annual compliance document provided by the Proponent and report to the public on any issues related to compliance and enforcement at the Project;
    f. Establish a complaints tracking record informed by the Proponent's complaint management system and informed by any other complaints received by the independent review body. Track how complaints have been resolved and what actions have been taken;
    g. Provide an independent report to the public regarding items a, b, c, d, e and f above, annually; and
    h. Establish a mechanism for members of the public to provide feedback on the report required in item f and any other concerns that arise.

26. The Proponent shall develop a complaint management system to track, manage, and address concerns related to the Project that are raised by the public, communities, and First Nations.

27. The community point of contact for complaints and grievances will be identified by the socio-economic committee.
28. The complaint management system results shall be made available annually to the independent review body.
29. The Proponent shall establish a perpetual care plan within three years of the issuance of the Decision Document that includes:
    a. Identification of components of the project and indexed future costing of each component that will inform funding requirements into the future.
    b. Analysis and costing will incorporate ongoing costs to continue site management and operations, including accounting for adaptive management, and governance of the site.
    c. The plan will also include a description of the mechanisms to secure the long-term funding, including how budgets will be set and approved through the Government of Canada.
    d. A copy of the completed perpetual care plan will be made available to the public and to the independent review body.
30. The Proponent will provide an annual report on funding of the Project to the public and the independent review body.

YESAA Section 110 Recommendation

Pursuant to s. 110 of YESAA, the EC recommends effects monitoring be conducted in respect of the Project. The Proponent shall:

1. Establish a monitoring and management framework for social, cultural, and economic effects of the Project. This framework will:
    a. Be developed by representatives from affected First Nations, affected communities, YG, GC, and the Proponent;
    b. Be administered by the Proponent in collaboration with affected First Nations.
    c. Be funded entirely by the Proponent for the duration of the Project;
    d. Be developed within 2 years from the issuance of the Decision Document for the Project;
    e. Identify timelines for monitoring that reflect not only the project timeline, but future monitoring requirements;
    f. Include input from experts on the subject matter;
    g. Provide publicly available annual reports; and
    h. Develop methods for the collection, storage, and sharing of monitoring information.

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LIST OF ACRONYMS

2SLGBTQIA+	Two-Spirit, Lesbian, Gay, Bisexual, Transgender, Queer/Questioning, Intersex, Asexual and Others
AMI	Adaptive Management Initiative
AMP	Adaptive Management Plan
AEMP	Aquatic Effects Monitoring Plan
AHRA	Aquatic Health Risk Assessment
AQMMP	Air Quality and Meteorological Monitoring Plan
ARD/ML	Acid Rock Drainage/Metal Leaching
BCI	Bray-Curtis Index
BCR	Bird Conservation Region
BIPOC	Black, Indigenous, and People of Colour
BMU	Bear Management Unit
CAAQS	Canadian Ambient Air Quality Standards
CAC	Criteria Air Contaminant
CCME	Canadian Council of Ministers of the Environment
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
CO	Carbon Monoxide
CO_{2e}	GHG Emissions (Kt of Carbon Dioxide per Year as per GC)
COPC	Contaminant of Potential Concern
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DFO	Fisheries and Oceans Canada
DSR	Draft Screening Report
DTA	Devolution Transfer Agreement
EAP	Employee Assistance Plan
EC	Executive Committee
ECCC	Environment and Climate Change Canada
EEM	Environmental Effects Monitoring
EQS	Effluent Quality Standard
FCM	Federation of Canadian Municipalities
FSR	Final Screening Report
GC	Government of Canada
GHG	Greenhouse Gas
GMS	Game Management Subzone
HC	Health Canada

HDS	High-Density Sludge
HHERA	Human Health and Ecological Risk Assessment
HQ	Hazard Quotients
HR	Human Resources
HRIA	Heritage Resources Impact Assessment
HROA	Heritage Resources Overview Assessment
HRPP	Heritage Resources Protection Plan
HSS	Health and Social Services
IC	Intermediate Component
IPCC	Intergovernmental Panel on Climate Change
IR	Information Request
KT	Kilotonnes
LAA	Local Assessment Area
LFN	Liard First Nation
LSCFN	Little Salmon Carmacks First Nation
MBCA	*Migratory Birds Convention Act*
MBR	*Migratory Birds Regulations*
MDF	Maximum Disturbance Footprint
ML	Megalitre
MMIWG	Missing and Murdered Indigenous Women and Girls
MMU	Moose Management Unit
MPY	Major Projects Yukon
NAPS	National Air Pollution Surveillance
NCCIH	National Collaborating Centre for Indigenous Health
NIR	National Inventory Report
NO_2 / NO_x	Nitrogen Dioxide
NPMO	Northern Projects Management Office
NRCan	Natural Resources Canada
O_3	Ozone
PPE	Personal Protective Equipment
$PM_{2.5}$	Fine Particulate Matter
PM_{10}	Coarse Particulate Matter
PSOA	Preliminary Scope of Assessment
PWTP	Permanent Water Treatment Plant
RAA	Regional Assessment Area
RRDC	Ross River Dena Council

SARA	*Species at Risk Act*
SATAC	Scope of Assessment Technical Advisory Committee
SDH	Social Determinants of Health
SFN	Selkirk First Nation
SMMP	Socio-Economic Management and Monitoring Plan
SO_2	Sulphur Dioxide
TAC	Technical Advisory Committee
TK	Traditional Knowledge
TKD	Tracks/Kilometre/Day
TLU	Traditional Land Use
TRH	Tay River Herd
TSP	Total Suspended Particles
TSS	Total Suspended Solids
UFA	*Umbrella Final Agreement*
VESEC	Valued Environmental and Socio-Economic Component
VOCs	Volatile Organic Compounds
WHO	World Health Organization
WHR	*Workplace Health Regulations*
WKA	Wildlife Key Area
WQG	Water Quality Guidelines
WQO	Water Quality Objective
YAAQS	Yukon Ambient Air Quality Standards
YESAA	*Yukon Environmental and Socio-Economic Assessment Act*
YESAB	Yukon Environmental and Socio-Economic Assessment Board
YG	Government of Yukon
YOR	YESAB Online Registry

PART A

Part A of this report provides context, background information, and general considerations for the assessment of the Project.

1 PROJECT OVERVIEW

1.1 Proponent Information

The Proponent of the Project is Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), a department of the federal government. The Proponent is leading all parts of the Project, including care and maintenance, site monitoring, consultation, remediation plan design, and regulatory process.

Where the term “Proponent” appears in this report, it refers to CIRNAC.

Contact for the Proponent is:

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and

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1.2 Description and Purpose

The Faro Mine is one of the largest contaminated mine sites in Canada and was once the largest open pit lead-zinc mine in the world. The mine was abandoned in 1998, leaving behind large amounts of tailings and waste rock.

Signed in 2001, the Devolution Transfer Agreement (DTA)[1] is a negotiated agreement whereby Government of Yukon (YG), Government of Canada (GC), and Council of Yukon First Nations transferred the resources and responsibilities associated with various northern affairs programming, including the management of contaminated sites. The Faro Mine was identified through this agreement as a Type II site, where Canada is leading the funding, care and maintenance, and remediation activities.

[1] Government of Canada and Government of Yukon, *Yukon Northern Affairs Program Devolution Transfer Agreement,* 2001, https://www.rcaanc-cirnac.gc.ca/DAM/DAM-CIRNAC-RCAANC/DAM-NTHAFF/STAGING/texte-text/nth_pubs_yna_yna_1316538556192_eng.pdf.

The purpose of the Faro Mine Remediation Project (the Project) is to remediate the historical Faro Mine by reducing existing and future risks to the environment, and to address the overarching objectives set by the Oversight Committee which was established in 2003 to help develop the Faro Mine remediation plan.

The Proponent's remediation plan is based on a "stabilize-in-place" concept and designed to meet five overarching objectives. The objectives identified by the Proponent are:

1. Protecting human health and safety;
2. Protecting and, to the extent practicable, restore the environment, including land, air, water, fish, and wildlife;
3. Returning the mine site to an acceptable state of use that reflects pre-mine land use where practicable;
4. Maximizing local and Yukon socio-economic benefits; and
5. Managing long-term site risk in a cost-effective manner.

The remediation plan consists of consolidating and covering ore, waste rock, and tailings; revegetation; diverting clean water away from contaminated sites through diversion channels; collecting and treating contaminated water; and ongoing adaptive management to address uncertainties. Remediation of the Faro Mine through engineering design is intended to mitigate for current and future conditions. These activities are described in more detail in section 2, Project Scope.

The Project will have an average of 165 workers during the active remediation phase. A 304-person camp will accommodate fluctuations in the number of workers on-site.

1.3 Stages and Schedule

The Project, which is proposed for 25 years, consists of two main phases:

- Active remediation phase (15 years)
- Operations and maintenance phase (10 years)

Although not proposed as part of this project, it is acknowledged that future monitoring, operation, and maintenance of the project site will be required far into the future, beyond the 25-year temporal scope described in the project proposal.

1.3.1 Active Remediation Phase (15 years)

The active remediation phase consists of the major construction activities required to remediate and decommission the mine. It includes water treatment, monitoring, adaptive management, and the ongoing care and maintenance of the project site. This phase includes the stabilization, land forming, and covering of tailings and waste rock; borrow development; non-contact and contact water management; demolition, contaminated soils and waste management; and

supporting activities. Project activities undertaken as emergency measures are also included in this phase. This phase is anticipated to last up to 15 years.

Care and maintenance activities are anticipated to occur throughout the active remediation phase and will continue until most construction activities are completed. At that stage, the care and maintenance activities will become part of the operations and maintenance phase described below.

1.3.2 Operations and Maintenance Phase (10 years)

The operations and maintenance phase is defined by the Proponent as the period of time in which the efficacy of active remediation and reclamation success are confirmed through performance monitoring, and adaptive management is implemented to achieve a predictable steady-state that meets the overarching objectives of the Project. Once this predictable steady-state is achieved, ongoing water treatment, monitoring, and maintenance will continue to occur into the very distant future. Although limited to 10 years in the project proposal, this phase is anticipated to continue in perpetuity.

Key activities during this phase include monitoring and inspections, collection and treatment of contaminated water, performance monitoring, and adaptive management. Regular inspections will be done during this phase on key remediation components including dams, water conveyance, landforms and covers, including revegetation.

1.3.3 Advancements of Emergency Works

Since the Faro Mine was abandoned, conditions and facilities at the site have presented substantial chemical and physical stability risks. On July 5, 2022, the Proponent advised the Executive Committee (EC) of the decision to commence works pursuant to s. 49(1), emergency exempted, of the *Yukon Environmental and Socio-economic Assessment Act* (YESAA or the Act) [S.C. 2003, c. 7].

Specifically, the Proponent advised that it is advancing construction of the Permanent Water Treatment Plant (PWTP) on an emergency basis. The construction of the PWTP and related activities, including the construction of a concrete batch plant and additional borrow source development, were set to begin in the spring of 2023 and be in operation by 2025 to address increased risks associated with water management on-site, namely the increasing volumes of water in the Faro pit and contaminant loading.

Since April 2019, the Proponent has undertaken the following emergency works to maintain the physical integrity of the site and to control and mitigate potential effects of contaminants:

- Installation and operation of the X13 seepage interception system;
- Re-alignment of the North Fork of Rose Creek (including contact water collection from the former North Fork Rose Creek alignment); and
- Construction of hydraulic upgrades to the Rose Creek tailings area.

1.4 Location and Layout

1.4.1 Project Location

The Project is located 15 kilometres north of the Town of Faro and 200 kilometres northeast of the City of Whitehorse. The following additional communities are located near the Project: the community of Ross River (65 km E), the Village of Carmacks (152 km W), the community of Pelly Crossing (162 km WNW), the Town of Watson Lake (415 km SE), and the community of Stewart Crossing (196km NNW), as shown in Figure 1.

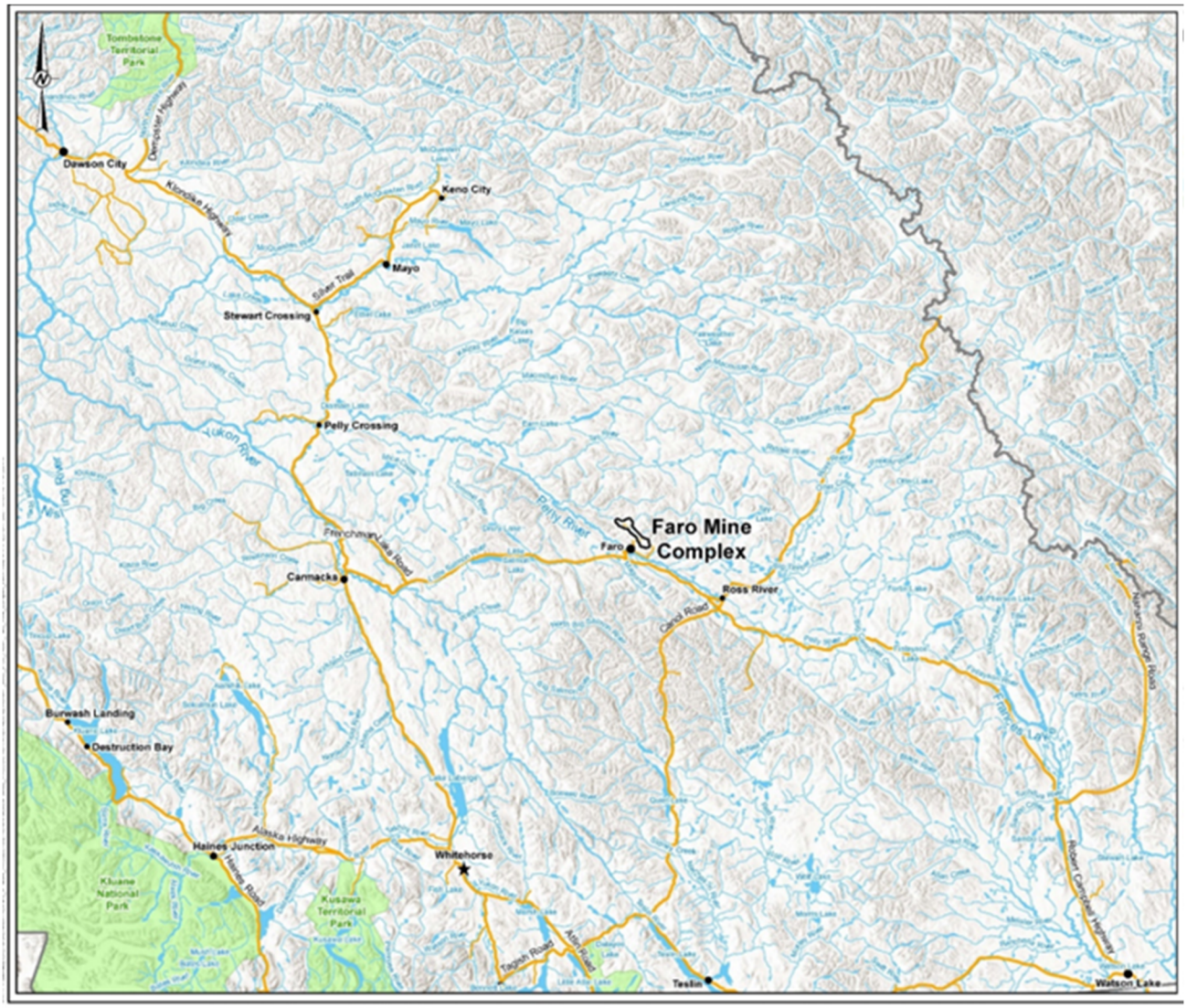

Figure 1: Regional Overview of the Faro Mine Remediation Project[2]

Access to the Project from the Town of Faro is proposed via the Faro Mine access road and existing site access and haul roads. Existing accesses and roads will be upgraded as part of the

[2] YOR 2019-0149-0638

Project; this may require the installation of temporary and permanent water crossings. Any existing accesses and roads not used during the Project will be reclaimed. Accesses and roads already in the process of natural reclamation will be left to naturally revegetate. Accesses within the project site are shown in Figure 2.

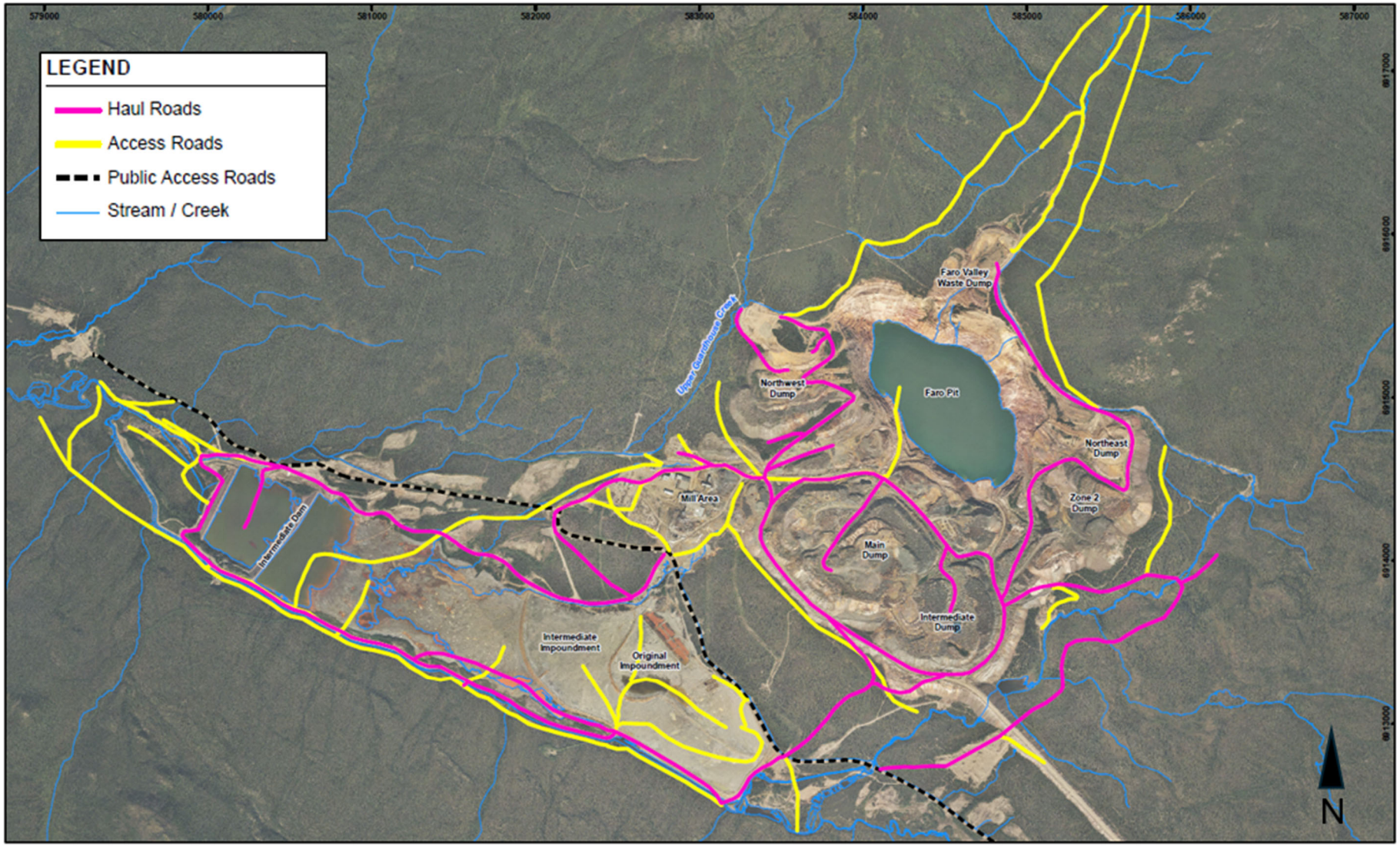

Figure 2: Proposed Remediation Access Roads to be Used During the Active Remediation Phase at the Project Site[3]

[3] YOR 2019-0149-0638

The Project overlaps with the Rose Creek watershed, which drains to the Pelly River via Anvil Creek and the Vangorda Creek watershed, which joins the Pelly River at the Town of Faro, shown in Figure 33.

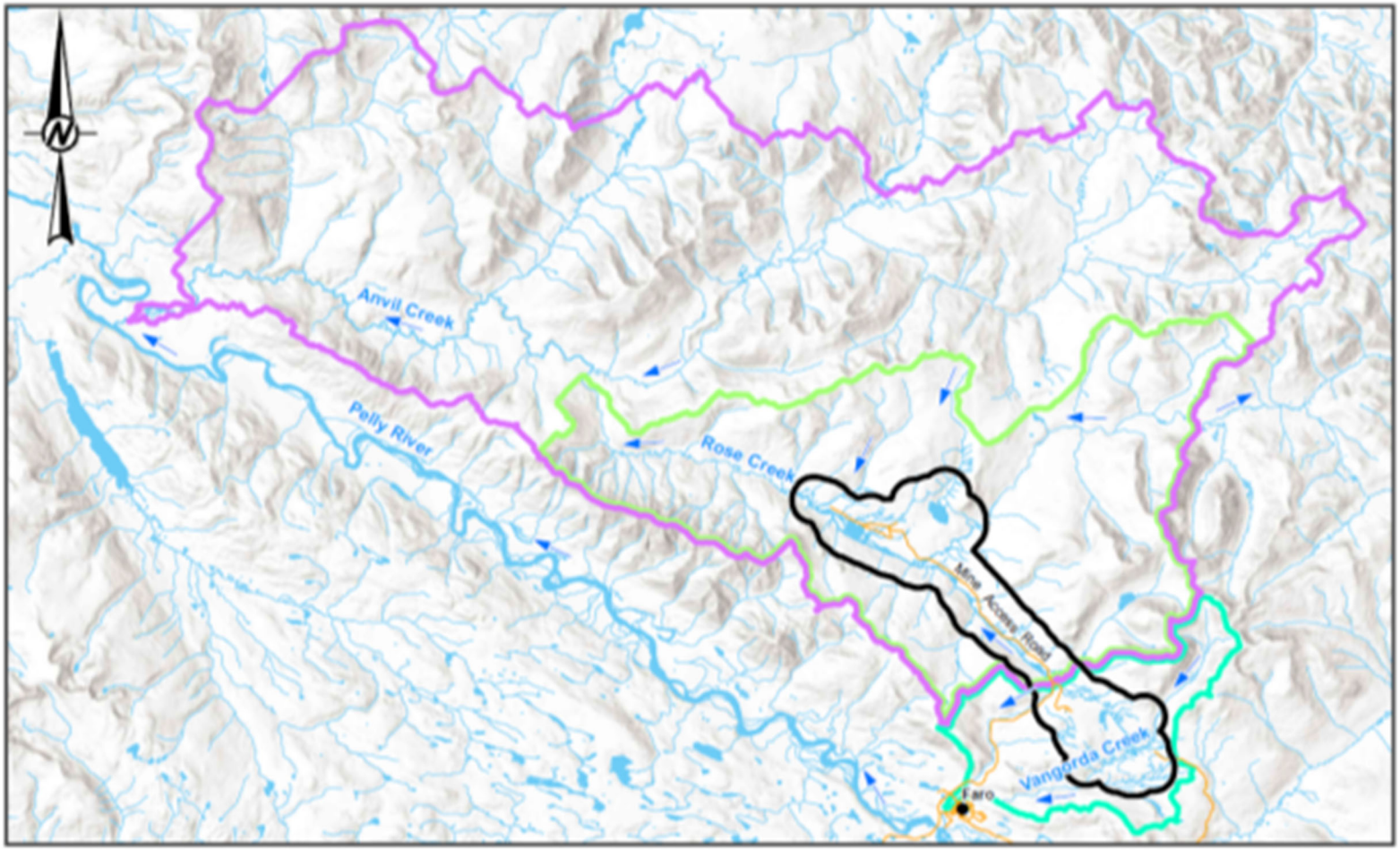

Figure 33: Watersheds, Creeks, and Water Flow Direction of the Project Site[4]

[4] YOR 2019-0149-0638

1.4.2 Affected First Nation Traditional Territories

The DTA identifies the Ross River Dena Council (RRDC), Liard First Nation (LFN), and Selkirk First Nation (SFN) as affected First Nations of the Project (Figure 44). The Project is located within the Traditional Territory of LFN and RRDC. The Project is located upstream of the Traditional Territory of SFN. Although First Nation Traditional Territories will be referred to as such based on the boundaries established in the *Umbrella Final Agreement*,[5] the EC acknowledges LFN's comment that "there is no 'traditional territory of LFN'; the territory is Kaska territory as we are one land, one people. Our Elders remind us, time and again, to reject borders imposed by others."[6]

[5] Government of Canada, Council for Yukon Indians, and Government of Yukon, *Umbrella Final Agreement between The Government of Canada, The Council for Yukon Indians and The Government of the Yukon.* 1993.
[6] YOR 2019-0149-8167

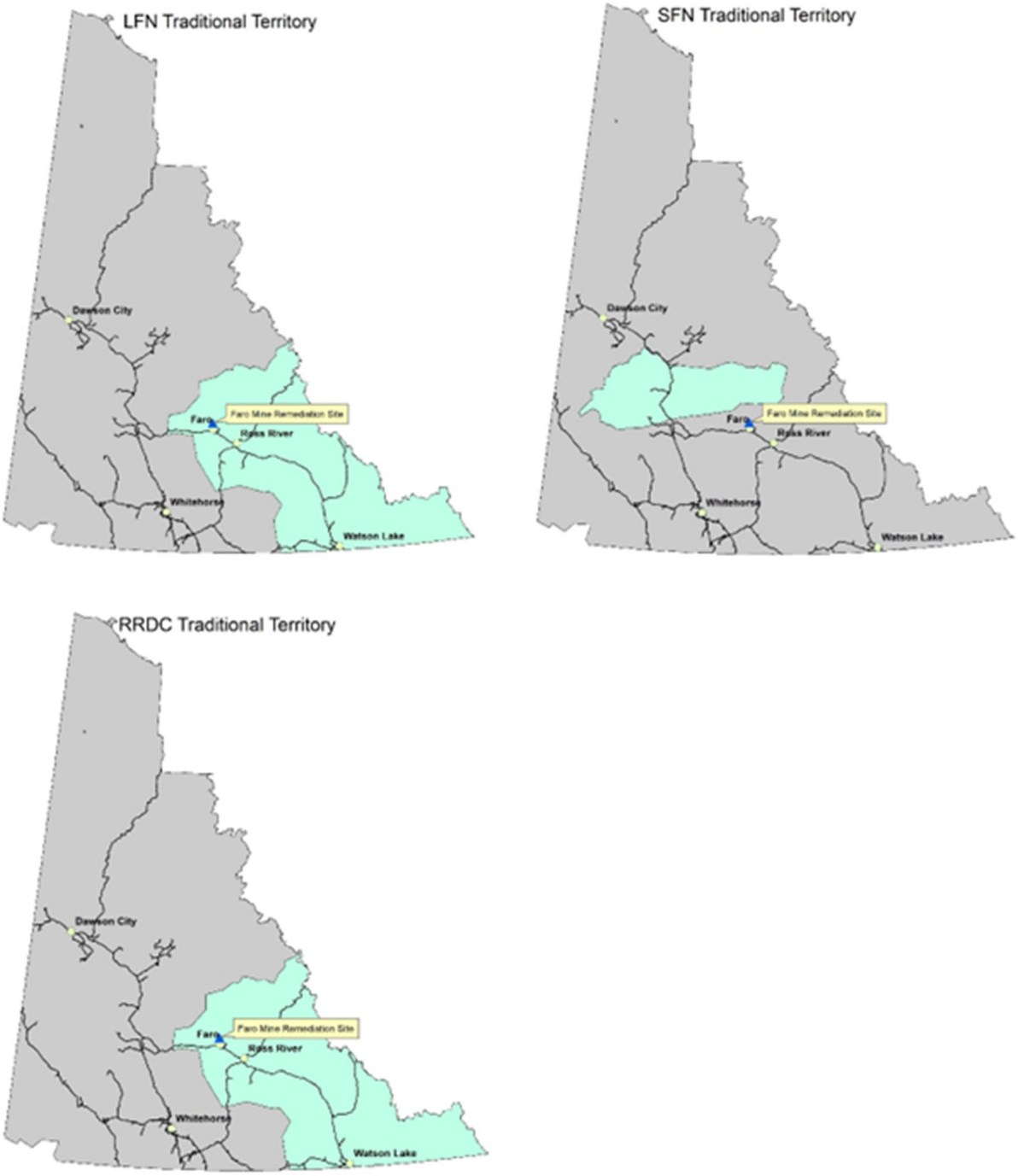

Figure 44: Traditional Territories of Affected First Nations

1.4.3 Project Layout

The Project consists of three main areas: the Faro Mine area, the Rose Creek tailings area, and the Vangorda Plateau mine area (Figure 55). The Faro Mine area includes the Faro pit, waste rock dumps, emergency tailings area, and the former milling facilities and associated infrastructure. The Rose Creek tailings area includes a series of dams and impoundments located below the mine in the Rose Creek valley. The Vangorda Plateau mine area includes the Grum overburden dump and the 10-kilometre haul road connecting the Faro Mine area to the Vangorda Plateau mine area.

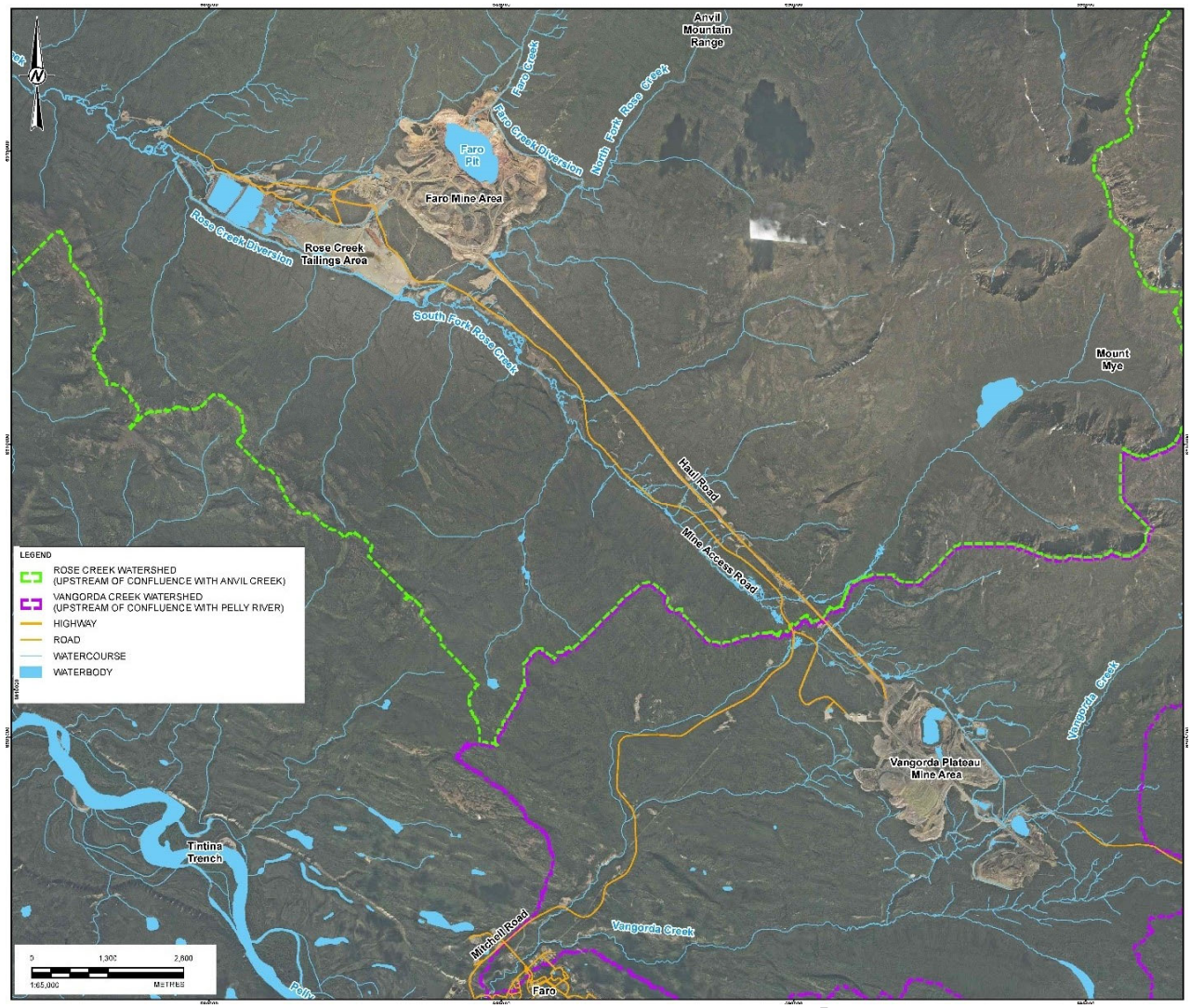

Figure 5: Project Layout and Watersheds. Figure Provided by Proponent.[7]

[7] YOR 2019-0149-0638

2 PROJECT SCOPE

The scope of the Project is the entire Project as described in Appendix R4-2-1 of the Proponent's response to Information Request (IR) no. 4[8] and as noted by the EC when the screening commenced.[9] Note that this is a revised project description (PD) from the one provided in the project proposal. Subsections revised in that document are included within Section 5.0 of the project proposal.

Additions were since made to the scope as a result of emergency works related to water management scheduled to be carried out by the Proponent under s. 49(1) of YESAA.[10,11]

In addition, emergency works pursuant to s. 49(1) of YESAA have been identified in IR No. 8[12] for the advancement of the PWTP. The specific activities and timelines related to its construction are identified in Table 1 below and throughout the project scope, as needed.

Table 1: Project Activities Related to the Advancement of the Construction of the Permanent Water Treatment Plant

Activities
Construction of the PWTP
Construction and operation of a concrete batch plant
Construction of the effluent discharge pipe from the PWTP
Targeted borrow development and use
Targeted excavation and relocation of contaminated soils in the PWTP and piping footprints
Construction and operation of PWTP access roads
Construction and operation of PWTP laydown areas
Moving and adding power lines and high-voltage infrastructure
Construction of term 1 camp
Operation of term 1 camp
PWTP septic system
PWTP water supply
Implementation of management plans and monitoring plans

[8] YOR 2019-0149-0742
[9] YOR 2019-0149-4011
[10] YOR 2019-0149-8843
[11] YOR 2019-0149-3070
[12] YOR 2019-0149-1350

2.1 Project Activities

Table 2 identifies the individual project components and lists the activities proposed for each component.

Table 2: Project Components and Description

Component	Description
	General Project
General Project	• The Project is located about 15 km north of the Town of Faro and 200 km northeast of the City of Whitehorse. • The project activities have been identified to occur over a 25-year time period. • Monitoring and maintenance will be required into perpetuity following the 25-year time period for the proposed remediation project activities.
	Stabilization, Landforming, and Covers at the Project Site
Faro Pit	• The construction of a safety berm around the pit perimeter to restrict inadvertent access.
Waste Rock Dumps	• Relocate approximately 500 000 m^3 of material to limit leaching from small waste rock dumps with high levels of contamination and to remove interference with current or planned non-contact surface water flow paths.[13] If additional similar materials are identified during later design stages or implementation, they will be relocated using the same approach. • Regrade internal slopes, most external slopes, and plateau areas to 3H:1V or flatter to facilitate cover construction and, in the case of external slopes, enhance slope stability. • Increase the footprint of the waste rock dumps by 44 ha due to pushing material down and flattening the slopes but maintaining areas of high contaminant sources within the waste rock dumps. • Cover waste rock to prevent direct contact with wildlife and people and to support development of vegetation, using very low infiltration, low infiltration, or isolation covers dependent on the contaminant source.

[13] YOR 2019-0149-0742

	• The cover design will be refined, as required, based on the results of the field trials and the cover performance monitoring. • Cover "medium-strength" contaminant sources (e.g., sulphide cells) with low infiltration covers to reduce the geochemical loading to the PWTP.[14] • Cover "high-strength" contaminant sources (e.g., consolidated low grade ore and oxide fines stockpiles) with very low infiltration covers to reduce the geochemical loading to the PWTP.[15]
Rose Creek Tailings Area	• Integrate the overall landforming plan with upgrades and expansion of the Rose Creek diversion to manage the water that comes in contact with the Rose Creek tailings area. • Excavate selected tailings and transfer them to the Rose Creek tailings area from the following areas to the extent that excavations meet acceptable thresholds for metals contamination: • The emergency tailings area; • The historical tailings spill area immediately downstream of the Cross Valley dam; • East of the original impoundment area, adjacent to the former copper and sulphate/bulk explosives plant site and North Fork Rose Creek diversion; and • Upstream of the overflow structure weir between the Rose Creek diversion channel and secondary dam. • Relocate small piles showing evidence of tailings outside of containment. • Upgrade the secondary dam to reduce possibility of dam failure due to weak foundation conditions in certain areas. • Upgrade the Intermediate dam to reduce possibility of dam failure due to weak foundation conditions in certain areas. • Drain the Cross Valley pond and remove sludge/contaminated sediment and transport to Faro pit for permanent storage. • Lower the Cross Valley dam. • Landform the Rose Creek tailings area to create swale channels to reduce percolation into the contact water system. • Provide covers to prevent contact by people and wildlife and to provide a substrate to support vegetation for use by people and wildlife, using a minimum 0.5-m layer of rockfill

[14] YOR 2019-0149-0742
[15] YOR 2019-0149-0742

	and/or fine materials (where required for trafficability) overlain by up to 1 m of compacted till and up to 1 m of uncompacted till as a growth medium.[16] Very low infiltration covers may also include a geomembrane protective layer with fine material (sand, tailings) required for bedding in addition to or in lieu of rockfill. In addition, existing site material may be used to cover tailings as fill. Depths of materials may vary slightly, depending on the materials available and the type of cover required.
Revegetation of Waste Rock Dumps and Rose Creek Tailings Area	• Revegetate covered waste rock dumps to reduce erosion and associated sediment yields by seeding erosion-prone areas, planting in areas where drainage is required for erosion control, and native seeding on plateau areas. • Revegetate the landform and covered tailings area by seeding (including native and non-native plants) and by planting in drainages where vegetation is relied on for erosion protection.
	Borrow Management and Remediation
Borrow Development	• Obtain four main material types: • Till/alluvium for covers, stabilizing, or general fill; • Granular soils for use as erosion protection in channels, filter or drain material, liner bedding, aggregate in concrete, road construction, or stabilizing fill; • Coarse rock fill for rip-rap erosion protection in channels and against wave action in ponds and road ballast; and • Organics to promote soil profile development, moisture retention, and vegetation growth.
Borrow Source Requirements	• Obtain up to approximately 17 mm^3 of material from 19 potential borrow source areas within a maximum disturbance footprint within and around the project site.[17] • Use of the Grum overburden dump as a potential alternative source of borrow material, if required. This dump is proposed to remain as an option. • Development of an additional borrow source area extending beyond the previously maximum disturbance footprint assessed in the project proposal (7.6 ha) 'Gabbro' (YOR

[16] YOR 2019-0149-0742
[17] YOR 2019-0149-0742

	2019-0149-3070, Figure 1: Regional Overview of the Faro Mine Remediation Project, YOR 2019-0149-0773 R9-1-1 Maximum disturbance Footprint & Borrow areas).[18]
Borrow Design and Construction	• Design and develop each borrow area specific to its location, type of material, and surrounding environment.[19] • Develop each borrow area with the following main activities: • Geochemical testing for suitability; • Clearing/grubbing vegetation and management of the spoils; • Processing of borrow materials as required to meet specifications; • Material handling and stockpiling; • Building and maintaining access roads; and • Water management during and after construction of each borrow source and reclamation.[20]
Borrow Reclamation	• Use and retention of overburden that is removed from borrow sources as covers and landforming at the project site. • Landform burrows to control erosion, promote vegetation growth, and allow for appropriate drainage. • Erosionally stable final surfaces (maximum slopes of 3H:1V, unless steeper slopes can be demonstrated to be erosionally stable). • Revegetate to stabilize slopes, where required. • Maintain upstream diversion, collection channels, and sediment trap until vegetation is established or erosion potential has decreased. • Use of phased excavation and reclamation, where practical. • Decommission access roads to borrow areas once no longer required.

[18] YOR 2019-0149-3070; YOR 2019-0149-0773
[19] YOR 2019-0149-9964
[20] YOR 2019-0149-9964

	Infrastructure for Management of Non-Contact Water
	Northeast Perimeter Management
Faro Creek Diversion[21]	• Refinement of the Faro Creek diversion area from 157.8 ha to 28.6 ha.[22] • Realign the Faro Creek diversion to convey clean water around the Faro pit to reduce the volume of treated water and reduce seepage losses that could potentially impact the stability of the Faro pit wall: • The realigned channel will provide protection to the creek against pit wall failure in the nearby Faro pit; • The realigned channel may include a geosynthetic (or other) liner to reduce seepage losses from the Faro Creek channel into the Faro pit to reduce a source of water that would require treatment; and • The channel will be protected for the 500-year flood and will have capacity to convey the probable maximum flood within its floodplain. • Construction of an access road for maintenance. • Refine the Faro Creek diversion from the proposed alignment in Appendix 5A of the project proposal[23] to move the inlet downstream so that it will intersect the original Faro Creek channel downstream of the current Faro Creek diversion. • Refine the Faro Creek diversion by moving the excavated segment of the downstream end of the proposed upgrade to a lower elevation.
North Fork Rose Creek Diversion and Channel Realignment[24,25] Items relevant to s 42(1) *YESAA*	• Connect the remedial works with the realigned North Fork Rose Creek. • Realignment, including contact water collection from the former North Fork Rose Creek was carried out as part of emergency works.[26] • Grade the area between the North Fork Rose Creek diversion and the toe of the re-sloped waste rock (upstream of the haul road) to create a positive gradient that conveys surface runoff toward the North Fork Rose Creek diversion or other non-contact water channel.

[21] YOR 2019-0149-0742
[22] YOR 2019-0149-3070
[23] YOR 2019-0149-8532
[24] YOR 2019-0149-0742
[25] YOR 2019-0149-8532
[26] YOR 2019-0149-1350

	• Provide a platform for installing contact water management infrastructure and a floodplain for flows exceeding the capacity of the North Fork Rose Creek diversion.
Rose Creek Confluence Area[27]	• Decommission the historic North Fork diversion and convey all flows along original North Fork Rose Creek alignment (including through historical infiltration ponds) to provide a more stable channel without sharp (~90°) bends and to separate the creek from the southeast limb of the secondary dam. • Retain pumphouse pond and pumphouse pond dam to maintain the current groundwater gradient.
	South Perimeter Water Management
Rose Creek Diversion Channel[28]	• Refinement of the Rose Creek diversion channel area from 65.8 ha to 69.5 ha as per Figure 3 of the NCSB Faro *YESAA* scope of Project.[29] • Increase the capacity of the Rose Creek diversion to convey the probable maximum flood event by widening the current alignment and increasing the gradient. • Refinement to eliminate the Rose Creek diversion channel overflow channel that was in the original project proposal.[30] • Construct a primary channel to convey typical flow within the channel and to maintain an adequate flow depth for fish passage and temperature control. • Realign the furthest downstream reach of the channel upgrade to roughly follow the alignment of the existing Rose Creek diversion channel. • Armour the channel for erosion protection. • Deepen the channel in the reach adjacent to the Intermediate and Cross Valley dams to position the channel entirely within bedrock. • Construct a dyke in the right bank near the intermediate impoundment to provide a portion of the design capacity, while limiting the amount of widening required for the channel. • Extend the channel alignment and outlet beyond the last line of the Down Valley seepage interception system.

[27] YOR 2019-0149-0742
[28] YOR 2019-0149-0742
[29] YOR 2019-0149-3070
[30] YOR 2019-0149-0742

	Northwest Perimeter Management
North Wall Interceptor Ditch	• Maintain the existing North wall interceptor ditch during the active remediation period to convey water during construction for the West tailings channel, intermediate dam spillway, and down valley diversion. • Breach the North Wall Interceptor Ditch near the end of active remediation to re-establish Lower Guardhouse Creek.
Upper Guardhouse Creek	• Maintain, with no conveyance upgrades as it currently can convey the probable maximum flood.
East and West Tailings Channels	• Design the West tailings channel to convey the 200-year peak flow plus 0.3 m of freeboard. • The surrounding landform will have the capacity to convey the probable maximum flood. • The West tailings channel will collect surface runoff from the catchment area downgradient of the North wall interceptor ditch and emergency tailings area and will receive flows from the West waste rock channel and will convey flows to the Intermediate dam spillway. • The East tailings channel will collect surface runoff flows from the area south of the main dump and convey that runoff to the North Fork Rose Creek. • All primary collection channels collecting surface runoff from disturbed areas (i.e., waste rock cover and borrow areas) will flow into control ponds prior to discharging to the non-contact downstream channels.
Intermediate Dam Spillway	• The Intermediate dam spillway will have the capacity and erosion protection to pass the probable maximum flood.
Down Valley Diversion[31]	• Design the Down Valley Diversion for erosion protection and with a capacity to convey the 200-year peak flow, including a minimum 0.3 m freeboard over the design storm. • Align the furthest downstream segment of the channel to avoid traversing the Down Valley area (where key seepage interception systems will be constructed and operated) by maintaining the channel alignment at a uniform slope downgradient of where the channel passes the Intermediate dam, transitioning to a steeper cascading reach excavated into bedrock downgradient of the Down Valley seepage interception system and then transitioning to a flatter slope for the final reach, including the outlet to Rose Creek.

[31] YOR 2019-0149-0742

	Infrastructure for Management of Contact Water
Groundwater Capture Systems	• Installation or upgrade and operate the seepage interception systems: Down Valley, emergency tailings area, and North Fork Rose Creek and Zone 2 seepage interception systems. • Each interception system will have multiple lines of capture, (i.e., multiple capture systems in each location), except for the Zone 2 system; • The interception systems are intended to capture most of the contaminated groundwater, such that the receiving environment is protected; • The Down Valley seepage interception system will capture the contaminant load in the Rose Creek aquifer in the Down Valley area and limit discharge contaminants from the Rose Creek aquifer to Rose Creek; • The emergency tailings area seepage interception system will decrease the load to the Down Valley seepage interception system; and • The North Fork Rose Creek seepage interception system will continue localized capture of high-strength sources. • Continue to pump the Zone 2 pit seepage interception system through active remediation and potentially through operations and maintenance. May require upgrades following landforming to maintain Zone 2 pit water level below the spill point elevation. • Place and upgrade capture systems as required for the very long-term (i.e., >500 years).
Intermediate Tailings Sump	• Infill the Intermediate Pond with coarse rock so that tailings landforming and cover material can be placed up to the Intermediate dam. • Construct a sump to keep the contact water level below the base of the tailings cover and to collect water that infiltrates the tailings cover and contacts tailings.
Contact Water Conveyance System	• Operate year-round the contact water conveyance system consisting of pipelines, sumps, and a head tank, if required, installed at the high point between the PWTP and the Faro pit. • Transfer of water through the contact water conveyance system between contact water collection points and the Faro pit, and from the Faro pit to the PWTP.
Faro Pit	• The Faro pit will act as a surge pond for the PWTP and store contact water during periods when the PWTP is non-operational. • Serves as the permanent repository for water treatment sludge from the PWTP, as sludge will be pumped for long-term storage at depth (Faro pit has hundreds of years of capacity).

Water Treatment	• The interim water treatment system may be in place, dependent on the timing of receipt of a water licence. Therefore, the current interim water treatment system may continue to operate in early active remediation. While some remedial works would start, any works associated with increasing the amount of contact water requiring treatment would likely be delayed, dependent on water balance and timing of the installation of the PWTP. • The interim water treatment plant uses a lime precipitate technology and is designed for a rated treatment capacity of 33 megalitres per day (6 000 USgpm). • The interim water treatment plant will seasonally discharge water. • The PWTP will be a High-Density Sludge (HDS) lime treatment plant, with major components including a lime silo, two neutralization tanks, a flocculent dosing system, and a clarifier. • The PWTP average freshwater demand will be approximately 1 196 m^3/d, with a peak of 1 405 m^3/d (YOR 2019-0149-3070). • Water may be sourced from groundwater, Faro Creek, Guardhouse Creek, Next Creek, and Rose Creek (and tributaries) with final water source(s) being determined as the project design is refined. • Additional surface requirements of 600 m^3/d are anticipated in the non-discharge season for general operations of the PWTP.[32] • It is anticipated that a portion of this demand will be sourced from groundwater, but the volume is unknown. • Rose Creek downstream of the confluence (RC-SW001) would have sufficient supply with the withdrawals being within the acceptable range of Ecological Instream Flow Needs (DFO, 2013). The reduction in flows from water withdrawal does not change the total effluent volume that can be discharged annually. • Annual treatment volume is predicted to be 9 800 000 m^3/year, which includes a 25 % contingency. • Operation of the PWTP. • Continuous monitoring of effluent quality and adjustments to effluent flow rates (volumes), if required, to protect the receiving environment water quality. • Discharge from the interim water treatment plant and PWTP is seasonal such that conditions allow effluent quality standards to be met.

[32] YOR 2019-0149-3070

	• Discharge of treated effluent to Rose Creek at or downstream of the Rose Creek diversion channel. • Design the PWTP discharge with an energy dissipation system to prevent creek erosion. • Direct effluent back to the Faro pit if effluent water quality does not meet operational targets. • Sludge production from the PWTP is estimated to be 5 200 m^3 to 5 400 m^3 per year with a density of 25 % to 30 % solids by weight. • Pump sludge to the Faro pit for storage at depth. • Water treatment is expected to be required for the very long-term (i.e., >500 years).
Rose Creek Tailings Area	• Direct most surface runoff from the covered tailings surface towards the Rose Creek diversion channel using the new watershed divide. • Direct surface water runoff north of the watershed divide towards the upgraded Intermediate dam spillway. • Construct control ponds to remove sediment prior to discharge into the Rose Creek diversion channel or Intermediate dam spillway. The number of control ponds required on the Rose Creek tailings area will be determined as design advances with the goal of limiting the movement of water across the Rose Creek tailings area. • Backfill the Intermediate Pond with rock to create a subsurface sump to capture water that contacts the tailings.
Project Site	• Manage surface runoff through conveyance channels that provide erosion protection and that include control ponds upstream of points of discharge to the downstream environment. • Direct surface water runoff through channels to control ponds where it will be monitored and either discharged or pumped back to the Faro pit for treatment.
	Demolition and Waste Management – Approach
Buildings, Equipment, and Facilities	• Demolish site buildings that do not have a continuing function. • Remove hazardous materials and potential contaminants from the buildings prior to demolition, where safe and practical.
Historical Pipelines and Utilities (Buried and Above-ground)	• Determine site-specific approach based on location, potential contaminants, and condition of the pipelines and utilities.

	• Remove historical pipelines and utilities following standard construction and abatement practices with emphasis on worker safety and environmental protection.
Historical Disturbances (e.g., borrow sources and access roads)	• Assess the historical disturbance areas to determine the current conditions of these areas. • Apply a revegetation strategy based on current conditions and growth potential.
Hazardous Waste	• Remove, handle, and dispose of hazardous waste from the buildings according to industry best practices and Yukon regulations.
Landfill	• Use of the existing landfill for the non-hazardous waste landfill. • Use of landfill for non-hazardous asbestos as per Government of Yukon 2020 Designated Materials Regulations for asbestos.[33]
Contaminated Surficial Materials	• Manage metal contamination in the mill area in place or consolidate adjacent to the Faro pit in waste rock dumps and capped with a very low infiltration cover. • Consolidate or cover in place the petroleum hydrocarbon contaminated soils in the mill area and the emergency tailings area. • Excavate the exposed tailings outside of the containment of the Rose Creek tailings area using truck and shovel methods and transfer to the Rose Creek tailings area. This includes the emergency tailings area and Down Valley area, East of the original impoundment and adjacent to the Rose Creek diversion channel. Dewatering may be required when excavating tailings. • As investigations advance, if metal concentrations in undisturbed areas are deemed to pose an unacceptable health risk to wildlife and/or people, based on additional evaluation of human or ecological health risks, mitigation would be implemented based on the findings, including administrative controls (i.e., use restrictions such as exclusion areas with signage or fences).[34]

[33] Government of Yukon, *Asbestos Disposal*, 2020, https://yukon.ca/sites/yukon.ca/files/env/env-asbestos-disposal.pdf.
[34] Contaminant monitoring program is included as part of the Terrestrial Effects Management and Monitoring Program. It is anticipated that if results of this monitoring or other soil monitoring conducted at site during remediation show concentrations outside of the range used in the risk assessment, then an evaluation of ecological and human health risks based on the updated data would be completed.

	Care and Maintenance
Management of Contaminated Water	• Monitor, treat, and manage contaminated water though the operation, maintenance, repair, and upgrading, as required, of major water collection, storage, conveyance, and treatment systems, including seasonal lime-based water treatment plants. • Potential commissioning and operation of temporary water treatment plants and discharge of compliant water to the receiving environment. • Manage water elevations of the Faro pit to expedite reduction of contaminated water inventories to target levels while protecting the stability of the pit walls. • Manage the elevations of the Intermediate Pond (contaminated water) and Cross Valley pond in conjunction with the elevation of the Faro pit to reduce contaminated water inventories to target levels while protecting the stability of the Intermediate dam and Cross Valley dam. • Manage contact water infrastructure for construction and for final remediation component as they are commissioned through active remediation.
Management of Non-Contact Water	• Inspect, monitor, operate, field maintain and repair of all engineered non-contact water structures and systems including diversions, drop structures, storage ponds, ditches, other permanent conveyance structures, piping, and culverts on an approved schedule to ensure they perform as intended in all seasons and conditions, including freshet • Monitor, field maintain, and repair as required of selected natural non-contact water systems within the site, including creeks, ponds, and wetlands, to ensure that natural clean water systems remain uncontaminated and that site operations are not adversely affected by any upsets that may occur in these systems. • Inspect, monitor, operate, field maintain and repair of certain critical non-contact water diversion systems, which include the Rose Creek diversion channel, and the Faro Creek diversion channel. • Provision of emergency preparedness and response services related to the management of clean water. • Periodic mobilization, installation, inspection, monitoring, operation, general field maintenance, decommissioning, and demobilization of seasonal or other non-permanent pumping and conveyance systems, including pumps, generators, heaters, pipes, and hoses.

	• Provision of on-site laboratory analysis in support of contaminated water management services, including operating and maintaining the site lab to Canadian Association for Laboratory Accreditation proficiency requirements for a certified analytical laboratory.
Other Activities	• Engineering site investigations to support the advancement of the project design. • Earthworks. • Potential installation of additional groundwater seepage interceptions systems. • Drill/test investigations of groundwater and/or geotechnical stability, including clearing of small drill pads or digging of small test pits, as required. • Use of existing roads and development of small access roads that may be required to reach areas where drilling, testing, or maintenance is required. • Maintain and perform minor repairs on road surfaces to keep roads in a condition suitable for travel that is commensurate with the frequency of use and types of vehicles commonly used on all roads that are needed for conducting the activities, including the maintenance of roadside safety berms. • Use of existing temporary buildings on-site. • Use of temporary camps, as required, until construction camp is established. • Management of waste, including operating and maintaining the sludge conveyance systems from water treatment facility to the designated storage area, consolidating waste oil from various sources on-site to be used in waste oil heaters, and managing solid waste in accordance with relevant permits. • Disposal of excess used oil in an approved facility if the on-site storage capacity of used oil is reached. • Use of existing material laydown areas and borrow areas. • Plan, schedule, and perform preventative maintenance and minor repair activities at the site on the following: • Real property (e.g., land, buildings, facilities); • Site infrastructure (e.g., dams, electrical systems, piping, ditches, road, and culverts); • Equipment (e.g., light-duty, medium-duty, and heavy-duty equipment, generators, mobile electrical equipment, and other equipment); and • Supplies (e.g., parts, materials, consumables, and other supplies). • Use of power sourced from existing power lines. • Operate, maintain, and perform minor repairs on the electrical distribution system, as required, to carry out activities.

	• Relocation of a substation and extension of the main transmission power to the new substation. • Construction of a new electrical power distribution system, including overhead lines, communication lines, and back power to the water treatment plants and water pumping system. • Operate, maintain, and perform minor repairs on the site-wide communications system as required, including telephone, internet, and radio communications systems. • Maintain and perform minor repairs on the potable water system to keep in good working order to provide clean/potable water distribution to site staff, visitors, and employees. • Maintain and perform minor repairs on the sewage/septic system in good working order, as required, to carry out the work. • Treat sewage at multiple locations such as the PWTP, main construction manager office, and accommodation camp to avoid pumping sewage around the site to a single location. • Operate, maintain, and perform minor repairs on the fuel distribution system as required to carry out the activities. • Remediate spills of fuel or lubricants as required by relevant and appropriate regulations and in accordance with the pertinent sections of the Spill Contingency Plan. • Implement the following monitoring programs: • Hazards monitoring (geotechnical), including the implementation of any recommendations from the geotechnical consultants' inspections; • Environmental monitoring, including monitoring of surface water, groundwater, and seeps, and provision of supplies and equipment, maintenance of monitoring stations, measurement of water chemistry and flows/levels needed, and use of helicopters or other aircraft; • General site conditions monitoring, including meteorological conditions and the operations and maintenance of meteorological stations, pit and ponds water levels, dust monitoring, wildlife incidental observations, and snow survey; and • Performance monitoring of constructed remedial works and mitigation measures to determine their effectiveness, to inform decisions regarding design adaptations, repairs, or operational changes, and to provide useful data for future remedial design efforts.

	• Implement plans included in the Environmental and Socio-Economic Management and Monitoring Framework[35]and/or Environmental Management Plans outlined in contractual arrangements. • Maintain year-round, 24 hour/day, 7 day/week site security and access control for the site to protect site assets and the public. • Maintain health and safety in compliance with the Yukon's *Occupational Health and Safety Act*. • Address issues that arise related to the ongoing protection of the receiving environment outside of the areas where construction activities related to active remediation are occurring.
	Active Remediation
Schedule	Active remediation is anticipated to take approximately 12 to 15 years, including ramp up and ramp down.[36] During active remediation, care and maintenance activities will continue until construction activities are complete. The high-priority remediation activities include: • Constructing and operating the PWTP; • Installing the Down Valley seepage interception system; • Completing the Rose Creek diversion channel probable maximum flood upgrade; • Installing North Fork Rose Creek seepage interception system; • Constructing the Faro Creek diversion channel; and • Continuing with care and maintenance.
	Supporting Infrastructure
Buildings, Pipes, Electricity, and Communications	• Supporting infrastructure, including buildings, pumps and pipelines, communications infrastructure, energy supply, and access. Utilization or re-purposing of the existing buildings and facilities will be limited by their structural condition and contamination. New buildings that require construction include the workforce construction camp and PWTP. • Wherever practical, site development infrastructure required to support active remediation will also be used for operations and maintenance. Pumps and pipelines will be sited to minimize relocation requirements. The existing electrical system will require modification,

[35] YOR 2019-0149-9964
[36] YOR 2019-0149-0742

	particularly during demolition activities, commissioning of the PWTP, and while relocating pumps, pipelines, and other site infrastructure. • Communications are required for active remediation and operations and maintenance. The focus of the communications system is to develop an adaptive system to support telephones, internet, two-way radios, and cellular. • Construct, use, and operate a concrete batch plant to produce up to 30 000 m^3 of concrete over a five-month period from June to October 2023 to support the construction of the PWTP.[37] The plant will be constructed within 1 km of the PWTP and within the maximum disturbance footprint. Power will be generated for the plant using a diesel generator and heat inputs to concrete using a diesel boiler and diesel-powered equipment for the handling of materials. • The use of the concrete batch plant following the completion of the PWTP will be limited to intermittent concrete production for general care and maintenance activities, implementation of remedial designs, and potential engineering structures in response to unexpected outcomes triggered through the Adaptive Management Plan (AMP).[38]
Site Preparation	• General laydown areas for storage of construction materials will be required. The project site is a highly disturbed area, and the laydown areas will be within the currently disturbed areas and within the footprint of potential borrow sources. Exact locations will vary as landforming is completed.
Fuel, Hazardous Materials, and Explosives Management	• During active remediation, the Project is estimated to require a total of 45.2 Megaliters (ML of fuel, representing an annual fuel use of 3.1 ML. • During active remediation, temporary explosives storage magazines will be required. Siting explosives and detonating supplies will follow Canadian regulations, which include separation distances between the magazine location and infrastructure and travel corridors for people. • Removal of hazardous waste from buildings will be handled and disposed of according to industry best practices and applicable regulations. Hazardous material management is described in the Waste Management Plan.[39]

[37] YOR 2019-0149-3070
[38] YOR 2019-0149-3070
[39] YOR 2019-0149-9964

Item relevant to s. 42(1) YESAA	• Additional diesel fuel volumes as required to operate concrete batch plant, boiler, and diesel-powered equipment.
Water Use	• Water sources include nearby watercourse and water bodies and collected groundwater, as appropriate for road watering and potable water. • Use of a fresh water supply will follow Fisheries and Oceans Canada allowable rate and timing of withdrawals from the point of supply. • Fresh water supply may be sourced from Guardhouse Creek and Rose Creek; however, the final water source will be determined as the design is refined. • Water used for dust management will be sourced from local surface water, groundwater, or treated effluent.
Access, Roads, and Transportation	• Estimated annual truck and crew bus traffic on the site access road of 247 vehicles annually. • Haul roads to borrow areas/concrete plant/PWTP, temporary bridge(s) and culverts, and accesses to waste rock dump grading and cover areas will be required for short durations at various stages of active remediation. • Use of up to 10 concrete trucks during the construction of the concrete batch plant. • The approach to roads that are not required from remediation at the project site is as follows: • Roads needed for access will be left or ungraded to maintain access; • Roads or pads that are vegetated or in the process of naturally reclaiming will be left to naturally revegetate; and • Roads that are no longer needed and have do not have natural grown vegetation will be scarified, de-compacted, and seeded following a site-wide vegetation strategy. • Construction and use of roads and access during active remediation and operations and maintenance to monitor and maintain contact and non-contact water management infrastructure as well as to monitor remediated waste rock dumps and the Rose Creek tailings facility. • Construction and use of temporary and permanent watercourse crossings. • During the construction of the Rose Creek diversion channel, temporary crossings will be required to cross the diversion channel throughout the construction period.

	• Construction of temporary or permanent crossing structures, such as bridges and culverts, will be designed to meet applicable regulations, following best engineering practices. The proposed final road locations are shown in updated Figure 5.5-2 in response to IR No.4.[40]
Workforce	• The on-roll workforce average required for active remediation is 156 people, assuming a two-and-two rotation. • Off-site staff required for the Project include general management, project management, engineering review, and regulatory oversight. In addition to the requirements for implementation of the remediation plan, care and maintenance activities will be required during active remediation and the workforce is expected to be similar to the care and maintenance workforce. • Use of a construction camp to house the workers. The number of workers on-site will fluctuate based on the sequencing of active remediation and the potential for overlap of intensive tasks. To accommodate variability, the camp is sized to house up to 304 people (phased build-out may be considered, in which case initial camp capacity would be lower). • Construction of temporary utilities such as water, sewer, and power to support the camp.[41] The camp will be located near in the Freshwater Supply Reservoir Area. • Workforce requirements for active remediation: • Direct workforce: driller/blaster; foreman; heavy equipment operator; labourers; linesperson; trades; truck driver; and care and maintenance workforce. • Indirect on-site workforce: administration; environmental monitor; PWTP operators; superintendents; engineering technician; surveyors; heavy equipment mechanic; heavy equipment servicer; health and safety specialist; and camp staff. • Off-site workforce: general management; project management; engineering review; and regulatory oversight.
Domestic Waste	• Storage of domestic waste generated by the camp and the on-site workforce at an on-site landfill, the Town of Faro landfill, and/or incinerated (i.e., non-hazardous, combustible waste). • Disposal of ashes resulting from incineration at an on-site landfill.

[40] YOR 2019-0149-0742
[41] YOR 2019-0149-0742, YOR 2019-0149-8532

Public Access Through Mine Site to Public Lands	• Retention or replacement of public roadside pull-outs at trail heads located on public access roads. • Reconstitution of controls where institutional controls such as fences and gates exist. • Development of new trails to connect impacted trail segments where borrow area developments impact the connectivity of existing trails. • Construction of new trails where the deactivation of haul roads impacts public access trails.
	Water Management
General	• Contact and non-contact water will be managed separately to minimize volume of contact water collected on the project site. • Collection and treatment of impacted water that would otherwise impair water quality of the receiving environment and discharging of treated effluent. • Minimizing erosion of natural soils and closure infrastructure to reduce suspended solid loading in surface runoff discharge. • Water for the Project has been classified into three types[42] and each water type will be managed separately. • Non-contact water will be diverted around mine facilities and closure activities to reduce the need for water treatment, when possible. • Contact water will be collected and pumped to the Faro pit for storage and subsequent treatment. • High-sediment water classification is required because erosion potential will be high at the site. Erosion potential is high based on slopes of the waste rock dumps and planned activities, which include vegetation clearing and topsoil stripping, grading and excavations, stockpiling of material, and construction of infrastructure (e.g., access roads and channels).
Non-Contact Water	• Diversion of non-contact water that is suitable for direct release to environment off-site using diversion channels.
High-Sediment Water	• Collection and conveyance of high-sediment water that is suitable for direct release to environment following settling of total suspended solids to control ponds using collection channels.

[42] YOR 2019-0149-0742

	• Treatment for total suspended solids and discharging to the receiving environment if it meets relevant standards.
Contact Water	• Collection and conveyance of contact water that is not suitable for release to environment without treatment at the PWTP to control ponds and/or the Faro pit for storage prior to treatment. • Treatment and discharge to the receiving environment once it meets relevant standards.
Diversion Channels	• Diversion of non-contact water away from mine infrastructure and working areas.
Collection Channels	• Interception of surface runoff or emergent seepage flows from disturbed areas (e.g., toe of regraded waste rock).
Control Ponds	• Collection of non-contact water from channels on the remediated waste rock dump and Rose Creek tailings area. Ponds will be equipped with pump-back system to either the Faro pit or other contact water system component, in the event the water is not suitable for direct discharge to environment. (This is anticipated during construction activities and when these channels and control ponds are initially commissioned and potentially during large precipitation events or during freshet.) However, when the water meets discharge criteria, it will be directly discharged to the environment.
Seepage Interception Systems	• Collection of contact water from impacted groundwater in locations to limit off-site release of contact water to receiving environment.
Rockfill Sumps	• Interception of contact water from seepage locations and conveyance to a contact water storage facility (i.e., the Faro pit) or seepage interception facility, typically while isolating from surface runoff through a low-permeability cover.
	Operations and Maintenance
General Activities	• Monitor, treat, and manage contact water, including the operation, maintenance, repair, and upgrading, as required, of major water collection, storage, conveyance, and treatment systems, as required, over the long-term.[43] • Management of water levels in permanent water management infrastructure.

[43] YOR 2019- 0149-0742

	• Inspect, monitor, operate, conduct field maintenance, and repair all engineered permanent non-contact water structures and systems including diversions and control ponds. • Removal of brush on/near infrastructure as routine maintenance. • Geotechnical inspection, monitoring, and maintenance of the Rose Creek tailings facility, waste rock dumps, dykes, and dams. • Inspect, use, maintain, and repair permanent access roads and associated watercourse crossings, if required.[44] • Operate, maintain, and perform repairs on the electrical distribution system, as required, to carry out activities. • Plan, schedule, and perform preventative maintenance and repair activities at the site on real property, permanent site infrastructure, equipment, and supplies, including covers on the waste rock dumps and tailings facility. • Maintain health and safety in compliance with the Yukon's *Occupational Health and Safety Act*. • Implement engineered adaptive management measures.[45] • Implement the Project AMP.[46]
Inspection, Maintenance, and Monitoring	• Once a predictable steady state is achieved for all components, activities will be limited to management of contact water and general site maintenance. The site will include infrastructure typically found at small industrial sites, including electrical/mechanical systems, power infrastructure, environmental monitoring infrastructure, site access, on-site network of service roads, and support facilities. In addition, the PWTP, associated water conveyance systems, and seepage interception systems will also remain in place. This infrastructure will require ongoing maintenance. Inspections and maintenance requirements will continue on dams, water conveyance channels, landforms, and covers. Inspections will be a combination of regular routine inspections and scheduled geotechnical inspections by qualified professional engineers. Where inspections identify a need, maintenance works will be undertaken. • Performance monitoring against targets, with application of adaptive management (if required), are key components of the Project, which will be initiated in the early stages of active remediation and continue through operations and maintenance. Project success and

[44] YOR 2019-0149-0742
[45] YOR 2019- 0149-0742, YOR 2019-0149-8532
[46] YOR 2019-0149-1347

	ability to achieve the Project's overarching objectives are based on three key criteria for performance: chemical, physical, and reclamation performance. [47] • Chemical monitoring is completed through the Performance Monitoring Plan[48] and the Aquatic Effects Monitoring Plan.[49] • Chemical, physical, and reclamation performance are managed through either the Faro Mine Remediation Plan or the AMP.[50] Socio-economic performance and monitoring to maximize benefits are addressed as part of the Socio-Economic Management and Monitoring Plan.[51] More detailed performance monitoring requirements will be developed in further stages of engineering design. If expected performance is not achieved, action will be required to confirm that component-specific objectives and the five overarching objectives are met. Figure 5.6-3 in response to IR No. 4[52] provides a framework for response.
Contact Water Management	• Collection and pumping contact water from seepage interception systems and sumps. • Operation of the X13 seepage interception system. • Potential installation and operation of additional extraction wells downgradient of proposed Down Valley seepage interception system. • Storage of contact water in the Faro pit. • Treatment of water during the open-water season. • Storage of high-density sludge from the water treatment process in the Faro pit. • Discharge of treated effluent into Rose Creek downstream of the Down Valley seepage interceptor system in the open-water season. • Monitoring of: • PWTP influent and effluent; • Sludge; • Groundwater capture systems; • Surface runoff from the covered tailings and waste rock dumps; and • Control ponds.

[47] YOR 2019-0149-0742
[48] YOR 2019-0149-9964
[49] YOR 2019-0149-9964
[50] YOR 2019-0149-9964, YOR 2019-0149-1347
[51] YOR 2019-0149-9964
[52] YOR 2019-0149-0742

	• Ongoing operation, maintenance, and minor repairs: • To the PWTP; • On pumps and the conveyance system; and • On the control ponds.
	Non-Contact Water Management
Non-Contact Water Management	• Operations and maintenance of non-contact water management illustrated in Figure 5.6-2 in response to IR No. 4.[53] The Water Management Plan[54] provides additional details on non-contact water management. During this phase, non-contact water management will primarily consist of monitoring and general maintenance activities, including erosion control and channel maintenance, long-term monitoring of water quality, and adaptive management if seepage bypass is identified. • In the event contact water enters the non-contact water channels as seepage bypass, adaptive management may include additional monitoring to confirm extent and magnitude, installation of additional seepage interception systems, additional diversions, and/or location-specific capture and treatment[55] to avoid impacts to the receiving environment.
Faro Mine Area	• Once the waste rock covers and vegetation are established and surface water runoff meets discharge criteria, the overall landform will then convey runoff east or west and limit direct surface runoff into the Faro pit. • Primary channels and associated erosion protection on the waste rock dumps will be sized for the 500-year peak flow. • Surface grading allows for the conveyance of the probable maximum flood through the east and west channel alignments. A control pond will be retained as a pond feature prior to allowing water from the west waste rock channel to enter the non-contact Lower Guardhouse Creek. • The primary water conveyance channels will be armoured with rip rap or protected by appropriate vegetation if peak-flow velocities are sufficiently low. • Secondary and tertiary drainage features will be designed to be consistent with natural analogues to limit erosion and convey flows to the primary channel conveyance network.

[53] YOR 2019-0149-0742
[54] YOR 2019-0149-9964
[55] YOR 2019-0149-9964

	The intent of the secondary and tertiary channels is to create small drainage networks that enable the use of vegetation as erosion protection within the channels and limit the requirement for armoured rip rap.
Rose Creek Tailings Area	• The operations and maintenance phase of the surface water management strategy for the landformed and covered tailings surface is integrated with the design of the upgraded Rose Creek diversion channel. • Surface runoff flows from the covered surfaces of the original and secondary impoundment areas will drain towards the Rose Creek diversion channel, and flows generated north of the catchment divide created by landforming will be conveyed towards the Intermediate dam spillway. • Control ponds constructed on the tailings landform[56] to control sediment loads prior to discharging to Rose Creek. The intent is to limit infiltration by limiting the length of channels on the Rose Creek tailings area and it is anticipated that two to three control ponds would be required on the Rose Creek tailings area. Vegetation and potentially rip rap will be used as erosion protection.
	Adaptive Management Plan
Adaptive Management Plan	• The purpose of the AMP is to use water-monitoring results to inform how the site is managed and to check that protection goals for each water body identified in the AMP are met by designing action levels to trigger a management response to prevent environmental changes that threaten the protection goals.[57] • AMP applies to the active remediation and operations and maintenance phases of the Project and provides a framework for responding to events and conditions beyond those predicted or expected for the Project. This includes an outline of a phased adaptive approach to implement mitigation measures when timing or occurrence of an event is uncertain, and identifying types of actions that must be taken to gather information and respond appropriately if an unanticipated or unpredictable environmental circumstance occurred, or if the project did not perform as necessary to meet Project objective . The scope of the AMP includes the following areas and associated activities:[58]

[56] YOR 2019-0149-0742
[57] YOR 2019-0149-9484
[58] YOR 2019-0149-1347

	• Groundwater quality on-site and its potential influence on surface water quality through seepage; • Surface water quality to evaluate effectiveness of capture, and potential groundwater quality changes in the North Fork Rose Creek and Down Valley seepage interception system areas and in the receiving environment along North Fork Rose Creek, the Rose Creek diversion, and Rose Creek downstream of the project site; • Effectiveness of water treatment for maintaining conditions in the receiving environment; • Cumulative effects of project water quality in Rose Creek; • Cumulative effects of care and maintenance of the Vangorda Plateau mine area on the Pelly River; and • Water quality in the far-downstream receiving environment (Anvil Creek, Pelly River). • Adaptive management monitoring will be conducted to protect against multiple types of uncertainties as outlined in specific monitoring/management plans for the Project, with the AMP primarily focused on water quality related uncertainties.[59] • Monitoring results will allow for development and implementation of additional mitigation measures, if necessary, and is part of the adaptive management framework. • AMP will compare monthly monitoring data to project AMP triggers with the data reported quarterly and annual. • The AMP is expected to be updated every three years or to address new or emerging concerns. • Details of the monitoring plan(s) for the Project will be fully developed as the Project progresses and will support the AMP.

[59] YOR 2019-0149-1347

3 ASSESSMENT REQUIREMENTS

3.1 Legislative Context

A project is required to be submitted to the EC when it involves an activity listed in Schedule 3 of the *Assessable Activities, Exceptions*, *and Executive Committee Project Regulations*. The project activity that triggers an EC screening is:

Item 3	**(the) construction, decommissioning, or abandonment of** **a metal mine, other than a gold mine, with an ore production capacity of 1 500 t/day or more**

3.2 Decision Bodies

To conclude its role in the screening process, the EC makes its final recommendation, including any required mitigation measures, to Decision Bodies. Decision Bodies complete the assessment by issuing a Decision Document accepting, varying, or rejecting the recommendation.

Generally, the authorizations or permissions required for proposed scheduled activities determine the Decision Bodies for an assessment. Based on the proposed scheduled activities, there are four Decision Bodies for this project: Fisheries and Oceans Canada (DFO), Natural Resources Canada (NRCan), CIRNAC, and YG.

Table 3 lists the Decision Bodies and the reason for which the Decision Body is identified as such.

Table 3: Decision Bodies Identified for the Project

Crown-Indigenous Relations and Northern Affairs Canada	
Scheduled Activity	**Authorization**
Any federal agency that is a Proponent of the Project.	*Section 47(2)(a) of* YESAA
Fisheries and Oceans Canada	
Scheduled Activity	**Authorization**
Schedule 1, part 10, item 2: Destruction, disruption, or harmful alteration of fish habitat.	*Fisheries Act* s. 35(2) authorization

Natural Resources Canada	
Scheduled Activity	**Authorization**
Schedule 1, part 13, item 1: Storage and manufacturing of explosives	*Explosives Act* NRCan may issue a factory licence for the manufacturing of explosives on site or a magazine licence for the storage of explosives on site
Government of Yukon	
Scheduled Activity	**Authorization**
Schedule 1, part 9, item 10: Diverting a watercourse or increasing the diversion capacity of an existing diversion	*Waters Act* Water Licence
Schedule 1, part 9, item 12: Other than for an electrical power undertaking, the deposit of waste into water or in any other place under conditions in which the waste, or any other waste that results from the deposit, may enter water.	

3.3 Consultation Requirements

3.3.1 Requirement Under YESAA

The Proponent, as required in s. 50(1)(a) of YESAA*,* submitted a project proposal to the EC. Prior to submitting the project proposal, s. 50(3) of YESAA requires the Proponent to "consult any first nation in whose territory, or the residents of any community in which, the Project will be located or might have significant environmental or socio-economic effects."[60]

Section 57(2) of YESAA requires the EC to commence screening a project "as soon as possible after it notifies the proponent under subsection (1) and advises the proponent that, in its opinion, the proponent has…consulted First Nations and the residents of communities in accordance with s. 50(3)."[61]

[60] Government of Canada, Yukon Environmental and Socio-economic Assessment Act, 2023, https://laws-lois.justice.gc.ca/eng/acts/Y-2.2/index.html.
[61] Government of Canada, Yukon Environmental and Socio-economic Assessment Act.

3.3.2 Requirement for the Proponent

Pursuant to s. 50(3) of YESAA, a Proponent is required to consult any First Nation in whose Traditional Territory the Project will be located or may have significant environmental or socio-economic effects, as well as the residents of any community in which the Project will be located or may have significant environmental or socio-economic effects, before submitting a project proposal to the EC (hereinafter, "Proponent Consultation"). Proponent Consultation is to be exercised in the manner described in s. 3 of YESAA below:

> Where, in relation to any matter, a reference is made in this Act to consultation, the duty to consult shall be exercised.
>
> (a) by providing, to the party to be consulted:
>
> (i) notice of the matter in sufficient form and detail to allow the party to prepare its views on the matter;
>
> (ii) a reasonable period for the party to prepare its views;
>
> (iii) an opportunity to present its views to the party having the duty to consult; and
>
> (b) by considering, fully and fairly, any views so presented.

The consultation record demonstrates that those with whom the Proponent was obliged to consult had enough information to understand the Project and to identify their values and interests related to project activities. Further, the record demonstrates that they had an opportunity to articulate their views related to potential effects of the Project on those values and interests, and that the Proponent has taken those views into consideration in the design of its Project and while developing the project proposal.

Consequently, having carefully reviewed the information included in the project proposal as well as all other relevant information, the EC is of the opinion that the Proponent has consulted First Nations and residents of communities in accordance with s. 50(3) of YESAA, as outlined in the November 2021 letter to the Proponent.[62]

3.3.3 Crown Consultation

Potential effects to Aboriginal rights and title are foundational to, and the focus of, Crown consultation. The EC considers Aboriginal rights and title as contextual factors when characterizing project effects and determining the significance of these effects for the purposes of the environmental assessment.

Specifically, "the duty to consult arises when the Crown has knowledge, real or constructive, of the potential existence of the Aboriginal right or title and contemplate conduct that might adversely affect it..."[63] Further, in order to fulfill the duties associated with Crown consultation,

[62] YOR 2019-0149-6935
[63] White River First Nation v. Government of Yukon 66 Yukon Supreme Court (2013).

the Crown must show that it has "…considered and addressed the rights claimed by Indigenous peoples in a meaningful way."[64] The Supreme Court of Canada has phrased the difference between environmental assessment and Crown consultation efforts as follows: "… the consultative inquiry is not properly into environmental effects *per se*. Rather, it inquires into the impact on the *right* [italics in the original]."[65]

In addition to, but distinct from Crown consultation on the Project, s. 74(2) of YESAA requires Decision Bodies to consult with LFN and RRDC when considering the EC's recommendations contained in this report (hereinafter, "Section 74 Consultation"). Section 74 Consultation will inform the decision document(s) issued in respect of the project.

When conducting Crown consultation and Section 74 Consultation, Decision Bodies are not limited to information contained in the assessment record, nor are they limited to information that predates the issuance of these recommendations.

However, the EC does not evaluate the adequacy of Crown consultation for the Project. Crown consultation continues after the issuance of the EC's final recommendations for the Project.

The EC does not have the duty or the authority to consult with First Nations affected by the Project. However, federal and/or territorial governments may choose to rely on the screening process for the Project to fulfil aspects of their constitutional duty to consult with First Nations.

[64] Coldwater Indian Band v. Canada 39111 Supreme Court of Canada (2020).
[65] Clyde River (Hamlet) v. Petroleum Geo-Services Inc. 40 Supreme Court of Canada (2017).

4 ENGAGEMENT

4.1 Affected First Nations and Communities

Based on the information provided in the project proposal (including supplementary information provided in response to IRs and all other information on record), the EC determines that for the purposes of s. 50(3) of YESAA, the Proponent was required to consult:

- First Nations on whose territories the Project "will be located or might have significant environmental or socio-economic effects."[66] Affected First Nations are:
    - RRDC
    - LFN
    - SFN
- Communities in which the Project "will be located or might have significant environmental or socio-economic effects."[67] Affected communities are:
    - The Town of Faro
    - The community of Pelly Crossing
    - The community of Ross River

4.2 Engagement

4.2.1 Identified Participants

Affected First Nations and communities, in addition to Decision Bodies and the Proponent were invited to participate in the screening process. These participants reviewed the Project and provided comments and questions during the adequacy review period and the associated IRs.

These participants were invited to participate in two technical workshops (the Adaptive Management Technical Workshop[68] and Water Model Technical Sessions[69]) and four Scope of Assessment Technical Advisory Committee Sessions (SATAC) held by the Yukon Environmental and Socio-economic Assessment Board (YESAB), while also being provided with regular updates and having their input sought at various stages throughout the process on documents such as the Preliminary Scope of Assessment and valued environmental and socioeconomic components (VESEC) outlines, as described below.

4.2.2 Technical Sessions

The EC hosted a series of sessions to solicit participants' views and to inform the assessment of the Project. Representatives from each affected First Nation, Decision Bodies, regulators, and the Proponent were invited to participate. Two Technical Advisory Committee (TAC) and four

[66] Government of Canada, Yukon Environmental and Socio-economic Assessment Act.
[67] Government of Canada, Yukon Environmental and Socio-economic Assessment Act.
[68] YOR 2019-0149-7822
[69] YOR 2019-0149-6367

SATAC sessions were held. The TAC sessions and first two SATAC sessions were held during the adequacy stage, while SATAC III and IV were held after the Project entered the screening stage.

4.2.2.1 Water Model Technical Session – December 8-11, 2020

This four-day session[70] covered topics such as the models used in the project proposal, loadings, water treatment, the Faro pit, water quality, and effluent quality standards (EQSs). Preliminary questions[71] for this session were circulated on July 27, 2020, to allow participants' concerns to shape the process. LFN and SFN provided preliminary comments, participated in the session, and provided follow-up comments after the session was concluded.

The EC's participation in this session was supported by their technical consultant EcoMetrix Inc.

4.2.2.2 Adaptive Management Plan Technical Workshop – February 23-24, 2021

On January 28, 2021, the EC circulated a preliminary list of issues for discussion at the workshop.[72] Feedback from participants identified six topics that included revisions to the operational AMP and the influence of YG draft AMP guidance, AMP protection goals, threshold and timelines, urgent works and the AMP, communications and community concerns, and the scope of the AMP. SFN provided preliminary comments. SFN and LFN provided a response to the workshop. The workshop was attended by RRDC, LFN, and SFN, and representatives from YG, the Proponent, and GC.

The EC's participation in this session was supported by their technical consultant EcoMetrix Inc.

4.2.2.3 Scope of Assessment Technical Advisory Committee Sessions

The EC also hosted four SATAC sessions. The purpose of these sessions was to inform the scope of assessment of the Project. The sessions were held sequentially, with representatives from each affected First Nation, Decision Bodies, regulators, and the Proponent. The dates and topics for each of these sessions are shown in Table 4 below.

Table 4: Scope of Assessment Technical Advisory Committee Session Dates and Topics

Session	Date	Topic(s)
SATAC I[73]	January 12-14, 2021	Identification of valued environmental and socio-economic components, spatial and temporal scope, existing conditions, thresholds, and indicators

[70] YOR 2019-0149-6367
[71] YOR 2019-0149-8225
[72] YOR 2019-0149-3969
[73] YOR 2019-0149-9158

SATAC II[74]	October 26-27, 2021	Preliminary scope of assessment
SATAC III[75]	March 22-24, 2022	Existing conditions, indicators, and thresholds for specific valued environmental and socio-economic components: First Nations way of life, community well-being, socio-economic monitoring programs, surface water quality, aquatic resources
SATAC IV[76]	June 14-16, 2022	Project governance, public trust, and cumulative effects

The EC also held several topic-specific meetings with participants, including bilateral meetings with affected First Nations.

4.2.3 Preliminary Scope of the Assessment

In June of 2021, the EC issued the initial Preliminary Scope of Assessment (PSOA) – VESECs and Sub-components[77] document to participants, inviting their comments on what was being proposed. The GC, LFN, SFN, RRDC, and YG provided comments. In October of 2021, the EC issued a document outlining the consideration of comments on the PSOA, titled Consideration of Comments Received on Preliminary Scope of Assessment.[78]

In July of 2023, the EC issued updates to the PSOA,[79] based on input from Participants on the initial PSOA as well as input received through bilateral meetings and SATACs II, III, and IV.

4.2.4 Project Updates

Throughout the screening stage, the EC provided Participants with a suite of project updates[80] that provided an overview of the assessment status, engagement efforts, next steps, and key dates. These were drafted to provide Participants with an understanding of the process, ongoing efforts by the EC, and milestones by which to track the project through the assessment.

4.2.5 VESEC Outlines Comment Period

During SATAC I, the EC committed to provide participants with the opportunity to review content developed for the DSR prior to its publication. On July 20, 2023, the EC provided participants with a status update letter.[81] This letter informed participants that the EC would be sharing, via the YOR, VESEC memos for feedback from participants. Participants were provided VESEC

[74] YOR 2019-0149-3563
[75] YOR 2019-0149-9549
[76] YOR 2019-0149-2584
[77] YOR 2019-0149-8171
[78] YOR 2019-0149-3045
[79] YOR 2019-0149-0822
[80] YOR 2019-0149-1375;YOR 2019-0149-8556; YOR 2019-0149-4955; YOR 2019-0149-1829
[81] YOR 2019-0149-1829

memos and renamed VESEC outlines on September 5, 2023, with a 30-day period, closing October 5, 2023, to provide comments. Due to a request from LFN, the comment period was extended to November 7, 2023, to afford participants additional time to provide their comments.

The four VESEC outlines shared were:

- First Nations' way of life[82]
- community well-being[83]
- Indigenous economies[84]
- public trust[85]

The VESEC outlines provided an overview of the VESECs, identified the legislative and regulatory context, outlined assessment boundaries, and included a discussion of preliminary effects assessment and a summary of First Nation and community input.

A discussion document[86] on methods identifying the proposed holistic approach to the assessment methodology and identification temporal scope accompanied the VESEC outlines. The EC sought participant feedback on this document as well.

4.3 First Nation Specific Matters

4.3.1 First Nations Rights and Interests

The role of First Nations rights and interests in modern-day Canada continue to evolve. The EC acknowledges the importance afforded to these rights and interests. YESAA contains specific provisions to protect Indigenous rights and interests within the screening process. A key example is s. 42(1)(g), which stipulates:

> the need to protect the rights of Yukon Indian persons under final agreements, the special relationship between Yukon Indian persons and the wilderness environment of Yukon and the cultures, traditions, health and lifestyles of Yukon Indian persons and other residents of Yukon […] and Yukon First Nations interests.

The EC and, by extension, this report do not directly assess rights or make findings about a project's effects on asserted or established First Nations rights. The EC makes factual, not legal, determinations about the significance of project effects to VESECs. The YESAB interpretive bulletin *Consideration of Aboriginal and Final Agreement Rights and First Nation Interest in YESAB Assessments* contains additional information on how YESAB considers Aboriginal rights. Asserted and established Aboriginal and Final Agreement rights are, however, considered in assessments conducted under the Act.

[82] YOR 2019-0149-9286
[83] YOR 2019-0149-7858
[84] YOR 2019-0149-5821
[85] YOR 2019-0149-4259
[86] YOR 2019-0149-8703

Aboriginal rights and title are considered as contextual factors when characterizing project effects and determining the significance of these for the purposes of the environmental assessment. For example, the EC received comments regarding the Project's potential to affect the rights and interests of First Nations, primarily in relation to traditional land use, harvest, and well-being. These comments, among others, helped identify First Nation land use and sense of place, cultural keystone areas and Indigenous economies as VESECs.

4.3.2 Traditional Knowledge

Section 39 of YESAA requires the EC to "give full and fair consideration to scientific information, traditional knowledge and other information provided to it or obtained under [YESAA]." Traditional Knowledge (TK) is generally considered to be a "body of knowledge built up by a group of people through generations of living in close proximity with nature...is cumulative and dynamic. It builds upon the historic experiences of a people and adapts to social, economic, environmental, spiritual and political change."[87]

TK is provided to the EC by affected First Nations throughout the assessment process. TK has also been used to inform the project proposal and supporting IRs. These documents and various publicly available reports and resources also contain TK and have been relied upon to inform the assessment. This information is considered and presented within the respective and applicable VESEC(s) characterization and is used to inform the EC's determinations of significance.

The EC does not value one source of information over another; scientific information and TK are given equal consideration in their determinations.

> TK needs to be used more broadly, on site and in decision-making. TK needs to come directly from the community and should be used to monitor and govern the Faro site. The use of TK to inform Western science decisions of "fill in gaps" isn't appropriate – cannot be taken out of context. TK is not just "facts" to be integrated, but a way of knowing and living – needs to be taken into consideration on its own terms, not just within context of impact assessment.[88]

TK is holistic in nature and helps to inform primary and secondary pathways as well as synergies amongst VESECs. TK has been used to further inform the holistic approach applied to this Final Screening Report (FSR).

[87] Government of Canada, Considering Aboriginal traditional knowledge in environmental assessments conducted under the Canadian Environmental Assessment Act, 2015, https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/considering-aboriginal-traditional-knowledge-environmental-assessments-conducted-under-canadian-environmental-assessment-act-2012.html.
[88] YOR 2019-0149-1912

4.4 First Nation Participation

This section summarizes the content provided by affected First Nations in the EC's screening process. The purpose of this section is to share the main themes the EC identifies from the First Nations input.

4.4.1 Ross River Dena Council

RRDC have participated throughout the screening process for this project, providing comments on documents, IRs and project documents, participating on TAC sessions, and meeting with the EC.

RRDC noted that they are the "…First Nation that will clearly be disproportionately affected by the remediation project"[89] and should have decision-making powers in proportion to this, as the Project lies wholly on the Traditional Territory of RRDC.

RRDC input on the Project indicated long-standing concerns with historical activity at the Project site and contemporary governance. They indicated the need for independent, third-party, and community-based review of project activities and encouraged creation of an independent review board with the authority to question project decisions.

RRDC also described the connection of historical and contemporary activity at the project site to larger issues experienced by their members, such as colonialism and dispossession from the region. Comment submissions by RRDC encouraged the EC to consider the long-term impacts of racism and colonial management associated with historic activity at the project site in the assessment of the Project.

RRDC also encouraged the Proponent to include community-directed monitoring of socio-cultural VESECs and to share results with the community.

4.4.2 Liard First Nation

In input from LFN, they stated that "[r]emediation objectives, selection of VESECs and indicators, as well as strategies to minimize further harm (or enhance benefits), are all ways that principles of reconciliation can be incorporated into this project assessment."[90]

LFN also shared many of the concerns that RRDC raised about the impacts of historical mining activity, colonialism, and racism, and express the need for deeper consideration of cumulative and long-term socio-cultural impacts.

LFN described an expanded view of human health that encompasses the four dimensions of health during SATAC III. This is of particular importance to LFN members regarding the Project,

[89] YOR 2019-0149-9549
[90] YOR 2019-0149-9801

because the health of LFN members is intrinsically connected to time on the land and traditional practices.[91]

Finally, LFN provided in-depth comments on the VESEC outlines.

4.4.3 Selkirk First Nation

Like RRDC and LFN, SFN identified the importance of including historic and ongoing legacy effects in the EC's evaluation of the Project. In their comments, SFN stressed the importance of considering all stages of activity at the project site during assessment.

Additional comments from SFN highlighted the importance of site governance during and after the Project. SFN strongly encouraged the formation of an independent review committee and cite the Giant Mine Project Review Board, as an example. There were also comments from SFN in a similar vein, indicating concerns about long-term site management and possible infrastructure failure.

SFN presented the Minto Socio-Economic Monitoring Program as a potential tool for project monitoring. Their comment submissions strongly encouraged the Proponent and the EC to adopt this monitoring program over the program proposed by the Proponent.

SFN also provided a volume of comments about the importance of salmon. Many SFN citizens living downstream of the project site are concerned about impacts to salmon, particularly via contamination. SFN noted the immense value of the salmon harvest for SFN people, both in terms of physical sustenance and perpetuating their culture. SFN also provided comments on VESEC outlines.

[91] YOR 2019-0149-9549, p.5

5 VIEWS AND INFORMATION

5.1 Comment Submissions

5.1.1 Adequacy Review

The EC solicited comments during the adequacy review phase to determine if there was sufficient information to draft a scope for the Project and to commence the screening.

Comments were received from 12 participants:

- RRDC
- LFN
- SFN
- Little Salmon Carmacks First Nation (LSCFN)
- YG
- Northern Projects Management Office (NPMO)
- Environment and Climate Change Canada (ECCC)
- DFO
- Town of Faro
- Health Canada (HC)
- NRCan
- Transport Canada

The EC received comments both during the initial adequacy review and in response to subsequent IRs. Comments received were considered in the drafting of IRs, scoping the Project, and informing subsequent stages of the assessment.

The EC issued five IRs during adequacy review seeking additional information, informed by comments submitted. Comments spoke to concerns including, but not limited to:

- Consultation with affected First Nations
- Community health and wellness
- Traditional land use
- Surface water and groundwater quality and quantity
- Water treatment
- Aquatic resources
- Borrow material
- Adaptive management
- Climate change
- Accidents and malfunctions
- Public trust and governance
- Emergency works

On November 12, 2021, the EC determined the project proposal, inclusive of the supplementary information submitted, was adequate to start the screening process.

5.1.2 Public Comments on the Project Proposal

The public comment period on the Project was from November 18, 2021, to February 15, 2022 (a two-week extension was issued on January 26, 2022[92]). During this time, the EC hosted six virtual public meetings to provide an overview of the YESAB process and opportunities for comment. These meetings were held December 7 to 9, 2021, and January 11 to 13, 2022. The more than 70 comments the EC received during this period came from governments, non-governmental organizations, interested parties, and individuals. These comments highlighted concerns and issues additional to those received during the adequacy review phase. These additional issues included:

- Reclamation costs and funding
- Training for locals in remediation procedures for mine sites
- Concerns about the public being kept informed of the Project's progress

Based on the comments received, the EC issued IRs No. 6, 7, 8, and 9.

5.1.3 Extraordinary Comment Period

To determine whether there was enough information to proceed to the subsequent stage of the screening process, the EC offered an additional comment period. This provided an opportunity for participants to submit any additional information they wanted the EC to consider, as well as allowed them to comment on the EC's view that there was sufficient information to proceed to the next state of the screening process. This additional comment period was offered because of the complexity, scale, and history of this project and the issues surrounding it. The EC sought comments in this extraordinary comment period from April 13, 2023 to May 15, 2023.

During this time, SFN and NPMO submitted comments expressing support for the EC's decision to move to the next stage of the screening process.

5.2 Technical Support

5.2.1 Adequacy Phase

During the adequacy review phase of the assessment, the EC retained independent consultants to undertake a technical review of select components of the project proposal (see Table 5).

The scope of work for consultants included the following tasks:

- Review and evaluation of information identified by the EC
- Participation in discussions, as needed
- Providing professional judgement on matters identified by the EC

[92] YOR 2019-0149-9013

- Conducting appraisals of models utilized by the Proponent where warranted
- Identifying, describing, and prioritizing key issues

Consultant teams produced technical memos to assist the EC in determining the adequacy of project proposal documents. In addition, the consultant teams considered information gaps identified in comments received during the adequacy phase. Each consultant team provided technical memos during the adequacy phase that informed IRs No.1, 2, 3, 4, and 5.

Table 5: Consultants and Their Area of Focus

Focus Topic	Consultant
Hydrology and aquatic resources, AMP	EcoMetrix Inc.
Engineering design and geotechnical considerations	SNC Lavalin Inc.

5.2.2 Screening Phase

During the first comment review phase of the screening, the period in which to provide comments on the project proposal, the EC again retained an independent consultant to undertake a technical review of the concerns raised in comment submission and other issues relevant to the screening.

Consultants carried out the following tasks:

- Reviewed relevant comment submissions
- Identified areas where additional information was required in order to draft a recommendation
- Identified possible approaches to addressing information deficiencies
- Provided professional judgement on key aspects of the project proposal

The consultant team aided in determining if the EC had sufficient information to draft a recommendation and helped inform the IRs no.6, 7, 8, and 9.

The assessment team sought specific information from EcoMetrix Inc. related to their knowledge areas of hydrology and aquatic resources as opposed to drafting a technical memo stating their concerns.

5.2.3 Drafting Recommendations Phase

In writing the FSR, the EC retained independent consultants to provide technical support in characterizing project effects. Consultants retained for this purpose are listed in Table 6 .

Table 6: Consultants Retained by the EC in Drafting its Draft Recommendations

Focus Topic	Consultant
Hydrology and aquatic resources	EcoMetrix Inc.
Socio-economic and socio-cultural components	Kiri Staples

In supporting the EC's drafting, these consultants helped by carrying out the following tasks:

- Providing material that characterized project effects
- Providing material that characterized contextual factors
- Identifying measures that could be implemented to mitigate project effects

5.3 Other Assessments

The EC considers previous assessments when assessing the effects of a project. Previous assessments provide an additional source of information on potential effects and their sources and receptors. Previous assessments may provide location-specific concerns or issues that are relevant to an assessment in progress. The EC considers both previous EC screenings and Designated Office evaluations.

Several previous assessments have been completed or are in progress in the Faro area. The EC specifically considered these previous assessments, including but not limited to those listed in Table 7.

Table 7: Previous and Current Assessments in the Faro Area

Assessment Number	Name
2023-0065	Solid Waste Management Facility (The Town of Faro)
2023-0058	Solid Waste Management Facility (Ross River, Upper Liard)
2023-0025	Quartz Exploration – Keg Property – Reclamation and Remediation
2022-0169	Placer Mining – Grew Creek
2018-0169	DO Evaluation Report – United Keno Hill Mines Reclamation Project February 2020
2019-0035	DO Evaluation Report – Aishihik Generating Station Relicensing September 2019

5.4 Studies and/or Research

The EC is required to consider "any studies or research undertaken under s.112(1) [of YESAA] that are relevant to the project or existing project." No research or studies have been undertaken under s. 112 of YESAA.

In conducting its assessment, the EC may also consider other relevant public studies and research. This research includes geographic data maintained by YG, available to view on the GeoYukon platform.[93] In addition, academic journals, governmental reports, and monographs have helped inform the assessment; they are listed in footnotes.

[93] Government of Yukon, "GeoYukon," Government of Yukon, 2023.

6 EFFECTS ASSESSMENT: PROCESS AND METHODOLOGY

The scope of assessment identifies the matters considered by the screening. It is determined by considering the matters set out in s. 42 of YESAA. The EC employs VESECs to assess the environmental and socio-economic effects of the Project. VESECs are identified through consideration of these factors:

- Views and information submitted during the adequacy review stage and the public comment period
- Internal and external technical advice and input
- TK where it is made available
- Previous assessments
- Studies and research

6.1 Valued Environmental and Socio-Economic Components

The EC has identified the following VESECs as having the potential to be adversely affected by the Project:

- Soils and Vegetation
- Air quality
- Surface water quality
- Fish and fish habitat
- Aquatic health and productivity
- Atmospheric greenhouse gases
- General wildlife
- Moose
- Woodland caribou
- Thinhorn sheep
- Grizzly bear
- Small mammals
- Avian wildlife
- Housing
- Public infrastructure
- Community services
- Health and emergency services
- Mental health and substance use services
- Community well-being
- Community personal and relational safety
- Occupational health and safety
- First Nation land use and sense of place
- Cultural keystone areas
- Heritage resources
- Indigenous economies
- Recreational and commercial land use
- Public trust

6.2 Spatial Scope of Assessment

The spatial scope of assessment for the project's effects on VESECs varies depending on the VESEC. The specific spatial scope of assessment is described for each VESEC in Part B of the screening report. In general, the EC identified three different spatial scopes to establish a boundary within which to characterize effects based on likely pathways of effects: maximum disturbance footprint (MDF), the local assessment area (LAA), and the regional assessment area (RAA).

6.2.1 Maximum Disturbance Footprint

The MDF for the Project is the smallest spatial scale of analysis used to encompass direct and immediate project effects in an area where active remediation activities occur. The area does not vary between VESECs.

The MDF is 2 003 hectares. It includes existing disturbances (i.e., Faro Mine area, Rose Creek tailings area, Grum overburden dump) and proposed additional footprint related to project activities (e.g., borrow areas, roads, water diversion channel modifications, water treatment infrastructure). The MDF provided by the Proponent and adopted in this assessment is likely larger than required to address uncertainty in the final design of the Project to ensure that adverse effects are not underestimated.

6.2.2 Local Assessment Area

The LAA for each VESEC was selected to encompass direct and immediate effects from project activities as well as indirect effects that may occur beyond the MDF. This area varies between VESECs.

6.2.3 Regional Assessment Area

The RAA for each VESEC was selected to encompass indirect effects from the Project as well as to understand effects from a cumulative perspective. This area varies between VESECs.

6.3 Temporal Scope of Assessment

The remediation plan as described in the project proposal[94] includes two phases:

1. Active remediation – this phase involves major construction activities that are required to remediate the Faro Mine, and undertaking ongoing care and maintenance, including water treatment, monitoring, and adaptive management. Active remediation is scheduled for 15 years.
2. Operations and maintenance – this phase is defined as the period of time in which the efficacy of active remediation and reclamation success is confirmed through performance monitoring and adaptive management to achieve a predictable steady state

[94] YOR 2019-0149-1170

> that meets the overarching objectives of the Project. Once a predictable steady state is achieved, ongoing water treatment, monitoring, and maintenance will continue to occur into the very far future (well beyond 100 years).

A temporal boundary for the assessment of approximately 25 years was selected, representing approximately 15 years for active remediation and 10 years for an initial period of operations and maintenance. This 25-year temporal boundary was selected because it is the maximum timeframe for which a water licence can be issued and coincides with the time period when the greatest adverse effects from the Project are anticipated. This temporal scope allows the project activities to be completed and provides accommodation for some delays that may occur during active remediation.

Effects during active remediation will be characterized compared to current conditions. Effects during operations and maintenance will be characterized compared to pre-mine conditions and the overarching restoration objectives of the Project.

6.4 Cumulative Effects

With regards to cumulative effects, s. 42(1)(d) of YESAA instructs the EC 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; and,
>
> (d)(2) the need for effects monitoring.

The Act distinguishes between project effects and cumulative effects. The Act directs YESAB to determine the significance of adverse project effects while considering the cumulative effects of other projects or activities that have been carried out, are being carried out, or are likely to be carried out. This means that cumulative effects are considered early in the assessment process, which helps to define the existing conditions of VESECs identified in the assessment and to inform significance determinations.

For the purposes of this assessment, the EC defines cumulative effects as: “changes to valued environmental and socio-economic components caused by an activity (related to a project being assessed) in combination with other past, present, and likely future projects or activities.”[95]

[95] Yukon Environmental and Socio-economic Assessment Board, *The Significance of Cumulative Effects as a Matter to be Considered in YESAB Assessments*, 2021, https://yesab.ca/wp-content/uploads/2021/07/YESAB-Cumulative-Effects-Information-Bulletin-6-10-2021-1.pdf.

6.5 Determining Significance

The EC determines if a project will result in significant adverse effects by characterizing likely project effects and placing those effects in the context in which they will occur. To determine the context in which project effects will occur, the EC considers contextual factors; to characterize project effects, the EC considers effects characterization criteria.

6.5.1 Contextual Factors

Contextual factors inform the threshold of significance; they are factors that are independent of project effects. Contextual factors considered by the EC include, but are not limited to:

- The nature of the importance invested in a VESEC
- Legislation, regulations, and management plans
- The vulnerabilities and resiliency of effects' receptors, including thresholds and limits
- Existing conditions and trends
- Cumulative effects of other projects and activities
- Acceptability of different types of effects

Contextual considerations will vary for each VESEC; some may be more relevant than others.

6.5.2 Effects Characterization Criteria

In characterizing project effects and addressing what may constitute a significant adverse effect, the EC considers the following factors:

Magnitude: The extent of a change from baseline conditions as a result of a 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 VESEC can be returned to baseline conditions or other established reference point after proposed activities have ceased.

Context: The environmental and/or socio-economic context within which the project occurs. Context is related to the importance of VESECs, their resiliency to potential effects, and the extent to which those valued components may successfully adapt to change.

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.

6.6 Holistic Approach

6.6.1 Overview

As described above, YESAB's effects assessment methodology uses a values-based framework and focuses on effects to VESECs;[96] the aspects of the environmental, health, social, and economic conditions that may be important to individuals and/or communities. This values-based assessment considers impacts of the project in relation to the identified VESECs and how the VESEC may change or be affected by aspects of a project. This approach is widely used in impact assessment frameworks in other jurisdictions. A limitation of this method is that the assessment does not predict project impacts through the examination of the connections between VESECs. Natural, socio-cultural, and socio-ecological systems can be better understood using a holistic lens that emphasizes the entirety of the system and the interconnectedness of the parts within. The interconnectedness of VESECs, and the effects that they might have on or amongst one another, is a systems-based way of thinking, more closely aligned to an Indigenous worldviews approach.

There is great diversity amongst Indigenous peoples, however there are commonalities tied to their ways of knowing and being. Many indigenous worldviews can rely on a fundamental understanding of the interrelatedness between the spiritual, emotional, intellectual (mental), and physical elements of being.[97] One perspective of Indigenous worldviews, described by Pidgeon, isas a framework connecting "not only the philosophical underpinnings of Indigenous knowledges but attempts pictorially to represent the complexity of wholistic interconnections that we have as individuals, to our communities, nations, and global communities."[98]This view extends to relationships amongst beings and the elements and systems of creation within past, present and future states.

There is a growing interest in effectively acknowledging the interconnectedness of human and natural systems, and specifically in impact assessment, the connectivity amongst VESECs. This is often tied to concepts such as ecosystem services, health and well-being, resilience, and sustainability. A holistic approach to project-level effects assessment involves the identification of relationships that exist between the different components of a larger system. In this approach, the analysis of a project's effects includes the consideration of the outcome of multiple individual impacts that, in combination, result in an effect to a VESEC that otherwise would not arise. Some argue that examining valued components individually in the absence of considering the various interactions and relationships amongst these components results in an incomplete

[96] Yukon Environmental and Socio-economic Assessment, *YESAB's Environmental and Socio-Economic Assessment Methodology*, 2021, https://yesab.ca/wp-content/uploads/2024/01/YESAB-Information-Bulletin_Assessment-Methodology-1-11-2021-Date-Added.pdf.

[97] Cell, et al., "Pulling Together: A guide for Front-Line Staff, Student Services, and Advisors; Section 2: Indigenous Ways of Knowing and Being," *Pressbooks*, 2018, https://opentextbc.ca/indigenizationfrontlineworkers/chapter/indigenous-ways-of-knowing-and-being/.

[98] Pidgeon, "Moving between theory and practice within an Indigenous research paradigm", *Qualitative Research*, 19:4, (2019).

analysis.[99] Addressing the interrelationships of biophysical, social, and economic systems is one of the fundamental tenets of best practice in impact assessment espoused by the International Association for Impact Assessment.[100]

6.6.1.1 Participant Comments

Throughout the assessment process, the EC received comments from RRDC, LFN, and SFN pertaining to the use of a holistic approach in its methodology for effects assessment. For instance, RRDC stated that "the concern/critiques in this report go beyond responses strictly to the YESAB regulatory process and instead seek to frame Ross River's story of the Faro Mine and the Remediation Project in a more wholistic, community-based manner."[101] Moreover, this has been emphasized by supporting documents, such as TK reports, as well as through participation at SATAC sessions and through bilateral meetings. The Indigenous worldview, the intrinsic value of VESECs, and the linkages between natural and human systems, with continued emphasis on understanding and acknowledging these interrelationships, were consistently raised as important:

> When you look at non-First Nation perceptions of impacts and how they are affected, it's a very different lens to look at these impacts through. When it comes to impacts on FN and non-FN people in communities, in some ways there is a real divergence in how these are understood, represented and characterized. It is long overdue to look at these impacts through a First Nation lens, I welcome this happening now through these conceptual frameworks.[102]

LFN also brought forward the interconnected nature of individual and community health and well-being, with socio-economic and environmental elements:

> Health is considered holistically by Kaska people, with a full range of determinants and dimensions, including mental wellness […] health is much broader than the biophysical effects that might occur. Clear links need to be made between human health and broader community wellbeing…[103]

Indigenous frameworks tend to see health as not only physical, but also intertwined with mental, spiritual, and emotional factors.[104] Indigenous perspectives recognize health and well-being as determined and influenced by a wide array of social, economic, cultural, and environmental

[99] Canter and Ross, "A Basic Need for Integration – Bringing Focus to the Scoping Process," *Impact Assessment and Project Appraisal*, (2014).
[100] Senecal, et al., "Principles of Environmental Impact Assessment Best Practice," *International Association for Impact Assessment; Institute of Environmental Assessment, UK*, (1999).
[101] YOR 2019-0149-0555, p.5
[102] YOR 2019-0149-3563
[103] YOR 2019-0149-3563
[104] Salerno, et al., "Indigenous Mental Wellness and Major Project Development: Guidance for Impact Assessment Professionals and Indigenous Communities," *Impact Agency of Canada*, (2021).

factors.[105] Exploring these relationships as part of the context of values-based assessment, and depicting and discussing these connections, provides a more meaningful assessment that incorporates elements of the Indigenous worldview.

LFN underscored the importance of using a systems-based approach:

> Systems thinking would focus the assessment on the Kaska social-ecological system, identifying interconnections within and between valued environmental and socio-economic components ("VESECs"), feedback loops, nonlinear impacts, cascading effects and emergent properties. […] The Kaska culture is a complex social-ecological system deeply intertwined with and materially, culturally and spiritually dependent on the lands, waters and living beings in Kaska traditional territory. The Kaska carefully stewarded the balance of this system, exercising Kaska laws based on a deep understanding of local ecosystems and, seasonal cycles and wildlife migration patterns.[106]

TK and ways of knowing and being are important components of the Indigenous worldview. TK and ways of knowing and being are important components of the Indigenous worldview. The consideration and application of TK and ways of being is emphasized by First Nation participants in this assessment:

> Equal in importance to the identification and interaction of VCs is how their relative condition at a given point in time is evaluated for assessment […] Application of traditional knowledge (TK) and First Nations' views in relation to developing significance thresholds for VESECs should be extended to developing and implementing methods that incorporate TK and First Nations' views in evaluating significance in a culturally appropriate, inclusive and participatory way.[107]

SFN and LFN supplemented their comment submissions with TK as well as land use and socio-economic studies, which provide a better understanding of the interconnections amongst the various systems and elements. Similarly, RRDC emphasized the long-standing Kaska relationship with the land and the area in which the Project is located, with an emphasis on the impact that the historic activities of the Faro Mine have had, and continue to have, on TK, ways of being, Kaska culture, and individual and community well-being. This demonstrates the linkages amongst and between elements and systems at the site and the relationship to socio-cultural aspects of each community.

6.6.1.2 Holistic Approach for the Faro Mine Remediation Project Screening Report

To properly characterize and predict adverse effects that incorporate Indigenous worldviews, there is a need to complement the values-based analysis with a holistic approach. The holistic

[105] Salerno, et al., "Indigenous Mental Wellness and Major Project Development: Guidance for Impact Assessment Professionals and Indigenous Communities."
[106] YOR 2019-0149-2183
[107] YOR 2019-0149-4384

approach taken for this screening relies on identifying potential relationships, exploring interactions, and interpreting the overall significance of project effects, given the VESECs for the project.

The holistic approach intends to:

- Identify and describe interrelationships between physical, biological, and human environments
- Demonstrate the conceptualization of interrelated effects
- Identify connections between VESECs
- Describe potential effect pathways between VESECs

The interrelationships between physical, biological, and human environments are an important aspect of this approach. While there may be distinct pathways for environmental or socio-economic effects for a specific VESEC, characterizing the interrelationships between VESECs supports a deeper understanding of project effects and the full context of those effects from the project.

A theme of discussion at the SATAC sessions was the linkages between VESECs. In these sessions, YESAB acknowledged that “Faro is a large, interconnected web of effects pathways and values”[108] and, in an effort to carry that through the assessment and better reflect relationships and connection, it was identified that a holistic approach was needed.

The VESECs presented in the assessment evolved based on discussions, comments, and input seeking a more holistic approach, examining VESECs that were inclusive of various themes and elements important to participants.

The connections and interrelationships that individual valued components share is discussed and considered within each VESEC section of the FSR. These connections contribute to establishing and understanding the context of a values component and existing conditions, supports effects characterization and contributes to assessment outcome. In addition to this work, and in an effort to better reflect and capture the holistic approach, an examination and discussion can be found in section 37, synthesizing the interconnected social and ecological components of the systems related to the Project.

6.7 Reconciliation

LFN specifically raised reconciliation as an important issue for the EC to address in the screening report. This issue arose in comments on the VESEC outlines of public trust,[109] Indigenous economies,[110] and community well-being.[111] Generally, LFN advocated for the screening of the Project’s adverse effects to occur through a reconciliation lens and to include

[108] YOR 2019-0149-9549
[109] YOR 2019-0149-0428
[110] YOR 2019-0149-1605
[111] YOR 2019-0149-1279

reconciliation as a sub-component to the public trust VESEC. Such a sub-component would include references to colonization, Indigenous rights, recognition of past harms to the Kaska, and the complexity of determining funding needs.[112] The EC views reconciliation as a critical issue. However, the EC has specific obligations and authorities under YESAA, which it must consider when making recommendations regarding significant adverse effects of a project. The remedies and outcomes LFN highlighted as important in achieving reconciliation go beyond the jurisdiction of the EC.

Reconciliation is an ongoing process; it begins prior to the Proponent submitting a project proposal and extends beyond the EC's recommendation for the Project. Recognizing that this screening is only one component of the development and assessment process in Yukon, the EC encourages decision bodies, regulators, and territorial and federal governments to utilize and reference Indigenous views, information, and concerns compiled for the project.

Reconciliation is also a relationship that needs to advance through consultation with the Crown. The views and information provided for the assessment should, in part, be used to advance genuine, consultative discussions to address Indigenous peoples' concerns. LFN raised that government-to-government agreements, such as the draft reconciliation agreement[113] tabled in 2021, would assist in the advancement of reconciliation beyond the screening report, throughout implementation of the project, and during the perpetual care and maintenance of the site.

Reconciliation is also an action. The project activities represent a major step towards the improvement of biophysical conditions at the site. When undertaken as described and consistent with the recommendations in this screening report, they provide a foundation for actions to advance reconciliation at the project site. The Project's activities alone do not undo or atone for all the harms to Indigenous people, particularly the Kaska, and their long-term impacts on the social well-being lived today. However, they are an opportunity for the Proponent and the Crown to act and implement reconciliation at the Project. The Project is large, with the potential to create significant investment and return in Kaska and SFN Traditional Territory.

This assessment and its recommendations are, in part, an action of reconciliation. Based on views and information from First Nations, the screening report incorporates a holistic approach (see section 6.6) to the assessment, specifically considers First Nations interests, and makes recommendations that mitigate, reduce, or eliminate significant adverse effects that are likely because of the Project's activities. The views and information compiled for the assessment also contain a large volume of evidence demonstrating the nature, extent, and severity of harm from the Faro Mine's past. This information does not vanish upon conclusion of the assessment but should continue to be referenced and used to inform actions of reconciliation as the Project is undertaken.

[112] YOR 2019-0149-0428, p. 2
[113] YOR 2019-0149-0428, p. 8

6.8 Legacy of Faro Mine

RRDC, LFN, and SFN highlighted their experiences with the Faro Mine at a time beginning with the onset of early mineral exploration, through to development and operation of the mine, into abandonment, and then ultimately into care and control by the federal government as a contaminated site. The experiences are universally negative and clearly echo through several generations of First Nations people. The experiences fundamentally change how First Nations people view and use the area and remain unresolved to this day.

First Nations were initially displaced from the region[114] by industrial activity at the Faro Mine, and mining-related activities directly harmed First Nation people[115] and their communities. The Kaska have lived in and around Mount Mye (Tsē Zūl) since time immemorial. They were driven from a region of vital cultural and practical importance. From their view, LFN described the effects from those experiences:

> Some of the most significant effects of colonialism's legacy with the Kaska are measurable, such as the loss of language literacy in all Kaska dialects. There have been enormous migrations of people from villages, settlements and family use areas that Kaska have used for centuries to other existing villages (like Ross River, Upper Liard and Lower Post reserve and Watson Lake). These migrations were necessary so Kaska people could be closer to the residential school their children were forced into, or where they believe improved services and employment opportunities might exist. Individuals within the same family resettled in different communities yet continue to rely on kinship, cultural traditions, and improved access between communities to sustain relationships and close interconnectedness.[116]

In this screening report, legacy issues refer to the experience of First Nations people from the historic development, operation, and abandonment of the Faro Mine. CIRNAC notes that information from affected First Nations[117] demonstrates that the development of the Faro Mine and associated activity decreased the quality, quantity, and availability of lands and resources. This led to competition for other available lands and resources. There were notable declines in habitat and animal populations due to disturbances from the Faro Mine and increased access for non-First Nation land users.[118] Other experiences include the lack of compensation for historic effects to the land and water, loss of harvesting and other traditional use, fear of contamination, lack of business and training opportunities, and overall stress to the community.

[114] Weinstein, *Just Like People Get Lost: A Retrospective Assessment of the Impacts of the Faro Mining Development on the Land Use of the Ross River Indian People*, 1992.
[115] Weinstein, *Just Like People Get Lost: A Retrospective Assessment of the Impacts of the Faro Mining Development on the Land Use of the Ross River Indian People*.
[116] YOR 2019-0149-1242
[117] Weinstein, *Just Like People Get Lost: A Retrospective Assessment of the Impacts of the Faro Mining Development on the Land Use of the Ross River Indian People*; YOR 2019-0149-9030
[118] YOR 2019-0149-0971

These are in addition to the biophysical legacy issues that include actual contamination from fugitive tailings dust, tailings spills, and surface and groundwater contamination.[119]

In the project assessment process, comments from First Nations emphasized the importance of including and resolving these issues in the EC's assessment of the Proposed Project. LFN stated that "the 'context' of this project requires substantive and serious consideration, given that project specific effects are directly connected to legacy effects."[120] And:

> The severity of the project's effects on First Nation [w]ay of [l]ife must be determined in relation to this highly impacted baseline, i.e. no change from current conditions can be considered to be an adverse effect if it perpetuates existing impacts. Worsening conditions can be considered to be a highly adverse effect that compounds existing impacts.[121]

The EC makes determinations about the significance of adverse effects resulting from project activities. In doing so, it considers a wide variety of information, the assessment framework, and context for which effects should be understood to occur. The historic development, operation, and abandonment of the Faro Mine are not part of the project activities in the project proposal. However, legacy issues are considered in relation to VESECs where adverse effects might continue to occur or be exacerbated by the historic operation of the Faro Mine. This kind of approach is consistent with that taken in the Designated Office assessments of the United Keno Hill Mines Reclamation Project[122] and the Aishihik Generating Station Relicensing Project.[123] A similar approach was also taken in the Mackenzie Valley Environmental Impact Review Board's assessment of the Giant Mine Remediation Project.[124]

This position is in no way intended to disregard, reduce, or ignore the legacy of the Faro Mine on First Nations people. The work of the EC is forward-looking within its screening, and the Proponent, in undertaking the project, might not adequately address the legacy issues from the Faro Mine. CIRNAC, as the Proponent, recognizes the severity and importance of discussing the legacy effects of the Faro Mine and notes in the project proposal that these will be discussed outside of the YESAB process.[125]

[119] YOR 2019-0149-0971
[120] YOR 2019-0149-1242, p.4
[121] YOR 2019-0149-1242
[122] YOR 2018-0169
[123] YOR 2020-0123
[124] Mackenzie Valley Review Board, "Giant Mine Remediation Project -EA0809-00," 2024, https://reviewboard.ca/registry/ea0809-001.
[125] YOR 2019-0149-0971

PART B

Part B of this report provides context, background information, and general considerations for the assessment of the Project.

7 SOILS AND VEGETATION

7.1 Overview

Soils and vegetation are valued as they represent important components of the terrain and landscape. The inclusion of soils and vegetation in the VESEC title intends to reflect the high value placed on these components and how they contribute to general ecosystem health and productivity.

The Project proposes the removal of large volumes of borrow material for use as a cover source. The assessment of project effects on soils and vegetation includes the following:

- Contamination of soils and vegetation from chemical hazards
- Degradation of soil quality from dust deposition and surface water runoff
- Reduced soil stability due to excavation and stockpiling of soil materials and loss of permafrost
- Reduced ecosystem integrity from slope instability or failures

The EC determines that the Project will not result in significant adverse effects to soils and vegetation.

7.1.1 Reason for Inclusion

The Proponent included soils and terrain as an intermediate component (IC) in the project proposal. The project proposal noted that terrain, permafrost, and soils are strongly linked to VESECs such as vegetation, water quality, fish and fish habitat, wildlife, and wildlife habitat.

Participant comments focused on the volume of borrow material required for the Project. RRDC commented that there has been limited geochemical assessment of potential borrow sites and that sourcing borrow materials will increase the footprint of the site, and should be completed with direct engagement of RRDC members to minimize impact to undisturbed wildlife habitat.[126] LFN's concerns included the feasibility of the material balance for soil and organic cover material requirements, the extensive potential disturbance to peatlands, and the time required for the vegetation regrowth in other alpine and sub-alpine ecosystems.[127]

7.2 Spatial Boundaries

The spatial boundaries for assessing potential effects to soils and vegetation include the MDF of the Project with an additional 1 km buffer surrounding the MDF. The MDF is 2 003 ha in area and includes existing disturbances (i.e., Faro Mine area, Rose Creek tailings area, Grum overburden dump) and the proposed additional footprint related to project activities (e.g., borrow material sources, water diversion channel modifications). The spatial scope (9 260 ha) was

[126] YOR 2019-0149-0555
[127] YOR 2019-0149-9158

selected to characterize where the terrain and landscape integrity may be impacted by ground disturbing activities associated with the Project. Figure 6 displays the spatial scope of this VESEC.

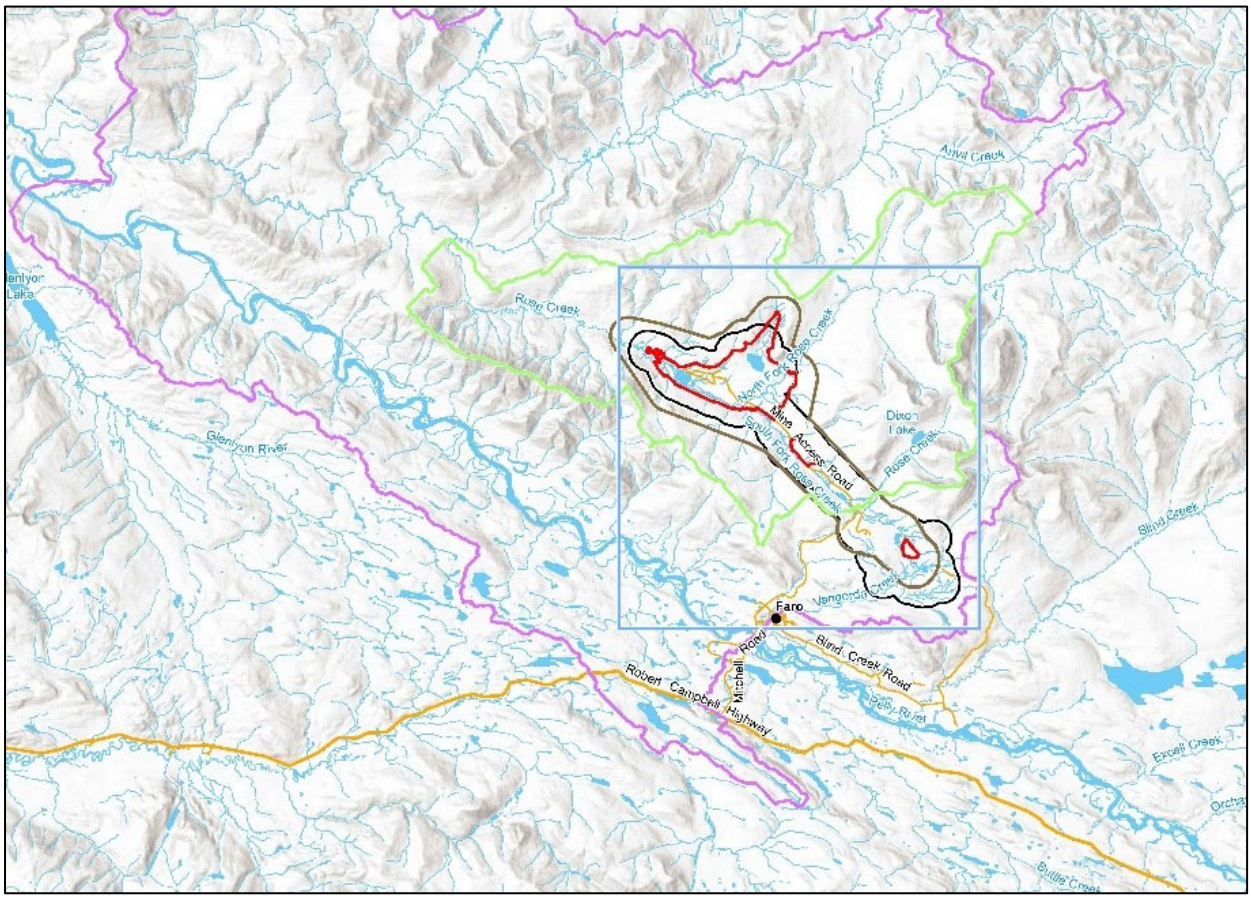

Figure 6: Spatial Scope for Soils and Vegetation Shown in the Brown Outline. MDF shown in the Red Outline

7.3 First Nations and Community Input

7.3.1 Liard First Nation

LFN raised concerns about the "elevated concentration of metals within local soils and vegetation"[128] as a result of dispersion of contaminants from mining operations, transportation, tailings, and waste rock. LFN referred to the Human Health and Ecological Risk Assessment (HHERA) provided by the Proponent to support their concerns:

> The Human Health and Ecological Risk Assessment (HHERA: Appendix 8D-1) identifies areas where metal concentrations in soils and vegetation appear to be elevated above background. For example, the document states: "The area with the highest lead

[128] YOR 2019-0149-8665, p.8

> concentrations (Zone 6) included … approximately 500 hectares of undisturbed area adjacent to the mine (mainly toward the northwest), suggesting that there has been significant aerial deposition of lead from the mine to the adjacent undisturbed areas (Gartner Lee 2006). Concentrations in Zone 6 were at least 10 times the maximum concentrations measured at Swim Lake (Zone 1)."[129]

LFN added that "The Project Proposal does not indicate how impacts to soils and vegetation in undisturbed areas will be managed. This information is required to better understand the current and residual impacts of the proposed undertaking."[130]

On another note, LFN asked in their comments on IR No. 1 response if TK was included in the vegetation and wildlife cumulative effects assessment and, if so, how it was included. More specifically, LFN noted that it is unclear "how Kaska were involved in defining these limits [resilience and adaptability limits] or predicting cumulative effects on these VCs [valued components]."[131]

The Proponent replied that funding was provided for TK and land use studies to be developed and prepared by the RRDC, LFN, and SFN. A letter was sent to each of the affected First Nations on August 11, 2020, from the Proponent, requesting access to this information or a meeting to further the discussion on the sharing of this information and how it can be integrated into project planning.[132]

7.4 Existing Conditions

7.4.1 Physical Geography

The physical geography of the area is defined by three key components: the Tintina Trench, the Vangorda Plateau, and the Anvil Range Mountains. The predominant influences on regional surficial geology are historical glaciation, physiography, and past and current fluvial regimes. Much of the Vangorda Plateau is overlain by a thin veneer of colluvium over bedrock; however, portions of the plateau are overlain by thin, discontinuous deposits of glacial till or glaciofluvial materials, with regions of deeper till also occurring in some valleys in the area.

7.4.2 Bedrock Geology

Bedrock outcrops are abundant at higher elevation along the ridges on both sides of the Rose Creek valley, but the valley flanks are dominated by a mantle of colluvial material interspersed with patches of thin glacial till. Past investigations indicate that the till in the valley bottoms tends to be very dense and is often overlain by a complex of fluvial and glaciofluvial sands and gravels. Within the sand and gravel deposits are discontinuous pockets of silty materials. Maximum thickness of the sand and gravel deposits is 35 to 40 m.

[129] YOR 2019-0149-8665, p.8
[130] YOR 2019-0149-8665, p.8
[131] YOR 2019-0149-3258, p.8
[132] YOR 2019-0149-7010

Within the spatial scope, in general, higher elevations and localized areas at lower elevations consist of bedrock-controlled topography overlain by till, glaciofluvial, fluvial, or colluvial material. Rock outcrops and thin colluvium veneers were found on Mount Mye (Tsē Zūl) and Mount Aho at higher elevations, as well as at lower elevations where isolated outcrops were located. The valley bottoms of Rose Creek and the North Fork Rose Creek transition to deeper, sediment-controlled topography dominated by undulating till and hummocky to gently undulating fluvial or glaciofluvial materials, along with isolated organic deposits. Colluvium is encountered throughout the LAA, typically as thin veneers overlying bedrock or till, or as depositions along fluvial and gully sidewalls.

7.4.3 Terrain

Most of the surficial materials in the LAA are morainal in origin (55.1 %), followed by anthropogenic (18.2 %), and colluvium (10.5 %). Glaciofluvial, fluvial, and organic deposits combine for a further 12.5 % of the LAA, while water, bedrock, and lacustrine materials account for less than 4 % of the area.

7.4.4 Permafrost

Discontinuous permafrost has been identified in the Vangorda Plateau mine site, the North Fork Rose Creek area, and in the Faro Creek diversion area. Frozen soils tended to be on north-facing slopes associated with thick organic deposits, wetland margins, or well-shaded areas. Approximately 11.4 % of the spatial scope was mapped as containing permafrost features.

7.4.5 Soils

Soil sampling within the spatial scope indicates that soils are generally low in fertility, with low levels of available phosphorus, potassium, copper, manganese, and zinc. Iron and calcium levels tend to be high. Soil organic matter levels are quite variable, as are pH levels (3.8 to 7.8; median 5.3). Dominant soils in the region have Agricultural Capability Classes between 5 and 7,[133] suitable for improved hay or grazing, or non-agricultural uses.

Salinity and sodicity are not problematic with respect to reclamation suitability, with the highest electrical conductivity level measured at 1.7 deciSiemens per metre. Fertility of disturbed soils was described as very low.

A soil and vegetation study conducted by Gartner Lee Limited for the Project suggested that “the spatial pattern of elevated elemental levels observed was the result of deposition from the [Faro Mine Complex]” and not attributed to natural effects present before mining.[134] Lead, zinc, and copper were determined to have elevated concentrations when compared to their reference site.

[133] YOR 2019-0149-6443
[134] Gartner Lee Limited (GLL). *Faro Mine Complex Closure Vegetation Baseline*. Prepared for Faro Project Management Team. 2008. February.

7.5 Proponent Mitigation Measures

The Proponent provided details on proposed mitigation measures in section Project Interactions and Mitigation, Table 7J.4-1 of the project proposal.[135] These mitigation measures are the list of actions used to inform the pathway analysis for its assessment. Other mitigation also apply, as outlined in the management and monitoring plans for the Project.

The Proponent predicts that at the end of remediation, the entire MDF will be reclaimed, except for areas mapped as water (and infrastructure necessary for site maintenance).

Of the area that will be reclaimed, 1 072 ha (53.5 % of the project footprint) consists of existing mine-disturbed material that could not currently support vegetation communities. The remaining 886.4 ha or 44.3 % of the project footprint consists of native soils units used as borrow sources during active remediation that will also be reclaimed.

Reclaimed soils are expected to provide similar ecological function as native soils surrounding the Faro Mine area. Increased soil productivity will result in the establishment of early-stage vegetation communities at the end of active remediation and during operations and maintenance. Mature seral stages are only expected beyond the 25-year assessment (e.g., more than 120 years).[136]

The following mitigations are provided in the project proposal to reduce potential adverse effects to soils, permafrost, and terrain:

- Dust Management Plan[137]
- Sediment and Erosion Control Plan[138]
- Air Quality and Meteorological Monitoring Plan[139]
- Revegetation Plan[140]

Additionally, environmental design features have been incorporated in the Project to mitigate the effects of dust deposition on soils. These include:

- The application of dust suppressant, as required, to the Rose Creek tailings area and other high-traffic areas prone to generating fugitive dust during windy conditions;
- Where practical, the stabilization of disturbed areas with vegetation after disturbance; and
- Scheduling and staging project activities to limit the extent of disturbed soils' exposure to erosional forces.

[135] YOR 2019-0149-6443
[136] YOR 2019-0149-7410
[137] YOR 2019-0149-9964
[138] YOR 2019-0149-9964
[139] YOR 2019-0149-9964
[140] YOR 2019-0149-8836

7.5.1 Revegetation Plan

The Revegetation Plan[141] provides initial input on reclamation cover designs from a revegetation perspective. However, there remain uncertainties in post-closure landform, cover design, material characteristics, material balances, and land use objectives.[142] This will require trial checking, collaboration, iteration, and adjustment prior to construction, and is intended as a reference point for more detailed planning as closure and reclamation information for the Project evolves.[143] The current estimates are established from the 2018 field program, which was completed to refine borrow material quality and quantity estimates. The plan is based on re-establishment of locally common characteristic plant species and ecosystems, and rapid revegetation for erosion control where needed.[144]

The following documents contain monitoring programs that are related to soils and vegetation and to the Revegetation Plan:

- Remediation Plan[145]
- Sediment and Erosion Control Plan[146]
- Water Management Plan[147]
- Adaptive Management Plan[148]
- Terrestrial Management and Effects Monitoring Plan[149]

The results of these monitoring programs will assist adaptive management measures to support the success of long-term reclamation of soils and vegetation, and to support the establishment of vegetation communities.

7.6 Project Effects Characterization

7.6.1 Project Effect: Contamination of soils and vegetation from chemical hazards

The project activities include the operation of heavy equipment, a concrete batch plant, a boiler, and other diesel-powered equipment. Large quantities of diesel and other fuel will be used and stored on-site during active remediation. Specifically, during active remediation, the Project is estimated to require a total of 45.2 megalitres (ML) of fuel, or 3.1 ML annually. The potential exists for spills, leaks, accidents, or malfunctions during equipment refuelling, normal use of heavy equipment, and transporting fuel.

[141] YOR 2019-0149-8836
[142] YOR 2019-0149-8836
[143] YOR 2019-0149-8836
[144] YOR 2019-0149-8836
[145] YOR 2019-0149-8532
[146] YOR 2019-0149-9964
[147] YOR 2019-0149-9964
[148] YOR 2019-0149-9964
[149] YOR 2019-0149-9964

Blasting powder and management of chemical waste on-site also has the potential to contaminate native undisturbed soils and soils that will be reclaimed. These deposited contaminants may also result in contaminant uptake by plants.

Hazardous wastes and potential contaminants will be removed from the buildings prior to demolition. These wastes will be handled and disposed of according to industry best practices and applicable regulations. Hazardous material management is described in the Waste Management Plan.[150]

The Proponent has provided a Waste Management Plan[151] and the Occupational Health and Safety Plan[152] to correctly handle, contain, store, transport, recycle, and dispose of the different types of hazardous, solid, and special waste materials used and generated on-site. In the event of a spill, all remediation activities will be conducted in accordance with the Spill Contingency Plan and the spill response procedure will be followed by containing and remediating spills or leaks by handling materials in an appropriate manner.[153] Equipment maintenance, surveillance, and spill management guidelines will be implemented as per the Emergency Response Plan to prevent and manage spills.[154]

Implementation of the plans provided by the Proponent will reduce the likelihood and frequency of spills and contamination to soils and vegetation. Should a spill or contamination occur, the application of the Spill Contingency Plan and Emergency Response Plan will ensure that the geographic extent and magnitude (i.e., severity) is reduced. Furthermore, dust suppression activities will limit deposition of dust and contaminant particles onto soil, and therefore limit plant uptake. The plans provided by the Proponent reduce and control effects to soils and vegetation from contamination.

7.6.1.1 Significance Determination

The EC determines that the Project will not result in significant adverse environmental effects to soils and vegetation by contamination from chemical hazards on-site. The Proponent has provided numerous plans that address pathways of contamination and effectively reduce the likelihood, frequency, and severity of contamination.

7.6.2 Project Effect: Degradation of soil quality from dust deposition and surface water runoff

7.6.2.1 Air Emissions

The Project includes major earthworks, land-clearing, grubbing, and excavation, as well as cover construction, landforming, and revegetation activities during the active remediation phase. These activities may lead to an increase in airborne dust and criteria air contaminants (CACs),

[150] YOR 2019-0149-9964
[151] YOR 2019-0149-9964
[152] YOR 2019-0149-9964
[153] YOR 2019-0149-9964
[154] YOR 2019-0149-9964

such as airborne dust containing metals and fugitive dust deposition from construction, transportation, and excavation activities. Suspended particles, nitrogen dioxide, sulphur dioxide, and carbon monoxide released into the atmosphere, once deposited onto the soil, can cause increased metal concentrations, and change the chemistry of soil. These effects result in direct accumulation of contaminants in soils, which in turn reduces soil productivity and plant growth indirectly through the soil or directly at the plant's surface.[155] Soil quality can be impacted from nitrogen and sulphur oxides and dust containing metals by the following methods:

- Altering soil pH, nutrient content, soil fauna composition, and rates of organic matter decomposition and nutrient cycling;[156]
- Altering soil through complex geochemical factors, such as duration and quantity of atmospheric inputs, soil sensitivity to acidification, and cation and anion exchange capacity in soil; and[157]
- Depositing nitrogen and sulphur oxides, leading to acidification of soils.[158]

The Proponent has provided a Dust Management Plan[159] to suppress dust on-site. Specific areas of concern are the Rose Creek tailings area and high-traffic areas throughout the project site. The Proponent has indicated that disturbed areas will be stabilized with vegetation after the initial disturbance and that at the end of the active remediation phase of the Project, 98 % of new and existing disturbed areas will be reclaimed.

Regarding CACs, the Proponent has provided an Air Quality and Meteorological Monitoring Plan[160] to the effects of air emission on soils. Efforts include a no-idling policy during non-winter periods, limiting hauling distances, and regular maintenance of equipment and vehicles.

Rates of dust deposition and accumulation on soil depend on the rate of supply from a source, wind speed, precipitation events, topography, and vegetation cover.[161] Mitigations provided by the Proponent reduce the magnitude, frequency, and extent of effects on soils. Dust deposition is anticipated to be reduced by the proposed mitigations. Revegetation of the site will address long-term effects of dust generation and degradation of soil quality will not continue beyond the

[155] Farmer, "The Effects of Dust on Vegetation – A Review"; Rusek and Marshall, "Impacts of airborne pollutants on soil fauna," *Environmental Pollution*, (1993): 395-423.
[156] Jung, Ok, and Hang, "Sulfate Adsorption Properties of Acid-Sensitive Soils in the Athabasca Oil Sand Region in Alberta, Canada," *Chemosphere*, (2011): 457-463; Rusek and Marshall, "Impacts of Airborne Pollutants on Soil Fauna," *Annual Review of Ecology and Systematics*, (2000): 395-423.
[157] Jung, Ok, and Hang, "Sulfate Adsorption Properties of Acid-Sensitive Soils in the Athabasca Oil Sand Region in Alberta, Canada," 457-463.
[158] Holowaychuk and Fessenden, "Soil Sensitivity to Acid Deposition and the Potential of Soils and Geology in Alberta to Reduce the Acidity of Acidic Inputs," Alberta research Council, Earth Sciences Report 87-1., Edmonton AB: Alberta Research Council.
[159] YOR 2019-0149-9964
[160] YOR 2019-0149-9964
[161] SRK Consulting Engineers and Scientists*, Faro Mine Complex 2009 Groundwater Investigations*; Liu, et al., *Wind Erosion of Saline Playa Sediments and its Ecological Effects in Ebinur Lake, Xinjiang, China*. 2009.

life of the Project. These guidelines are reflective of fugitive dust control practices within the mining industry[162] with the following success rates:

- Wet suppression of unpaved areas can reduce dust emissions by 10 to 74 %
- Chemical stabilization can reduce dust emissions by up to 84 %
- Revegetation can reduce dust emissions by more than 90 %

7.6.2.2 Surface Water Runoff

The Project includes activities such as excavation, handling, transport, consolidation, and stockpiling of tailings, waste rock, road material, and borrow, as well as the construction of water diversions and sediment control structures. These activities can expose new rock and salts present on the surface and may lead to the leaching of constituents from tailings, waste rock, and borrow areas and lead to downstream precipitation or acidification of soils. These effects will adversely affect soil chemistry, productivity, and quality.

Erosion of new materials from surface water and subsequent deposition is expected to be high during active remediation activities and then decrease as vegetation is established and the project moves into the operations and maintenance phase. To address concerns related to leaching, the Proponent will establish groundwater monitoring systems to monitor water quality downgradient of seepage interception systems to provide feedback for adaptive management. The seepage interception system has been designed to have seeps from landforming waste rock dumps to report to the seepage interception systems, rather than to the surface. A contact water management system will be developed prior to moving contaminated waste rock and tailings. Furthermore, the Proponent has provided a Water Management Plan[163] and Materials Management Plan.[164]

Although changes to surface water runoff patterns and rates can affect soil erosion and sedimentation to roadside or downstream ecosystems, the implementation of environmental design features and mitigation will limit the likelihood and geographic extent of contamination to soil quality. Furthermore, any seeps that arise will be confined to the MDF and their frequency and magnitude is expected to decrease following active remediation.

7.6.2.3 Significance Determination

The EC determines that the Project will not result in significant adverse environmental effects to soils and vegetation due to dust deposition or surface water runoff.

The Proponent has provided management plans, monitoring, adaptive management, and systems to reduce and control effects to soil quality from dust deposition and surface water runoff. Revegetation through planting, seeding, and natural processes is anticipated to begin

[162] Golder Associates, *Literature Review of Current Fugitive Dust Control Practices within the Mining Industry*, 2010, https://iaac-aeic.gc.ca/050/documents/p54755/143421E.pdf.
[163] YOR 2019-0149-9964
[164] YOR 2019-0149-9964

shortly after covers on tailings and waste rock are in place to limit erosion and reduce surface water runoff. Once vegetation is established, these surfaces will be much less susceptible to wind erosion.

In summary, dust and surface water runoff from the Project are expected to result in limited and local changes to soil productivity.

7.6.3 Project Effect: Reduced soil stability due to loss of permafrost or excavation and stockpiling of soil materials

7.6.3.1 Loss of Permafrost

In the Boreal Forest Zone, permafrost is located where soil moisture levels are higher, such as in till, colluviated till, and glaciolacustrine deposits. Within areas mantled by till, permafrost is more common on north-facing slopes and in old-growth forests; these sites typically receive reduced solar radiation. In the Vangorda/Grum area, drilling at the Little Creek dam identified discontinuous permafrost at about 11 m below ground surface. The vertical extent is unknown.[165]

Patterned ground, palsas, thermokarst, and frost boils are commonly associated with the glaciolacustrine deposits in the alpine valleys of Mount Mye (Tsē Zūl). Thermokarst erosion is also present on alluvial plains where streams are eroding fine-grained surficial deposits. Other evidence of permafrost activity occurs in the alpine and subalpine zones and includes frost shattering, stone stripes, and solifluction.[166] A local empirical-statistical permafrost probability model for the Faro Mine area was developed by Bonnaventure and Lewkowicz.[167] Using this model, the probability of permafrost at the spatial scope ranges from roughly 60 % to 82 %. The probability of permafrost is generally highest at the bottom of valleys and along ridgetops.

The Proponent has indicated that mapped permafrost consists of 58.3 ha or 2.9 % of the MDF. There is no mapped permafrost in the Grum overburden dump, or the haul road borrow area. The mapped occurrence of permafrost is limited to three locations at the project site:

- On colluvial or morainal materials in the northwest corner of the area, clustered on the north edge (northwest of the ponds);
- A thin band along the southern edge just west of a small water body. These soils have all formed in till material; and
- A series of scattered polygons along the valley edges of Faro Creek in a protrusion that extends in a northeast direction from the main part of the Faro Mine area. These polygons are primarily steeper till units, except one at the very tip of the protrusion, which is formed in colluvial materials.

[165] SRK Consulting Engineers and Scientists, *Faro Mine Complex 2009 Groundwater Investigations*.
[166] Bond, *Quaternary geology and till geochemistry of the Anvil district (parts of 105K/2, 3, 5, 6 and 7), central Yukon Territory*, 2001.
[167] Bonnaventure and Lewkowicz, “Permafrost probability modeling above and below treeline, Yukon, Canada.” Cold Regions Science and Technology, 2012.

Permafrost degradation is triggered by disturbances that cause the active layer to become saturated or the ground ice to thaw.[168] Similarly, the removal of the organic blanket will often result in the melting of the permafrost and excess water will be allowed to flood the surface, creating poorly drained soil conditions.[169] Other environmental factors that contribute to permafrost degradation include forest fires, river erosion, high pore pressure, and increased groundwater table or surface water runoff.

During the active remediation phase, the Proponent has indicated that all mapped terrain types with permafrost potential will be removed, where disturbance to soils occurs. The loss of permafrost in the MDF is permanent and irreversible. The loss of permafrost will impact soil quality in those areas and will likely change the vegetation communities that have been established. These effects will be isolated to the 58.3 ha within the MDF.

Project activities, including relocating waste rock and tailings, land-clearing and grubbing, development and use of the borrow areas, and the construction of water diversion site infrastructure and facilities, all contribute to an increase in the footprint of the Project. These activities will result in the disturbance and removal of previously undisturbed native soils, which may impact soil stability and thus soil productivity and established vegetation communities.

Comments received from LFN, RRDC, and SFN raised concerns regarding the large volume of materials required for remediation of the site (specifically the covers) and effects related to the increase of the project footprint.

The Proponent has provided a Revegetation Plan,[170] Terrestrial Management and Effects Monitoring Plan,[171] Materials Management Plan,[172] and Borrow Management Plan,[173] which outline how new disturbances will be managed and how the site will be revegetated and monitored. This includes sequencing remediation activities to limit the amount of new disturbance at any one time to the extent feasible, limit areas of vegetation clearing and soil disturbance, limit the length of time that erodible materials are exposed, avoid work during periods of high precipitation, stabilize erodible soil materials as soon as practical, and conduct prompt revegetation (outlined in the Sediment and Erosion Control Plan).[174]

At the end of active remediation, the entire MDF will be reclaimed, with the exception of areas mapped as water (and infrastructure necessary for site maintenance). Approximately 1 072 ha (53.5 % of MDF) of existing mine-disturbed material that does not currently support vegetation communities will be reclaimed. Natural terrain units used as borrow sources during active

[168] Lipovsky and Huscroft, A reconnaissance inventory of permafrost-related landslides in the Pelly River watershed, central Yukon, *Yukon Geological Survey*, 2007.
[169] Doherty, Yukon geoprocess file 2002: geological processes and terrain hazards of Tay River – 105K, *Exploration and Geological Services Division*, 2002.
[170] YOR 2019-0149-8836
[171] YOR 2019-0149-9964
[172] YOR 2019-0149-9964
[173] YOR 2019-0149-9964
[174] YOR 2019-0149-9964

remediation will also be reclaimed (886.4 ha or 44.3 % of the MDF) and are expected to provide functional material for the establishment of productive soils. During the operations and maintenance phase, the previously disturbed areas are expected to support the establishment and succession of vegetation communities (1 958.4 ha or 97.8 % gain in MDF). The information in Table 8 and Table 9, provided by the Proponent, show the conversion of the anthropogenic disturbance footprint to reclaimed areas.

Table 8: Change to Terrain Units within the MDF During the Active Remediation Phase (Adapted from the project proposal)[175]

Terrain Unit	Existing Conditions		Active Remediation		Area Lost/Gained	
	Area (ha)	Proportion (%)	Area (ha)	Proportion (%)	Area (ha)	Proportion (%)
Disturbed (anthropogenic)	1072.1	53.5	1958.4	97.8	886.3	44.3
Colluvium	34.2	1.7	0.0	0.0	-34.2	-1.7
Fluvial	60.0	3.0	0.0	0.0	-60.0	-3.0
Glaciofluvial	281.6	14.1	0.0	0.0	-281.6	-14.1
Morainal	462.1	23.1	0.0	0.0	-462.1	-23.1
Water	44.3	2.2	44.3	2.2	0.0	0.0
Organic	48.5	2.4	0.0	0.0	-48.5	-2.4
Reclaimed[(a)]	0.0	0.0	0.0	0.0	0.0	0.0
Total Terrain Unit Area	**2002.7**	**100.0**	**2002.7**	**100.0**	**0.0**	**0.0**

a) Due to the uncertainty in the timing and amount of progressively reclaimed area, it is assumed that reclaimed areas are not available until after the end of active remediation (i.e., the beginning of long-term operations and maintenance); ha = hectares.

ha = hectares; % = percent.

Table 9: Change to Terrain Units within the MDF During Operations and Maintenance (Adapted from the project proposal)[176]

Terrain Unit	Active Remediation		Long-term Operations and Maintenance		Area Lost/Gained	
	Area (ha)	Proportion (%)	Area (ha)	Proportion (%)	Area (ha)	Proportion (%)
Disturbed (anthropogenic)	1958.4	97.8	0.0	0.0	-1958.4	-97.8
Colluvium	0.0	0.0	0.0	0.0	0.0	0.0
Fluvial	0.0	0.0	0.0	0.0	0.0	0.0
Glaciofluvial	0.0	0.0	0.0	0.0	0.0	0.0
Morainal	0.0	0.0	0.0	0.0	0.0	0.0
Water	44.3	2.2	44.3	2.2	0.0	0.0
Organic	0.0	0.0	0.0	0.0	0.0	0.0
Reclaimed	0.0	0.0	1958.4	97.8	1958.4	97.8
Total Terrain Unit Area	**2002.7**	**100.0**	**2002.7**	**100.0**	**0.0**	**0.0**

ha = hectares; % = percent.

[175] YOR 2019-0149-6443
[176] YOR 2019-0149-6443

7.6.3.2 Change in Soil Profile

In addition to increasing the footprint of the Project, these activities may result in changes to the soil profile and final terrain conditions. All the native or undisturbed soil map units are assumed to be disturbed and are reassigned to the disturbed land map unit. This reduces native soil unit distribution and results in a more homogeneous landscape. The conversion of native soils to disturbed soils is deemed permanent, as native soils cannot be restored during the project assessment period. Native soils form due to complex interactions between inherent parent material properties, topography, weather, and other factors, and may take thousands of years to form. Increased homogeneity of the soils will result in changes to the soil quality, productivity, and vegetation community. The Proponent has provided the following mitigations that are outlined in the Revegetation Plan:

- Developing appropriate soil prescriptions designed to encourage vegetation communities;
- Controlling soil permeability in non-root zones to limit water movement/infiltration when necessary;
- Re-sloping and re-contouring terrain to achieve variation of slope steepness, length, aspect, and shape;
- De-compacting soil materials, if necessary, to establish suitable conditions for revegetation;
- Before materials are removed from a borrow area, salvaging topsoil and removing and stockpiling overburden separately;
- Upon completion of extraction, spreading stockpiled topsoil across the final graded borrow area to facilitate revegetation;
- As required, adding soil ameliorants (e.g., fertilizer, organic matter) to soil placed after long-term storage;
- Preserving adequate volumes of overburden and topsoil for use during remediation for cover material and for borrow;
- Progressive reclamation;
- Limiting the number of times soil materials are handled (i.e., direct placement rather than intermediate storage), when practical, to reduce soil degradation and loss;
- Following recommended slope ratios in the Remediation Plan[177] to achieve slope stability (slope ratios);
- Employing environmental monitors at site during active remediation to monitor adherence to mitigation measures; and
- Developing and following specific environmental protection plans prior to start of construction activities.

Disturbed soils can be reclaimed with appropriate mixing of materials, and over time, support similar ecosystem functions as native soils. Several studies have shown that reconstructed soils

[177] YOR 2019-0149-6443

can perform similarly in function to native soils and can support equivalent plant communities.[178] Although effects to soil stability and thus soil quality and vegetation are likely and adverse during the active remediation phase of the Project, the reclamation of the majority of the MDF area (97.8 %) will reduce long-term effects from native soil disturbance and terrain modifications. Although there will be a loss of native soil, the existing mine-disturbed soils (53.5 % of the MDF) that could not support vegetation communities will be reclaimed. The mitigations provided by the Proponent will ensure that disturbed native soil areas are reclaimed in such a manner that promotes vegetation regrowth, limits erosion, and reflects a soil profile conducive to the establishment and succession of vegetation communities beyond the 25-year assessment boundary.

7.6.3.3 Significance Determination

The EC determines that the Project will not result in significant adverse environmental effects to soils and vegetation as a result of permafrost loss or change in soil profile.

Given the remediation activities proposed in these areas, the established vegetation overlaying the mapped permafrost layer will be disturbed and removed, contributing to poor soil stability as the soil becomes saturated with meltwater. Although the loss of permafrost in the spatial scope will be permanent, irreversible, and likely, this loss will be isolated and represents a small geographic area (58.3 ha or 2.9 % of the MDF).

The Proponent has indicated that 97.8 % of the MDF will be revegetated, including the areas overlapping with permafrost. Revegetation will contribute to an increase in soil stability and reduce the magnitude of effects to soil stability through operations and maintenance of the site.

Regarding changes in soil quality, productivity, and vegetation as a result of changes to the soils and vegetation, the Proponent has provided detailed mitigation measures to ensure timely and effective remediation of disturbed areas. These mitigations reduce the magnitude of effects by promoting the establishment and succession of vegetation communities and limiting erosion.

7.6.4 Project Effect: Reduced ecosystem integrity from slope instability or failure

The Project includes major earthworks, relocating and consolidation of waste rock and tailings, land-clearing, grubbing, and excavation, as well as cover construction, landforming, and revegetation activities. These activities may contribute to slope instability and soil degradation from slides and slope failures.

The assessment focuses on slope stability because it links topography with important environmental factors related to reclamation success (e.g., soil erosion, quantity, and productivity) and can adversely influence human safety. Stability is measured using a class system where low numbers (I, II, III) are deemed stable and unlikely to fail under normal

[178] Séré, G., Schwartz, Ouvrard, et al., “Soil Construction: A Step for Ecological Reclamation of Derelict Lands” *Journal of Soils and Sediments 8*, 130, (2008); Holl, “Long-term Vegetation Recovery on Reclaimed Coal Surface Mines in the Eastern USA.” *Journal of Applied Ecology* 39-6, 2002.

circumstances, and higher numbers (IV, V) represent higher risk. As such, the assessment focuses on classes IV and V.

Under existing conditions, terrain mapping indicates that approximately 2.5 % of the MDF is comprised of slope stability class IV or V. The Proponent has provided a description of these two classes that are distributed among the three primary areas of the MDF:

- **Faro Mine area:** There are two main locations within this area where class IV or V terrain occurs. The first occurs on colluvial terrain units in the northwest corner of the area, clustered on the north edge (northwest of the ponds). The second is along the valley edges of Faro Creek in a protrusion that extends in a northeast direction from the main part of the Faro Mine Site. These polygons are primarily steeper till units, but some are comprised of colluvial material. In addition to the main concentrations, several scattered polygons occur within this area. With the exception of a colluvial polygon, contained within which a discontinuous band of till running through the bottom third of the area, all are very small (<1 ha); and
- **Haul road borrow area:** There is a narrow band of class IV or V terrain, associated with a colluvial polygon on the northern boundary of this area.

The Proponent has provided a Sediment and Erosion Control Plan[179] and the Revegetation Plan,[180] which provide mitigations and monitoring requirements to reduce and prevent slope instability and slides. These mitigations include the following:

- Limit areas of vegetation clearing and soil disturbance;
- Limit the length of time that erodible materials are exposed;
- Limit steepness and length of slopes of disturbed areas and stockpiled material;
- Stabilize erodible materials as soon as practicable;
- Limit the length of time soil is disturbed through prompt revegetation, when possible;
- Develop appropriate soil prescriptions designed to encourage vegetation communities;
- Control soil permeability in non-root zones to limit water movement/infiltration when necessary; and
- Re-slope and re-contour terrain to achieve variation of slope steepness, length, aspect, and shape, which will encourage diverse vegetation communities.

Additional mitigations are included in the Water Management Plan[181] to help control surface water runoff, which will in turn limit soil erosion and sedimentation. These mitigations include scheduling and staging activities to limit the extent of areas of disturbed soils and to limit duration of exposure to erosional forces. Slope ratios at the project site will follow the Remediation Plan[182] to achieve slope stability.

[179] YOR 2019-0149-9964
[180] YOR 2019-0149-8836
[181] YOR 2019-0149-9964
[182] YOR 2019-0149-8532

During the active remediation phase, large-scale earthmoving and related activities occurring at various locations over several years will create a landscape that is constantly in transition, particularly during earlier stages. The mitigation measures provided by the Proponent, including monitoring of the site, will ensure that unstable slopes are identified early and addressed to prevent slope failure and reduce impacts to soil quality and ecosystem integrity.

In addition to addressing concerns regarding new slopes on-site, the Proponent has indicated that slope ratios of waste rock dumps and tailings areas are known to exceed the recommended ratios in some areas and will be addressed during the active remediation phase of the Project. These activities will address concerns related to the potential for instability in these areas. The final recommended slope ratios in the Remediation Plan are typically 3H:1V or gentler for reclaimed land in the MDF. Through project activities and proposed mitigation and monitoring plans, the class IV and V slopes will be made more stable and the Proponent will ensure that new slopes are left in stable condition. This includes landforms and external slopes in the project area and the tailings retaining dams.[183] It should be noted that the unstable slope conditions in the Faro pit will remain unchanged well beyond the temporal boundary of the assessment.

7.6.4.1 Significance Determination

The EC determines that the Project will not result in significant adverse environmental effects to soils and vegetation as a result of slope instability and failure.

The Proponent has provided plans, mitigation measures, and monitoring requirements that reduce the likelihood of slope instability or failure and its subsequent impacts on the integrity of the affected ecosystem and ensure a timely and effective remediation of unstable slopes. These mitigation measures reduce the likelihood of slides occurring as well as the magnitude of effects by reducing the length of time slopes are left in an unstable state.

[183] YOR 2019-0149-8532

8 AIR QUALITY

8.1 Overview

Air quality is defined as the degree to which air in a particular location is free of air pollutants. The focus of this VESEC is on outdoor air quality, in proximity to the project site and in the surrounding area.

Air contaminant modelling and the HHERA identified the potential for intermittent contaminant exceedances during the active remediation phase. Proponent mitigations, coupled with the short duration, intermittent frequency, relatively limited extent, and reversibility, as discussed below, have led the EC to determine that the Project is not likely to result in significant adverse effects to air quality and to the health of off-duty workers and local land users during the life of the Project.

8.1.1 Reason for Inclusion

The World Health Organization (WHO) suggests that air pollution presents the biggest environmental risk to human health.[184] GC estimates that 15 300 premature deaths per year in Canada can be linked to air pollution from fine particulate matter, nitrogen dioxide, and ozone.[185] The total economic value of the health effects attributable to air pollution in Canada is $120 billion per year.[186]

The Proponent identified air quality as an IC. The EC has, however, chosen to select air quality as a VESEC, due to its inherent value to human and environmental health. Overall health and well-being are greatly tied to and influenced by one's respiratory health. Workers, residents, and land users in the vicinity of reclamation activities may be exposed to contaminants and fine particulate matter (e.g., fugitive dust) as project activities can introduce a suite of chemicals and contaminants into the environment. Such exposure may result in short-term illness, such as asthma and bronchitis, as well as lead to chronic conditions that include emphysema and various forms of heart disease.[187] Air pollution, even at low levels, can lead to disease, increased hospitalization, and premature death.[188] The majority of adverse health effects are associated with exposure to fine particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2), ozone (O_3), and sulphur dioxide (SO_2).

[184] Canadian Council of Ministers of the Environment, Canada's Air, n.d., https://ccme.ca/en/air-quality-report.
[185] Government of Canada, Health Impacts of Air Pollution in Canada, 2021, https://www.canada.ca/content/dam/hc-sc/documents/services/publications/healthy-living/2021-health-effects-indoor-air-pollution/hia-report-eng.pdf.
[186] Government of Canada, Health Impacts of Air Pollution in Canada. Dollars in 2016 Canadian dollars.
[187] Ibid.
[188] Ibid.

Air quality may impact other ecosystem components, such as wildlife and vegetation, as well as serve as a pathway for impacts to aquatic and terrestrial environments.

8.2 Legislative and Other Requirements

8.2.1 Environment Act

The Yukon *Environment Act*[189] ensures the maintenance of ecological and biological processes and diversity through wise management of the environment and promotes sustainable development in the interest of all Yukon residents and their well-being by integrating consideration of the environment into public policy. This includes provisions pertaining to the release of contaminants into the environment.

8.2.2 Air Emission Regulations

The *Air Emission Regulations*,[190] pursuant to the *Environment Act*, contain sections relevant to air quality and consideration of human health and safety, including specifically the release of air contaminants.

8.2.3 Air Quality Standards and Criteria

The Canadian Ambient Air Quality Standards (CAAQS) provide guidelines for air quality improvement across Canada, based on the objectives of protecting human health and the environment with associated management levels. The CAAQS have been established as ambient air quality objectives by the federal government under the *Canadian Environmental Protection Act*, 1999.[191] The CAAQS do not represent pollute-up-to levels and proactive actions should be taken to prevent CAAQS exceedances. The CAAQS are reviewed on a five-year basis[192] to reflect current knowledge of and ensure best practices in contaminant exposure.

The territory has developed the Yukon Ambient Air Quality Standards (YAAQS). Both the federal and territorial standards address NO_2, SO_2, and Total Suspended Particles (TSP), and within TSP, coarse particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$) and ground-level ozone.

Air quality standards across jurisdictions are regularly (every few years) updated to reflect new health, science, and other data and findings. Both the YAAQS and CAAQS will be updated as of January 1, 2025. The 2025 adjusted values are readily available to the public and industry, so

[189] Government of Yukon. *Environment Act. RSY 2002*, c. 76 2002, https://laws.yukon.ca/cms/images/LEGISLATION/PRINCIPAL/2002/2002-0076/2002-0076.pdf.
[190] Government of Yukon, *Environment Act, Air Emissions Regulations, O.I.C. 1998/207*. 2008, https://laws.yukon.ca/cms/images/LEGISLATION/PRINCIPAL/2002/2002-0076/2002-0076.pdf.
[191] Canadian Council of Ministers of the Environment, *Guidance Document on Achievement Determination for Canadian Ambient Air Quality Standards for Sulphur Dioxide*, 2020, https://www.ccme.ca/en/res/gdadforcaaqsforsulphurdioxide_en1.0.pdf.
[192] The current CAAQS were developed in 2020; the current YAAQS will apply up to January 2025, at which point the revised 2025 standards will be implemented. The EC has chosen to apply the 2025 standards, given the timeline for the Project.

that future forecasting and planning can consider upcoming changes. As the Project is proposed to occur over a 25-year period, the EC determines that the 2025 YAAQs and CAAQs will be used for reference in the assessment. Additionally, standards for Carbon Monoxide (CO) were not carried forward from the 2014 YAAQS, however these were used by the Proponent for analysis. The application of British Columbia Air Quality Standards (2021) for CO is recommended and will be applied by the EC.[193]

While the Yukon has the YAAQS, there are no standards established for metals. The federal government also has no criteria for metals in place. Ontario, conversely, has robust criteria[194] for an extensive list of ambient metals, which will be used to inform the EC's assessment of potential adverse effects.

8.3 Spatial Boundaries

The spatial boundary is divided into the LAA and RAA in the project proposal as shown in Figure 7. More specifically:

- The LAA is defined as a 20 km by 20 km area centred on the Project, including the Town of Faro. It is expected that this area will experience the greatest effects to air quality and is an area where there is a greater degree of certainty around measurements and predictions of effects; and
- The RAA is defined as 70 km (east-west) by 50 km (north-south), with the western edge encompassing the confluence of Anvil Creek and the Pelly River. This area is that which was used in the Proponent's air quality dispersion modelling. Input from HC coupled with the Proponent's consideration of previous modelling for the Faro Mine, and from examination of dispersion modelling of projects with similar emission sources, led to the development of this boundary.[195]

[193] Government of British Columbia, *British Columbia Ambient Air Quality Objectives*, 2021, https://www2.gov.bc.ca/assets/gov/environment/air-land-water/air/reports-pub/prov_air_qual_objectives_fact_sheet.pdf.
[194] Government of Ontario, *Ambient Air Quality Criteria,* 2020, https://files.ontario.ca/mecp-ambient-air-quality-criteria-list-en-2020-05-01.pdf.
[195] YOR 2019-0149-7410

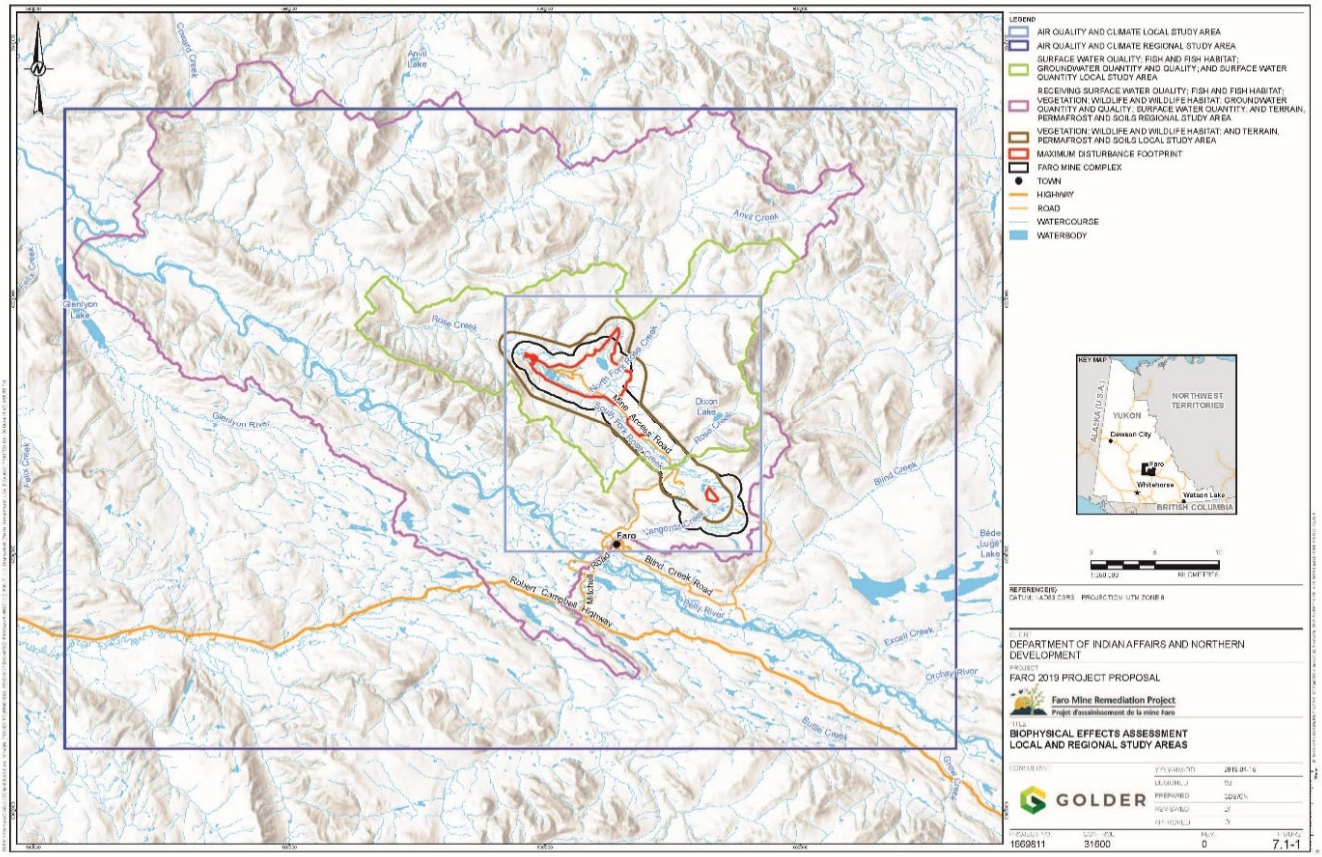

Figure 7: Air Quality Local and Regional Assessment Area[196]

8.4 First Nation and Community Input

The project proposal, TK, and land use information identifies traditional land-use activities (e.g., hunting, trapping, and fishing) that may occur in the project area. These land users may be exposed to contaminants or other air quality disturbances resulting from the active remediation and operations and maintenance phases.

Comments specific to air quality were not received by the EC from the three First Nations governments, however there were comments pertaining to climate change, which are captured and addressed in the atmospheric greenhouse gas VESEC (section 13). Many comments received did outline concerns related to traditional land use, community well-being (including human health), and possible impacts to the environment broadly, and, more specifically to fish, wildlife, and plants as it relates to harvest practices. These can be tied to air quality, in part due to the concerns having been raised surrounding perceived and actual contamination, of which part of this can be linked to air quality, including dust and metal deposition and resulting uptake by plants and animals. Additionally, comments received pertaining to sense of place, traditional land uses, and human health can also be linked to air quality, as all are influenced in part by the quality of the environment, in particular clean air.

[196] YOR 2019-0149-7410

First Nations did raise concerns pertaining to historical contamination on-site and human and environmental health concerns associated with those contaminants and their possible disturbance with project activities, such as earthworks. In SATAC II[197] and III,[198] First Nations also raised and discussed concerns with the reality and perception of contamination of both ground and water sources at the site. SATAC I[199] discussed contamination more broadly and with greater focus on water, fish, and fish habitat.

SATAC II acknowledged and discussed the interconnectivity amongst real and perceived contamination on-site and the effects to human and environmental health. LFN raised the following:

> While air quality, contamination, and noise can affect health, in general we have a very narrow expectation of the Human Health Risk Assessment in these environmental assessments […] It's a modeling tool to measure whether exposures may exceed a guideline, that's all. Health is much broader than the biophysical effects that might occur. Clear links need to be made between human health and broader community wellbeing indicators and VESECs.[200]

Similar sentiments were echoed by SFN during SATAC II: "Contaminants perceived or actual do affect where people choose to go/harvest on the landscape. There are relevant linkages between Land Use and Perceived Contamination."[201]

8.5 Existing Conditions

8.5.1 Air Quality Monitoring in the Yukon

The City of Whitehorse

Since 2011, YG has operated an outdoor air quality monitoring station in the City of Whitehorse as part of the National Air Pollution Surveillance (NAPS) network. No other NAPS stations are currently located in the Yukon.

$PM_{2.5}$ Purple Air Sensors

In 2019, YG installed small particulate matter sensors throughout the Yukon. These sensors are known as Purple Air sensors, which record and provide real-time air quality data on an interactive map. Purple Air sensors are located throughout other provinces and countries and build upon existing government and agency monitoring stations. Access to an availability of such data will inform air quality fluctuations in communities, including the Town of Faro.

[197] YOR 2019-0149-3563
[198] YOR 2019-0149-9549
[199] YOR 2019-0149-9158
[200] YOR 2019-0149-3563, p.8
[201] YOR 2019-0149-3563, p.9

Air Quality Repository

In March of 2022, the Decision Bodies issued the Decision Document[202] for the Coffee Gold Mine Project. In this Decision Document, a YESAA s. 110 monitoring requirement was accepted by the Decision Bodies:

> At the commencement of Project Operations, Government of Yukon (YG) shall develop a repository for the monitoring data collected by the Proponent under the Air Quality and Dust Management Plan, and which it will provide on a timely (quarterly) basis. This repository will be accessible to First Nations, industry parties, regulators and the general public. YG shall review repository data and ensure compliance with the Adaptive Management Measures outlined under Mitigations 40 and 41.[203]

It is unclear at this time, how this s.110 monitoring requirement is being pursued and implemented by YG; however, it is important to make note of the possibility of a future publicly accessible repository for air quality monitoring data for the Yukon..

If such a repository is created, the Project should serve as a source of data and could look to this repository as a source of supplemental data informing the Project's adaptive management into the future.

Criteria Air Contaminants/Contaminants of Potential Concern

Major earthworks and associated remediation activities to achieve the plan for the Faro Mine remediation will result in the introduction of contaminants, including dust, into the air through a range of emission sources. Changes to air quality from this introduction of contaminants can lead to short-term health effects as well as chronic disease, especially at high concentrations.

CACs are a set of pollutants typically produced by fossil fuel combustion, emitted by a variety of sources. Contaminants of Potential Concern (COPCs) are defined as any contaminant or chemical that may cause risk or adverse effects to the plants and animals at a site. CACs are typically used and examined in relation to air quality, while COPCs are tracked and considered in relation to human and environmental health. Collectively, their consideration provides a more comprehensive understanding of impacts to human health because of changes in air quality.

CACs were adopted for air quality analysis because of their association with mining activities and adverse health effects and have measurable parameters linked to Yukon and Canadian air quality standards.

These CACs, sources of their emissions, and possible health effects are listed in Table 10. The project proposal outlines the sources of CACs in greater detail specific to project tasks as well as the resulting emission type and locations.[204]

[202] YOR 2017-0211-8404
[203] YOR 2017-0211-8404, p.13
[204] YOR 2019-0149-0334, p.2

Table 10: Sources and Possible Health Effects of CACs

CAC	Source	Health Effects
Total Suspended Particles (TSP)	Refers to airborne solid and liquid microscopic particles (excepting water), suspended in the air momentarily or indefinitely; both natural and anthropogenic sources can generate TSP (e.g., industrial emissions, forest fires)	Respiratory tract effects, asthma, bronchitis, and heart attacks
Fine Particulate Matter ($PM_{2.5}$)	Originates primarily from combustion in transportation and industrial processes and burning	Increased frequency of asthma attacks, chronic bronchitis, and heart attacks
Coarse Particulate Matter (PM_{10})	Predominantly results from unpaved-road dust, construction activities, mining, and quarrying	Upper respiratory tract effects, such as cough, phlegm, rhinitis, and asthma
Sulphur dioxide (SO_2)	Emitted when industrial processes burn or use fossil fuels or raw materials containing sulphur	Reduced lung function, respiratory problems, and airway inflammation
Nitrogen dioxide[205] ($_{32}$)*	Formed primarily through the burning of fossil fuels	Reduced lung function, respiratory problems, airway inflammation, allergic reactions, asthma, and increased susceptibility to respiratory infection
Carbon monoxide (CO)	Majority of sources to outdoor air are vehicles, such as trucks or other machinery that burn fossil fuels	Reduced oxygen, chest pains, dizziness, and confusion

*NO_2 often represented by NO_x—see footnote 199.

Federal and territorial ambient air quality standards address these CACs and establish levels for tolerable concentrations; however, these are not to be interpreted as “pollute-up-to” levels. Specifically, both NO_2 and $PM_{2.5}$ are considered “non-threshold” contaminants, i.e., any increase in concentration represents an increased risk of adverse health effects.

These same contaminants (i.e., CACs) in addition to others, known as contaminants or COPCs when conducting and considering HHERA, were identified for air quality and broadly include particulate matter (PM_{10} and $PM_{2.5}$), volatile organic compounds, ambient metals, and particular hydrocarbons and acid gases. Health-based screening values and environmental quality

[205] Nitrogen dioxide (NO_2) is often represented by the term “nitrogen oxides” (NO_x) as a collective term encompassing NO_2 as well as other nitrogen-based compounds, such as nitric oxide (NO), nitrous oxide (N_2O), and others. Emissions collection and air quality modelling considers, predicts, and outputs using NO_x, where additional calculations are required to derive NO_2 concentrations, therefore often NO_x is used when discussing and considering NO_2 implications.

standards have been established by reputable agencies, such as the Government of Yukon department of Environment, Canadian Council of Ministers of the Environment (CCME), and HC to assess inhalation and multimedia exposure impacts to human health.

While occupational exposure to COPCs while working is covered under the *Occupational Health and Safety Act*, potential health effects through passive exposure is not. As such, the EC has assumed that off-duty workers are not subject to the same personal protective equipment (PPE) requirements as on-duty workers, despite being in the workplace while on-shift (i.e., residing at camp) but off-duty. The EC acknowledges the reasonable possibility that these workers may be exposed to contaminants, given proximity of the camp to remediation activities.

8.5.2 Existing Conditions

Existing conditions for air quality are informed by the Project's location, coupled with the state of the project site, the climate, and meteorological conditions.

The project area, situated in proximity to the Town of Faro and the community of Ross River, sees the main air emission sources as emissions and dust from unpaved roads or other areas experiencing wind erosion (including waste rock dumps, tailings areas, and other unvegetated areas), vehicles, combustion emissions from residential heating, and forest fires.

The existing conditions are those projected[206] to exist following the completion of the emergency works[207] of the North Fork Rose Creek realignment.[208] These conditions for the LAA and RAA were established using data from a 2008 sampling program coupled with monitoring data from stations operated by ECCC (NAPS monitoring network). Additional monitoring occurred in 2017, which provided greater clarity to the NAPS data and the 2008 data initially collected.

All air quality measurement indicators for existing conditions are below the adopted standards. Yukon standards were applied where they existed, and where they did not, national criteria, followed by other jurisdictions, were used.

The CACs data was collected through the 2008 study and available NAPS data. Specifically, TSP, PM_{10}, and ambient metals data was collected through the 2008 study, while $PM_{2.5}$, NO_2, SO_2, and CO were established based on NAPS monitoring data collected between 2012 to 2016. Table[209] in the project proposal outlines, for each of the CACs and metals, the monitoring station location, record date, and the data source.

[206] YOR 2019-0149-0334, air quality conditions were projected for 2022, following completion of these works.
[207] Government of Yukon, *Milestone reached: North Fork of Rose Creek Realignment in Faro Mine Remediation Projec*t, 2020, https://www.canada.ca/en/crown-indigenous-relations-northern-affairs/news/2020/10/milestone-reached-north-fork-of-rose-creek-realignment-in-faro-mine-remediation-project.html.
[208] YOR 2019-0149-0334, the North Fork Rose Creek realignment work was identified as emergency works and is outside of the project scope.
[209] YOR 2019-0149-0334, p.4

Table 11: CAC and Ambient Metals Data Sources[210]

Air Quality Indicator		Monitoring Station Location	Period of Record	Data Source
CACs	TSP	2008 monitoring program – 9 stations around the Faro Mine and the Town of Faro	17 Jul to 3 Oct 2008	SENES 2009
	PM_{10}	2008 monitoring program – 9 stations around the Faro Mine and the Town of Faro	17 Jul to 3 Oct 2008	SENES 2009
		NAPS data (Steele Street Station) for $PM_{2.5}$ and literature review to derive a $PM_{2.5}/PM_{10}$ ratio	2012 to 2016	ECCC Database accessed November 2017 (ECCC 2017)
		2017 monitoring program – 8 locations on the Faro Mine	October 2017 (One 24-hour period of sampling at each location during October)	Parsons 2017
	$PM_{2.5}$	NAPS data (Steele Street Station)	2012 to 2016	ECCC Database accessed November 2017 (ECCC 2017)
		2017 monitoring program – 8 locations at the Faro Mine	October 2017 (One 24-hour period of sampling at each location during October)	Parsons 2017
	NO_2	NAPS data (Steele Street Station)	2012 to 2016	ECCC Database accessed November 2017 (ECCC 2017)
	SO_2	NAPS data (Norman Wells Station)	2012 to 2016	ECCC Database accessed November 2017 (ECCC 2017)
	CO	NAPS data (Steele Street Station)	2012 to 2016	ECCC Database accessed November 2017 (ECCC 2017)
Metals	Ambient metals	2008 monitoring program – 9 stations around the Faro Mine and the Town of Faro	17 Jul to 3 Oct 2008	SENES 2009

[210] Ibid.

8.6 Proponent Mitigation Measures

The Proponent has introduced mitigation measures contained within specific management plans. These include:

- Dust Management Plan
- Air Quality and Meteorological Monitoring Plan
- Materials Management Plan
- Borrow Management Plan
- Adaptive Management Plan

Through the Dust Management Plan, the Proponent proposes a number of mitigation measures to be implemented to address dust, including project-site speed limits, minimizing driving and hauling distances where possible, applying dust suppressants and road-watering measures during critical periods, limiting the number of vehicles on-site, and ongoing road maintenance. Additional measures include applying minimum disturbance areas, progressive rehabilitation and revegetation, stockpile orientation, and incorporation of wind breaks.

To address NO_x (which includes NO_2) emissions, the use of generators is to be limited to occasional instances where back-up power for the PWTP is required. In providing a response to IR No. R1-6[211], the Proponent outlined several additional mitigation measures to be implemented to mitigate emissions, specifically to address NO_x concentrations. These include the development of an anti-idling policy, scheduled preventative maintenance on non-road equipment, and requirements for construction vehicles to meet U.S. Environmental Protection Agency Tier 4 or better standards.

8.6.1 Monitoring and Management

Monitoring programs will be implemented and used to evaluate mitigation effectiveness and facilitate adaptive management modifications or enhancements. They are also expected to identify unforeseen effects, including accidents and malfunctions. Given the perpetuity of the project, monitoring is expected to provide information to inform and facilitate the implementation of adaptive management beyond the life of the Project.

The Proponent has introduced a number of monitoring and management programs, some of which are more conceptual in design than others. Specific to air quality, these include:

- Dust Management Plan, Section 11A.3[212]
- Air Quality and Meteorological Monitoring Plan, Section 11A.9[213]
- Borrow Management Plan, Section 11A.4[214]

[211] YOR 2019-0149-5406
[212] YOR 2019-0149-9964
[213] YOR 2019-0149-9964
[214] YOR 2019-0149-9964

The Dust Management Plan introduces the implementation of thresholds to facilitate contingency measures to address dust control. These thresholds are to be based on results stemming from air quality monitoring and tied to adaptive management. Findings may result in yet more additional control measures to be established and implemented.

The Dust Management Plan is comprised in part of the requirement for an annual dust assessment report. This is to assess and recommend the required suppression measures, and their locations, for the following year.

The Air Quality and Meteorological Monitoring Plan (AQMMP) is proposed to be implemented alongside the Dust Management Plan. This program is intended to ensure ongoing monitoring of the state of the site and confirm effectiveness of dust mitigations. The AQMMP also references the annual report, as required of the Dust Management Plan, assessing and recommending future dust-suppression measures and locations at the site.

While not expressly included as part of air quality modelling or the HHERA, awareness of and attention to potential toxic vapours has been noted by the EC and are broadly linked to air quality. It is therefore important to note that toxic gases, such as hydrogen sulphide, carbon dioxide, and volatile organic compounds may be generated because of earthworks. This is predominantly due to historical subsurface contamination that, when disturbed, could result in the release of such vapours. The Proponent's response to IR No. R1-16[215] identifies specific likely sources for these potentially hazardous vapours on-site. Monitoring through the Health and Safety Management Program is expected to detect these vapours, and a health/industrial hygiene program is to be implemented to manage any potential effects to workers from vapour release at site. Both ambient air sampling and worker occupation health and safety air sampling will be included to monitor vapour release. Through monitoring, the Proponent intends to establish an adaptive action plan whereby specific actions and responses are tied to established triggers. Through the Proponent's response to IR No. R2-14,[216] potential effects and likelihood of exposure to such sources were discussed and rationale provided as to the limited probability of exposure and supporting on-site management measures for health and safety.

8.7 Project Effects Characterization

Based on projected air emissions during the most intensive active remediation year, changes to air quality are anticipated during this phase of the Project. More specifically, land-clearing and re-grading, material handling and processing, heavy-duty off-road equipment use, material storage, electricity and heat production, and landfilling and waste incineration are the key active remediation activities that are implicated in CAC emissions.

The 10-year operations and maintenance phase is also expected to increased CAC emissions, albeit from fewer sources. Wind erosion of the remediated mine tailings and waste rock areas is the expected predominant source of emissions during this period, particularly as revegetation

[215] YOR 2019-0149-5406
[216] YOR 2019-0149-7010

efforts progress prior to there being established vegetation communities (e.g., grasses and shrubs). Light-duty off-road vehicle use, and generator use (as needed) are expected to contribute moderately to emissions during this phase. With a lack of continuous sources of air emissions, once in the 10-year operations and maintenance phase, the emissions are expected to be intermittent.

Estimated contaminant emission rates, established to represent the peak of active remediation, were combined with meteorological and climate data to produce ambient concentration predictions during the active remediation phase. In addition to grid-based receptors and maximum disturbance receptors, the Proponent selected several discrete receptor locations within both the LAA and RAA. These distinct receptor locations include upstream and downstream locations on the Pelly River, several hypothetical and identified hunting/fishing camps and other recreational areas, the pumphouse pond, Dixon Lake, and the Town of Faro. The HHERA further considered many of these same receptors, as well as the worker camp. Hunting/Fishing Camp 1 was selected as representative of a location continually accessible throughout all phases of the Project and informed by the knowledge that seasonal camps historically existed in the past. This location represents the worst-case exposure scenario during active remediation. Additionally, separate haul road modelling was implemented to gain a clear understanding of contaminants in relation to haul road activity.

As outlined in the Legislative and Other Requirements section, the EC has considered the 2025 YAAQS and CAAQS standards in relation to the modelling data in carrying out the effects characterization, as the temporal scope of the project is for 25 years, which will see applicability of the 2025 values at such time. Characterizing effects with those standards in mind is proactive.

8.7.1 Project Effect: Exceedances of air quality standards during active remediation for TSP, PM_{10}, and $PM_{2.5}$

The Proponent notes that predicted ambient concentrations are conservative in that these concentrations represent worst-case meteorological and operational conditions. For example, the assumption that all heavy equipment will operate at maximum emission rates 20 hours per day annually, or assumptions of the amount of surface area disturbed and susceptible to wind erosion coupled with application of the maximum rate of erosion over a 24-hour period.[217]

Project design activities aimed at reducing fugitive dust emissions were factored into air dispersion modelling.

Predicted ambient concentrations for PM_{10}, $PM_{2.5}$, and TSP annually and per 24-hour averaging period are expected to exceed YAAQS. The Proponent applied YAAQS from 2014,[218] whereas current YAAQS were updated in 2020, and increased restrictive standards are again coming

[217] YOR 2019-0149-0334
[218] Ibid.

into effect January 1, 2025.[219] The EC has chosen to apply the 2025 territorial and federal standards in its analysis. The predicted ambient concentrations for these CACs continue to exceed the 2025 YAAQS as summarized in Table 12 "any projects and developments that will extend past January 1, 2024 should take the updated standards into account."[220] These exceedances are expected to occur during the active remediation phase of the Project, per worst-case scenario data inputs to modelling. These exceedances are largely confined to the LAA and, more specifically, the majority concentrated within the MDF. $PM_{2.5}$ and TSP exceedances extend down the Rose Creek drainage into the RAA, by roughly 300 m and 3 km respectively.

Specific to the haul road, findings conclude that fugitive road dust emissions are predicted to exceed the YAAQS along the haul road. However, these values substantially decrease within 100 m of the road and are expected to dissipate quickly, due to their intermittent and infrequent nature.

Table 12: CAC Concentrations Predicted to Exceed Ambient Air Quality Guidelines

CAC	YAAQS (2025)	Predicted Concentrations[221]
$PM_{2.5}$ (µg/m3)		
24-hour avg	27	95
Annual mean	8.8	24
PM_{10} (µg/m3)		
24-hour avg	50	478
TSP(µg/m3)		
24-hour avg	120	1 097
Annual mean	60	241

The project proposal outlines the following:

- PM_{10}
- "For the 24-hour averaging period, the change in maximum PM_{10} concentration is 956 percent of the YAAQS."[222]
- TSP
- "For the 24-hour averaging period, the change in maximum TSP concentration is 913 percent of the YAAQS."[223]

[219] Government of Yukon, *Yukon Ambient Air Quality Standards*, 2019, https://yukon.ca/sites/yukon.ca/files/env/env-yukon-ambient-air-quality-standards.pdf.
[220] Government of Yukon, *Yukon Ambient Air Quality Standards*.
[221] YOR 2019-0149-0334
[222] 2019-0149-0334, p.36
[223] 2019-0149-0334, p.36

- "For the annual averaging period, the change in maximum TSP concentration is 402 percent of the YAAQS."[224]
- $PM_{2.5}$
- The Proponent's calculations of the percent of YAAQS for the above CACs was based on 2014 YAAQS. The 2025 YAAQS for TSP and PM_{10} thresholds have not changed. However, the thresholds for $PM_{2.5}$ have become more restrictive, per the YAAQS 2025, and as such percentage changes in maximum $PM_{2.5}$ concentrations would increase beyond the 336 % and 235 % for 24-hour and annual average periods respectively.[225]

8.7.1.1 Significance Determination

Predicted concentrations of TSP, PM_{10}, and $PM_{2.5}$ will exceed YAAQS thresholds during active remediation. However, exceedances are largely confined to the MDF. As this area encompasses the camp facilities, worker exposure is likely, resulting in experience of short-term effects to respiratory health. There is a lower likelihood that land-based users would be adversely affected since there is a low likelihood that their land-use activities in the project area would overlap temporally and spatially with increased CAC levels.

While exceedances of $PM_{2.5}$, TSP, and PM_{10} are likely to result in short-term health effects to workers and land-based users through contaminant inhalation, exceedances are predicted to occur infrequently and intermittently. Further, this estimation is based on conservative and worst-case scenario modelling undertaken by the Proponent. Exposure to contaminants will thus be infrequent and short in duration (i.e., 24 hours). Effects are reversible once contaminant concentrations are reduced. Implementation of health, safety, and monitoring mitigation measures at the on-site worker camp and throughout the life of the Project by the Proponent will further reduce or eliminate effects.

The EC determines that the Project will not result in significant effects to the respiratory health of off-duty workers and land-based users stemming from increased concentrations in TSP, $PM_{2.5}$, and PM_{10}.

8.7.2 Project Effect: NO_2 emissions exceed both one-hour and annual YAAQS

Modelling does not directly predict results for NO_2, rather models for nitrogen oxides (NO_x). The NO_x predicted by the model is subsequently processed to derive NO_2 predictions. Assumptions made include the conservative approach of assuming 20 hours per day, 365 days a year that NO_x is emitted.

The Proponent's modelling compared derived NO_2 predictions against 2014 YAAQS and determined only exceedance of the one-hour average concentrations would occur. However,

[224] 2019-0149-0334, p.36
[225] 2019-0149-0334, p.36

when comparing with existing YAAQS (2020) and 2025 YAAQS, both one-hour and annual concentrations are exceeding the standards, as can be seen in Table 13.

Table 13: NO_2 Concentrations Predicted to Exceed YAAQS

CAC	YAAQS (2014)	YAAQS (2020)	YAAQS (2025)	Predicted concentrations + background concentrations*
NO_2 (µg/m3)				
1-hour avg	400	113	79	794
Annual mean	60	32	23	51

*The predicated concentration of NO_2 without background is not calculated because the model does not directly output NO_2. The NO_x background concentrations were used to support conversions (1-hour = 45 µg/m3; annual = 17 µg/m3).[226]

The one-hour exceedances are expected to occur within the LAA, concentrated predominantly within the MDF, with some extension in the area immediately adjacent. Highest concentrations are situated near the primary emissions source, back-up power supply (generators), and adjacent to the Rose Creek diversion. Visual representation of annual NO_2 predictions was not provided in the project proposal, however, it is assumed to be like the pattern and trend presented in the one-hour and 24-hour visuals.

The Proponent does not address the management of possible ground-level ozone,[227] despite elevated concentrations of NO_2 (which is a precursor compound). Predicted exceedances for NO_2 should be deemed considerable, given the substantive difference between 2014 and 2025 YAAQS thresholds.

8.7.2.1 Significance Determination

NO_2 is predicted to exceed 2025 YAAQs for the one-hour and annual mean concentration thresholds during the active remediation phase of the Project. These concentrations are however predicted, via modelling, to be limited almost entirely to the MDF, and thus minimal impacts are expected for land users of the LAA. These elevated contamination levels are expected only to occur during active remediation, and most prominently during one-hour exposure, albeit based on conservative and worst-case scenarios. Mitigative measures in place coupled with the short-term and localized scales are expected to reduce effects. The EC determines that the Project will not result in significant adverse effects to health of off-duty workers and land-based users as a result of effects to air quality.

[226] YOR 2019-0149-0334, p. 23
[227] Ozone can be formed through secondary atmospheric interactions with nitrogen oxides and volatile organic compounds (VOCs).

8.7.3 Project Effect: Off-duty workers and land users exposure to intermittent air quality exceedances in the LAA

Off-duty workers and land users in the LAA may experience adverse effects to respiratory health when contaminants are inhaled. The degree to which respiratory effects are experienced depends on the concentration and type of contaminants present, the duration of exposure, and any pre-existing respiratory issues of the affected person(s). NO_2, $PM_{2.5}$, and PM_{10} are non-threshold contaminants, and are therefore harmful at any concentration[228] which means that any increase in exposure will result in an incremental population risk. While some individuals may experience adverse health issues at concentrations below established standards, health risks exist below the YAAQS and CAAQS values (which are not solely health-based), and therefore these standards should not be viewed as "pollute-up-to" levels. In recognition of this, additional management levels exist at concentrations below the CAAQS values to set targets that can further protect human health and the environment.

The Proponent's HHERA and air quality analyses address the same CACs, or COPCs in the case of the HHERA: CO, SO_2, NO_2, TSP, PM_{10}, and $PM_{2.5}$. In addition, the HHERA examines volatile organic compounds, polyaromatic hydrocarbons, and ambient metals. Similar to the air quality modelling carried out, the HHERA receptor locations were selected throughout the LAA and RAA and include hunting/fishing camps, the worker camp and pumphouse pond, the Town of Faro, and locations upstream and downstream on the Pelly River.

As part of the HHERA, there was an air assessment and multimedia assessment. The HHERA details the threshold exceedances for an extensive suite of COPCs, including carcinogens, ambient metals, and coarse and fine particulate matter. The HHERA uses Hazard Quotients (HQs), which are established by comparing predicted concentrations with toxicity benchmarks. An HQ higher than 1.0 is above the acceptable level of risk. Table 14 presents a summary of COPC threshold exceedances from the HHERA[229] findings. Comprehensive HHERA findings can be found in Appendix 8D of the project proposal: Human Health and Ecological Risk Assessment.[230]

Table 14: Summary of COPC Threshold Exceedances

COPC	Finding
NO_2	Elevated levels (at maximum concentration) were found to occur during active remediation, specifically at the worker camp and three out of the four hunting/fishing camp locations, based on the CAAQS (2025 – 79 ug/m3).

[228] Government of Canada, *Guidance for Fine Particulate Matter ($PM_{2.5}$) in Residential Indoor Air*, 2012, https://www.canada.ca/content/dam/canada/health-canada/migration/healthy-canadians/publications/healthy-living-vie-saine/fine-particulate-particule-fine/alt/fine-particulate-particule-fine-eng.pdf.
[229] YOR 2019-0149-7760
[230] Ibid.

	The Proponent however utilized the YAAQS (2014 – 400 ug/m3) to find that risk estimates were below the acceptable thresholds, except for where it was slightly above at the worker camp.
Diesel Particulate Matter	During the active remediation phase, maximum concentrations for Diesel Particulate Matter were found to exceed the hazard quotient at hunting/fishing camp 1, while all other locations were below thresholds. The frequency of exceedances was found to equate to two one-hour exceedances within a year.
Chromium	The values for the existing conditions for chromium were elevated above standards. During active remediation, chromium was found to further exceed thresholds at all receptor locations. Hunting/fishing camp 1 saw the highest increases (25 % increase), with smaller increases at the worker camp (6 % increase), access road recreation area (2 % increase), and less than 1 % at other receptor locations. The 10-year operations and maintenance phase saw the same risk estimates as existing conditions, which continue to be above standards. Chromium exists in two main forms: trivalent and hexavalent. Trivalent is non-toxic, while hexavalent is toxic and carcinogenic. The screening value is based on carcinogenic effects, and specifically Ontario MOECP thresholds (those applied in the absence of Yukon or federal standards) are established for hexavalent chromium. Given the unknown concentration ratio of hexavalent chromium, it was therefore assumed for calculating risk that concentrations consisted of 100 % hexavalent chromium. The HHERA notes that the use of a "screening threshold for trivalent chromium would result in a 700-fold decrease in the risk estimate and acceptable risk at all receptor locations."[231]
Lead	Hazard quotients for lead (one-hour assessment) increased with proximity to the Project site, "suggesting a Project-related contribution near the mine site."[232] Two receptors were above target thresholds: hunting/fishing camp 1 and the worker camp. These exceedances were modelled to occur during the active remediation phase. The exceedance at the worker camp was noted to occur for a total frequency of three hours out of a year and would occur intermittently. Hunting/fishing camp 1 exceedances, while greater, were noted to occur for a total frequency of 18 hours out of a year and would also occur intermittently. Hunting/fishing camp 1 also showed elevated levels for the 24-hour assessment. Exceedances were predicted to occur infrequently (two days of the year).
Manganese	During active remediation, hunting/fishing camp 1 was slightly above the hazard quotient, equating to one hourly exceedance during the modelled year. All other locations were below the target thresholds. This exceedance was predicted to occur infrequently and limited in duration.
$PM_{2.5}$	During the active remediation phase, hunting/fishing camp 1 exceeded the threshold of 25 ug/m3 (WHO threshold chosen for HHERA, as more conservative than the YAAQS (2025) of 27 ug/m3), equating to one daily exceedance of the threshold.

[231] YOR 2019-0149-7760, p.48
[232] YOR 2019-0149-7760, p.50

PM_{10}	During active remediation, hunting/fishing camp 1 and the worker camp exceeded the threshold of 50ug/m3 (YAAQS 2025), both equating to two daily exceedances of the threshold.

Overall, the HHERA and air quality analyses demonstrate that certain contaminants will exceed YAAQS (2025) thresholds established to protect human health. This will predominantly occur within the LAA and, more specifically, at the worker camp and locations near the MDF (e.g., Hunting/Fishing Camp 1). Given these findings, off-duty workers are likely to experience negative health effects from contaminant exposure. Further, land users within the LAA and in proximity to the MDF, as demonstrated by Hunting/Fishing Camp 1, will experience increased exposure to a variety of COPCs, which is likely to result in negative health effects.

Maximum exceedance and deposition events for particulate matter (TSP, PM_{10}, and $PM_{2.5}$) will be confined to the LAA and immediate vicinity but could result in the exposure of workers and land users to CACs in adjacent areas if these events are not effectively managed or mitigated. The Proponent notes that predicted exceedances most often involve short-term periods (one-hour and 24-hour maximum averages) and/or will be limited to a small number of occurrences annually.[233]

8.7.3.1 Significance Determination

According to the modelling, receptors within the LAA will see increases in COPCs. These occurrences occur over short-term periods (one-hour and 24-hour maximum averages) and will be limited to only a few annual occurrences. Effects are reversible once contaminant concentrations are reduced. Implementation of health, safety, and monitoring mitigation measures at the on-site worker camp and throughout the life of the Project by the Proponent will further reduce or eliminate effects. The EC determines that the Project will not result in significant effects to health resulting from elevated concentrations of COPCs during active remediation caused by changes in air quality.

[233] YOR 2019-0149-7760

9 WATER AND AQUATIC RESOURCES OVERVIEW

9.1 Overview

There is a high degree of overlap among the VESECs: water and aquatic resources, including surface water quality, fish and fish habitat, aquatic health, and productivity. To reduce replication this section contains information that applies to each of these VESECs. Table 15 identifies the VESEC sections where project effects on aquatic resources are discussed.

Table 15: Project Effects and Associated VESECs

VESEC Section	Project Effects
Surface Water Quality	Reduced surface water quality due to water discharge (controlled and uncontrolled)
Fish and Fish Habitat	Habitat alteration Reduced groundwater quantity Reduced accessibility or habitat use due to road development Increased fish mortality Changes to riparian and wetland areas
Aquatic Health and Productivity	Increased sedimentation and sediment mobilization Reduced productivity Habitat alteration Reduced groundwater quantity

9.2 Legislative and Other Requirements

The legislative and management setting for the Project regarding surface water quality is set out in the *Yukon Waters Act*, *Umbrella Final Agreement*, federal *Fisheries Act*, *Yukon Water Strategy and Action Plan*, *Yukon Guide for Developing Water Quality Objectives and Effluent Quality Standards for Quartz Mining Projects*, and *Guidelines for Developing Adaptive Management Plans in Yukon*.

9.2.1 *Waters Act*

The *Waters Act* sets out the authority of the Yukon Water Board to regulate activities involving water use and deposit of waste to water. As the regulator under the *Waters Act*, the Yukon Water Board has established rules, policy, and guidance for the water licensing process.[234]

9.2.2 *Waters Regulations*

Part 1 of the *Waters Regulations* sets out the requirements when applying for a water licence to the Yukon Water Board, including the required information, fees, and licensing criteria. Part 2 of

[234] Yukon Water Board, *Legislation, Policies, Rules and Guidelines.* 2021, https://www.yukonwaterboard.ca/legislation.htm.

the *Waters Regulations* concerns application reviews for quartz mining undertakings, while Schedules 5 through 10 stipulate the thresholds for activities requiring a water licence.

9.2.3 *Umbrella Final Agreement*

This agreement provides an overarching template for land claims agreements made for, by, and between all Yukon people. Yukon First Nations have rights in relation to water that are set out in final agreements. These include use and protection of water on Settlement Lands, and use of water in the Yukon for trapping, non-commercial harvesting, and traditional heritage, cultural, and spiritual purposes.[235]

The objective of Chapter 14 is to maintain water resources in the Yukon in a natural condition while providing for its sustainable use. Section 14.4.1 states that the Council of Yukon First Nations shall nominate one-third of the members of the Yukon Water Board. Section 14.8.1 states:

> Subject to the rights of Water users authorized in accordance with this chapter and Laws of General Application, a Yukon 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.

Under Chapter 16, the Yukon Fish and Wildlife Management Board was created and empowered to be "the primary instrument of Fish and Wildlife Management in the Yukon." The Board has the authority to make recommendations to the minister, Yukon First Nations, and councils on all matters related to fish and wildlife management, legislation, research, policies, and programs.[236]

9.2.4 *Fisheries Act*

Sections 34 to 40 of the *Fisheries Act* serve to protect fish as a public resource by prohibiting pollution that could be deleterious to fish. Subsection 36(3) is the key pollution prevention provision, which prohibits the deposit of all deleterious substances:

- In water frequented by fish; or
- In any place, under any conditions, where it may enter water frequented by fish.[237]

[235] Government of Canada, Council for Yukon Indians and Government of Yukon, *Umbrella Final Agreement between The Government of Canada, The Council for Yukon Indians and The Government of the Yukon.* 1993.
[236] Government of Canada, *Council for Yukon Indians and Government of Yukon, Umbrella Final Agreement between The Government of Canada, The Council for Yukon Indians and The Government of the Yukon.*
[237] Government of Canada, *Fisheries Act (R.S.C., 1985, c. F-14).* 1985, https://laws-lois.justice.gc.ca/eng/acts/F-14/.

9.2.5 *Fish and Fish Habitat Protection Policy Statement*

This policy statement outlines how DFO will interpret and apply regulatory and non-regulatory tools in the protection of fish and fish habitat. The policy statement also provides guidance to proponents on the application of the fish and fish habitat protection provisions of the *Fisheries Act*.

When a proponent is not able to carry on a work, undertaking, or activity without contravening s. 34.1(1) and/or s. 35(1) of the *Fisheries Act* (i.e., when the death of fish and/or harmful alteration, disruption, or destruction of fish habitat are likely to result), then a proponent can apply for ministerial authorization. Before granting an authorization, the Minister must consider a range of factors, such as:

- The contribution to the productivity of relevant fisheries by the fish or fish habitat that is likely to be affected
- Fisheries management objectives
- Indigenous knowledge
- Whether any measures and standards to offset the harmful alteration, disruption, or destruction of fish habitat give priority to the restoration of degraded fish habitat

9.2.6 *Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat Under the Fisheries Act*

This policy provides guidance on undertaking effective measures to offset the death of fish and the harmful alteration, disruption or destruction of fish habitat. The policy is intended to assist proponents in developing offsetting plans. As part of the application process for *Fisheries Act* authorization, proponents must submit a detailed plan of how they will offset any residual effects on fish habitat.

9.2.7 *Water for Nature, Water for People: Yukon Water Strategy and Action Plan*

The water strategy and action plan sets out YG's goals and priorities for water management. The goals are:

- **Water for nature**: Sustain water quality and quantity for aquatic and terrestrial health and ecosystem services. Respect the intrinsic value of water; and
- **Water for people**: Ensure accessible, safe, and sufficient water for drinking and other purposes, including commercial, recreational, heritage, cultural, and spiritual uses and values. Promote sustainable and wise use of water to support environmental, social, and economic needs.

YG's priorities for water management include:

- Better understanding and managing the Yukon's groundwater
- Maintaining and improving access to safe drinking water
- Promoting the sustainable use of water
- Improving the sharing of information about the Yukon's water

- Improving water management programs
- Planning for water needs now and in the future

As stated in the Minister's message: "Water is essential to life and to the health of Yukon's people, economy and natural environment."[238]

9.2.8 *Yukon Guide for Developing Water Quality Objectives and Effluent Quality Standards for Quartz Mining Projects*

The guide provides technical and scientific guidance about approaches and procedures for developing narrative and numerical water quality objectives (WQOs) for freshwater ecosystems in the Yukon, including methods to derive effluent quality standards (EQSs) for water licences. Although the guide was developed for quartz mining projects, the approaches and procedures can be used for other activities that may affect water quality. Three water management approaches were developed based on social, economic, and environmental values, and existing water quality of the receiving waters:

- **Non-Degradation Approach**: This approach aims to maintain baseline water quality (i.e., pre-project conditions) and prevent degradation of water quality.
- **Use-Protection Approach**: This approach aims to maintain a condition that will not adversely affect the most sensitive designated water uses (e.g., aquatic life, drinking water).
- **Use-Restoration Approach**: This approach aims to improve the quality of impaired waters to support restoration of designated water uses to the extent practical over time and avoid any further degradation of water quality.

The guide also describes five methods for developing numerical WQOs for COPCs.[239]

9.2.9 *Guidelines for Developing Adaptive Management Plans in Yukon*

Guidance was developed to provide a consistent and transparent method to respond adaptively to changes in water quality and quantity over the lifecycle of a mining project. Although the guide was developed for quartz mining applicants or licensees that are permitted under the *Waters Act* and *Quartz Mining Act*, Yukon and First Nation governments and agencies, stakeholders, and the public can use the guide to learn about AMPs and their application to water.[240]

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[238] Government of Yukon, *Water for Nature, Water for People. Yukon Water Strategy and Action Plan*. 2018, https://yukon.ca/en/water-nature-water-people-yukon-water-strategy-and-action-plan.

[239] Government of Yukon, *Yukon Guide for Developing Water Quality Objectives and Effluent Quality Standards for Quartz Mining Projects*. 2021, https://yukon.ca/sites/yukon.ca/files/env/env-yukon-guide-developing-water-quality-objectives-effluent-quality-standards-quartz-minig-projects.pdf.

[240] Government of Yukon, *Guidelines for Developing Adaptive Management Plans in Yukon: Water-Related Components of Quartz Mining Projects*, 2021, https://yukon.ca/sites/yukon.ca/files/env/env-amp-guidelines.pdf.

9.3 Spatial Boundaries

The spatial boundaries for the assessment of aquatic resources from the project proposal[241] are shown in Figure 8 and described below. These apply to all components of the aquatic resources VESEC.

- The MDF encompasses the project footprint, which covers 2 003 ha and includes existing direct disturbances for the Faro Mine (i.e. Faro pit, waste rock dumps, former mill, associated buildings, emergency tailings area, Rose Creek tailings area, Grum overburden dump) and proposed additional footprint related to project activities (e.g., water diversion channel modifications, water treatment infrastructure).
- The LAA covers approximately 34 000 ha and corresponds to the Rose Creek watershed, including the headwaters of Rose Creek, the project footprint (e.g., potential groundwater discharge effects), and Rose Creek downstream to its confluence with Anvil Creek (e.g., potential effluent discharge effects).
- The RAA covers 152 065 ha and corresponds to the entire watershed of streams (Rose Creek, Anvil Creek, and Vangorda Creek) flowing into the Pelly River between the confluence with Vangorda Creek upstream and the confluence with Anvil Creek downstream (monitoring station P4 on the Pelly River).

[241] YOR 2019-0149-2065

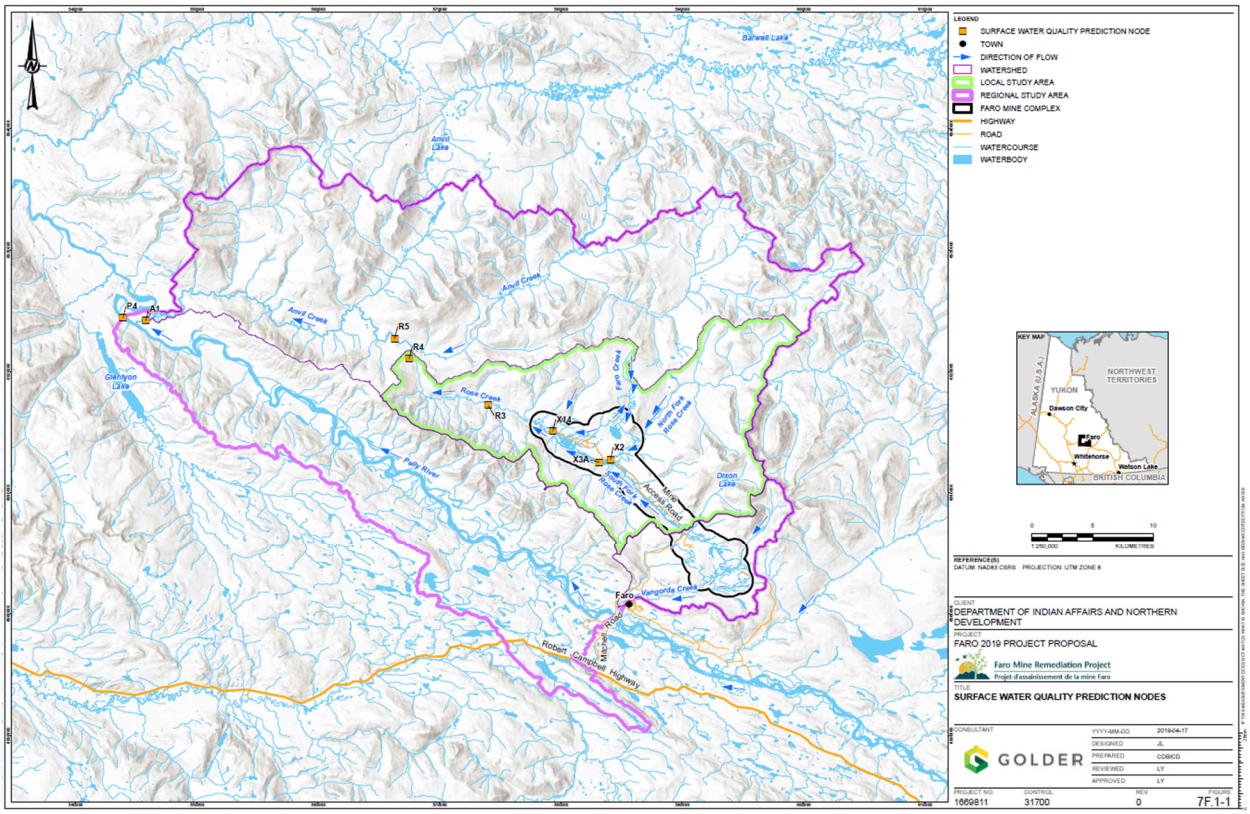

Figure 8: Spatial Boundaries for the Water and Aquatic Resources Effects Assessment

10 SURFACE WATER QUALITY

10.1 Overview

The development, operation, and abandonment of the Faro Mine have left a legacy of significant adverse effects on the downstream aquatic environment. Water in Rose Creek downstream of the site has failed acute toxicity tests[242] and, without implementing mitigations, water quality is expected to continue to deteriorate.[243] The Project is designed to address the deteriorating water quality associated with the legacy of the Faro Mine to protect human health and the environment.

The significance of project effects on surface water quality must be considered in the context of existing conditions and continued release of pre-project sources of COPCs from waste rock and tailings over time. While downstream water quality effects from the PWTP in the LAA are expected for sulphate, zinc and iron when compared to site-specific WQOs, if the Project performs as intended, they are generally localized, the magnitude is small and water quality is expected to improve over time compared to current conditions.

Water quality for these COPCs is also projected to remain similar to or improve over time relative to current conditions for site locations upstream of the PWTP. The Project will not result in significant adverse effects from project discharges downstream in the Pelly River. Generally, the Project is predicted to improve surface water quality over time compared to existing conditions, and the Project is needed to prevent much worse conditions, including adverse effects on the water quality of the Pelly River.

Technology and best practices for surface water, tailings, and waste rock management are evolving over time and it is likely that over the life of the Project, current proponent mitigation measures could be improved upon in the future in terms of efficacy, cost, carbon emissions and sustainability, and/or other factors. As such, it is important that the Proponent continually review and adapt the plan above to include these developments to reduce the likelihood of significant adverse effects over the life of the Project.

If the Project is unable to capture and adequately treat nearly all contact water, the Project will impact downstream environments. The proposed water management strategy requires strict compliance (i.e., near complete capture and effective treatment of contact water) and robust adaptive management to succeed. Robust monitoring and adaptive management and long-term funding are crucial for the Proponent's proposed mitigations for surface water quality.

The EC determines that the Project is likely to result in significant adverse effects to surface water quality. As such, mitigations are recommended to reduce, control, or eliminate significant adverse effects. Vigilant monitoring, prompt adaptive management, and continued improvement

[242] YOR 2019-0149-2584
[243] YOR 2019-0149-7410

in best practices and technology are required over the long-term to move towards achieving the overarching restoration objectives of the Project.

10.1.1 Reason for Inclusion

Water is a precious resource and highly valued in the Yukon from spiritual, cultural, recreational, and ecological perspectives.[244] Surface and groundwater quality at the project site is degrading and is expected to continue to degrade without intervention, due to ongoing acid and metal release to groundwater and surface water from chemical reactions within the waste rock and tailings.[245] Emergency works are already underway to address deteriorating water quality and elevated water volumes.[246] Capture, containment, and treatment of contaminated water (surface and groundwater) is the cornerstone of the remediation strategy for the site: water is the potential pathway, in the absence of capture and treatment, for transfer of metal and acidity loadings from waste rock and tailings into downstream aquatic environments.

The project proposal included surface water quality as a VESEC.[247] Surface water quantity, and groundwater quality and quantity, were included as ICs that affect surface water quality.

Participants have stressed the importance of groundwater and its interactions with surface water and subsequent impacts to the receiving environment (fish and fish habitat, aquatic health and productivity, and drinking water). RRDC recommended that groundwater be included as a VESEC and not an IC, as groundwater "may significantly impact surface water quality, and vice-versa."[248] SFN raised concerns regarding the ability to capture and treat the required volume of groundwater to ensure the downstream fish, fish habitat, and aquatic health environment is protected.[249] LFN expressed concerns related to groundwater/surface water interactions.[250]

Groundwater is integral to surface water and supports the functioning of the aquatic ecosystem. Similarly, surface water quantity is integral to surface water quality, as water volumes affect water treatment capacity and contaminant concentrations. Project-related changes to surface water quantity, groundwater quantity, and groundwater quality will thus be integrated into the evaluation of surface water quality, aquatic health and productivity, and fish and fish habitat VESECs. The significance of changes in surface water quality, aquatic health and productivity, and fish and fish habitat will be evaluated on the basis of amplitude of change relevant to various use-protection objectives (protection of aquatic life, wildlife, and traditional uses).

[244] YOR 2019-0149-0555
[245] YOR 2019-0149-1170; YOR 2019-0149-8532
[246] YOR 2019-0149-1350
[247] YOR 2019-0149-7410
[248] YOR 2019-0149-0555, p.34
[249] YOR 2019-0149-1865
[250] YOR 2019-0149-9691

10.2 First Nation and Community Input

Surface water quality is vital to LFN, RRDC, and SFN, who understand that water must be protected and is connected to fish and land.[251] During the consultation period prior to submission of the project proposal[252] and during engagement activities for this screening, key concerns expressed by First Nations related to surface water quality have included:

- Impacts of surface water quality on the food chain
- Inadvertent access to contaminated water by people
- Water segregation, treatment, and monitoring
- Compliance points, downstream goals for water quality and site-specific WQOs
- Fish and fish habitat[253]
- Importance of considering legacy issues from the historical development, operation, and abandonment of the Faro Mine in the effects assessment
- Importance of taking a holistic approach to the overall assessment[254]

10.2.1 Ross River Dena Council

RRDC expressed the importance of water:

> Although water is “everywhere”, some sources are considered exceptional. Headwater streams are also considered of significant importance, because they were the source of water. Wetlands are valued because of the life they support, but also recognized for their hydrologic properties. Some fens also hold special significance, for example, braided fens. There is also an appreciation of aquifers, springs, and underground water systems. Connection of water across the Faro mine site and the region should be paramount to communication and assessment of the Faro Remediation Project.[255]

RRDC outlined numerous concerns and recommendations pertaining to surface water quality, which highlight the importance of this VESEC. Their review of the project proposal included concerns and recommendations related to redundancy and contingency for the PWTP, sludge storage, prevention of “pulses” released during relocation activities, appropriate cover selection strategy, consideration of alternative treatment systems (e.g., permeable reactive barriers, in-situ remediation of hydrocarbon and coal materials) and better geochemical characterization of high strength sources, non-acid generating waste rock, and borrow materials.[256] RRDC particularly highlighted the need for careful monitoring in the long-term to inform adaptive management and to ensure contaminated water does not enter Rose Creek. They have also expressed concern about the challenge of requiring nearly complete capture of contaminated water in the Rose Creek valley to meet water management plan objectives. Despite expressing

[251] YOR 2019-0149-7410
[252] YOR 2019-0149-7410
[253] YOR 2019-0149-7410
[254] YOR 2019-0149-0822
[255] YOR 2019-0149-0555, p.34
[256] YOR 2019-0149-0555

misgivings about the YESAB process, RRDC are generally supportive of the Project moving forward in a timely manner, with their participation,[257] to mitigate further environmental and cultural damage.

10.2.2 Selkirk First Nation

SFN expressed concern about any ongoing impacts to water quality over the long-term, highlighting the uncertainty associated with long-term water quality modelling predictions, and stressed the importance of robust adaptive management and mitigation options for surface water quality.[258] SFN stressed concerns including but not limited to the magnitude and rate of deterioration of water quality at the site.[259] A collection of quotations from SFN on concerns and interests related to the surface water quality VESEC is provided as follows:

> SFN is very much concerned about the environmental hazard that this project represents. This project is such a significant hazard to the downstream if there is a physical failure with the tailings dams. We know that there are issues with those structures, and if the long-term water quality is not appropriately managed, and that it has to continue forever.[260]
>
> The people who are affected need to be part of that decision structure for how we respond to things changing because this is a dynamic site and conditions with water quality at the site are expected to get worse…. CIRNAC mentioned … that they do not expect the water quality downstream to get worse. This is a laudable goal; however, we also know that mitigation measures at this site do not always work [as] intended. How we respond is critical. People need to be involved in decision-making about response.[261]
>
> In 2013, for example, we saw deterioration of water quality in the North Fork of Rose Creek. It was 2021 before that problem was solved. Yesterday, we discussed the technical challenges of this project with several project proposals about how to solve that problem. Some were started and stopped part way through. Some were undertaken and proved not to be effective. There was probably knowledge from the start of what could be effective, but there were decisions based on operational needs, on funding needs, as to why things could not be done quickly.[262]
>
> Ultimately, eight years went by before we had a solution. […] We still do not have that problem fully solved. Plus, we have known for over twenty years that there are high risks associated with flood conveyance for the tailings facilities even as they sit there today for the operating period. And yet we do not have solutions for those problems. If First

[257] YOR 2019-0149-0555
[258] YOR 2019-0149-9549; YOR 2019-0149-2584
[259] YOR 2019-0149-1865
[260] YOR 2019-0149-2584, p.12
[261] YOR 2019-0149-2584, p.45
[262] YOR 2019-0149-2584, p.19

> Nations were in a decision-making role, had more of a substantive role in decision-making, would those delays have occurred?[263]

10.2.3 Liard First Nation

LFN identified a number of interests, issues, and concerns related to the VESEC similar in theme to remarks by RRDC and SFN. These include concerns related to groundwater and surface water interactions,[264] extensive comments on adaptive management and the need for a broader adaptive management focus on VESECs related to surface water quality,[265] thoughts on looking beyond protection goals to restoring the environment, and thoughts on the importance of the linkage between general environmental mitigation (including surface water quality) and First Nation land use and sense of place, Indigenous economies, and community well-being. Selected quotations to this effect include:

> The AMP mentions many other monitoring and management plans but does not provide clear direction or information on how the results will be used in an adaptive management approach. The advantages of incorporating adaptive management components from monitoring and management plans into AMPs rather than leaving them in the monitoring or management plans are annual review, triennial modification, and increased transparency. Appendix A does not provide enough specifics to determine where the adaptive management elements fit within the monitoring or management plan.[266]

> The AMP focuses almost exclusively on water quality. Water quantity is only mentioned as it relates to calculating loading to surface water. A broader AMP for water quality and quantity should be developed, and separate AMPs should be developed for aquatic effects (which could be integrated with “Protection Goals”), terrestrial effects, water treatment, and other important components of the Project that will perform better with clear adaptive management goals and components. Water quality and quantity should be linked to aquatic effects. See the Buckhorn Mine AMP (Golder Associates Inc., 2014) as an example.[267]

> We want to look beyond the “protection goals” as a maximum allowable negative effect, and focus also on the remediation goals of the project as a whole: restoring the environment, returning the mine site to an acceptable state of use that reflects pre mining land use, providing for the effective resumption of Kaska rights [exercised] by Kaska members, and protecting and improving VESECs that incorporate Indigenous health and cultural, social, and economic well-being.[268]

[263] YOR 2019-0149-2584, p.19
[264] YOR 2019-0149-9691
[265] YOR 2019-0149-6483
[266] YOR 2019-0149-6483, p.1
[267] YOR 2019-0149-6483, p.1
[268] YOR 2019-0149-6483, p.2

10.3 Existing Conditions

In the project proposal, existing conditions represent the combined effects of previous and current human activities and natural factors that have shaped the observed surface water quality conditions in the assessment areas. These existing conditions were the starting point for the assessment of project effects.[269]

Exposed sulphide minerals in waste materials such as waste rock and tailings react with atmospheric oxygen and water over time and release acidity, metals, and sulphate; these geochemical processes are termed acid rock drainage and/or metal leaching (ARD/ML). Historical and ongoing releases of acidity, metals, and sulphate from ARD/ML-related processes in mine wastes at the site have affected groundwater and downstream surface water quality.

In addition to ARD/ML-related releases from the site, naturally occurring Total Suspended Solids (TSS) downstream of the site can be elevated in surface water compared to the site due to erosion. This can result in natural increases in total metal concentrations in downstream surface water (i.e., increases not corresponding to changes in mass loads originating from the site).[270] This increase in TSS from erosion has been documented for areas of Anvil Creek and the Pelly River, with correlating increases in selected metal concentrations.[271]

Surface water quality monitoring data between 2008 and 2017 are summarized in the Surface Water Quality Baseline Report[272] for reference stations (i.e., locations not affected by the site), the receiving environment within and downstream of the site (Rose Creek, Anvil Creek, and the Pelly River), and two other stations used by LFN and RRDC during traditional activities, monitored at the request of RRDC. The following COPCs for the Project were identified based on comparison to Water Quality Guidelines (WQGs), temporal trends (increasing from 2008 to 2017), spatial trends (concentrations highest downstream of mine sources), and persistence of elevated concentrations (as compared to guidelines or reference conditions) in Rose Creek and in some cases Anvil Creek:

- Conventional measurements and major ions: pH, alkalinity, magnesium and sulphate
- Metals**:** Total aluminum, total and dissolved cadmium, cobalt, total and dissolved iron, manganese, and zinc

In the summary of historical and recent surface water data (2008 to 2017), spatial distribution of WQG exceedances varied for different parameters, but fluoride, total aluminum, iron, manganese, and zinc exceedances were noted at almost all stations. Sulphate and cobalt concentrations were also noted above WQGs at stations within the site and immediately downstream of the site. Concentrations were usually highest at the site receiving environment

[269] YOR 2019-0149-7410
[270] YOR 2019-0149-2065
[271] YOR 2019-0149-7410
[272] YOR 2019-0149-6797

stations, and frequency and magnitude of guideline exceedances were noted to increase with proximity to the site.[273]

Rose Creek is heavily influenced, Anvil Creek is moderately influenced, and the Pelly River is minimally influenced by existing water quality conditions at the site:[274]

- Elevated concentrations (compared to WQGs or reference conditions) of zinc and dissolved cadmium persist downstream of site into Rose Creek;[275]
- Elevated concentrations of cobalt, manganese, nickel, and strontium affect water quality downstream of the site and persist to Anvil Creek but not to the Pelly River;[276] and
- Elevated specific conductivity and elevated concentrations of hardness, magnesium, sulphate, and total and dissolved iron persist into the Pelly River.[277]

Groundwater chemistry at the site is already acidic and has high metal concentrations with the potential for chemical loading to the environment as of 2018. This water is actively remediated, contained, and treated on-site to prevent further surface water quality deterioration downstream of the site.[278]

Over time, sulphate and metal concentration trends have increased at various stations downstream of the site within the LAA due to loadings of constituents released from mine wastes during ongoing geochemical weathering processes. For example, total iron concentrations have increased over time in the LAA of Rose Creek, downstream of the site (stations X14 to R4), and concentrations at station X14 (Rose Creek, within the Faro Mine site) have seasonally exceeded both acute and chronic guidelines for protection of aquatic life since 2012.[279]

Seasonal trends in surface water quality have been documented at the site and in the downstream environment due to differences in surface water and groundwater flow rates (i.e., fluctuation in surface water flow rate throughout the year with relatively constant groundwater flow), release of TSS during high-flow conditions in the spring, and/or mine water influence.[280]

Since submission of the project proposal in 2019, emergency works have been advanced at the site to control and mitigate potential adverse effects of contaminants and maintain the physical integrity of the site. This includes the installation and operation of the Down Valley X13 seepage interception system and realignment of North Fork Rose Creek (including contact water collection).[281] In both Down Valley and North Fork Rose Creek areas, release of metals,

[273] YOR 2019-0149-6797
[274] YOR 2019-0149-6797
[275] YOR 2019-0149-6797
[276] YOR 2019-0149-6797
[277] YOR 2019-0149-6797
[278] YOR 2019-0149-7410
[279] YOR 2019-0149-7410
[280] YOR 2019-0149-7410
[281] YOR 2019-0149-1350, IR response 8-1

sulphate, and acidity from ARD/ML geochemical reactions occurring in mine wastes increased earlier than expected.[282] As of 2022, higher-than-expected volumes of contact water were being stored in the Faro pit due to collection of higher-than-expected volumes of contact water from accelerating ARD/ML geochemical reactions in mine wastes and higher-than-average annual precipitation for two consecutive years. The construction and operation of the PWTP is being advanced to manage the increase in contact water volumes.[283]

1.1.5.1 Water Quality Reference Stations

Data characterizing pre-mining conditions from the site are not available for surface water quality. Sampling results from locations not affected by the Faro Mine site (i.e., locations upstream of mine influences) may be used to characterize water quality pre-mining but may not capture naturally elevated concentrations of constituents that can be found in naturally mineralized areas. Data collected at reference stations between 2008 and 2017 were used to characterize natural background water quality conditions upstream of mine influences (i.e., not mine-impacted, but also not necessarily a direct analogue to pre-mine baseline conditions at the site):[284]

- Data from five stations located upstream of potential mine-related influences (FC, R6, R7, USFR, and W10) were grouped to characterize background water quality conditions in the smaller catchments (Upper Guardhouse Creek, Faro Creek, Rose Creek, and Anvil Creek); and
- Data from one station on the Pelly River (P1), upstream of Vangorda Creek, was used to characterize background water quality conditions for the Pelly River. This station (P1) was identified as providing information on the Pelly River prior to any input from watersheds affected by the Faro Mine site.

In general, water quality at all reference stations was slightly basic and well-oxygenated with total alkalinity values above 20 mg/L and concentrations of fluoride occasionally above the CCME chronic guideline for protection of aquatic life. Water quality in the Pelly River is naturally different from water quality in the smaller catchments:

- Natural background water quality in the smaller reference catchments was generally moderately soft (median hardness value of 60 mg/L) with low conductivity (median value of 125 µS/cm), low total dissolved solids (median value of 72 mg/L), low total suspended solids (median value of 1 mg/L), low total organic carbon (median value of 2.7 mg/L), and low nitrate, nitrite, and ammonia (classified as ultra-oligotrophic to meso-eutrophic based on median and 95th percentile total phosphorus concentrations); and
- Natural background water quality in the Pelly River (P1) was generally hard to very hard with moderate conductivity (median value of 361 µS/cm), moderate total dissolved solids (median value of 212 mg/L), total suspended solids varying from low

[282] YOR 2019-0149-1350, IR response 8-2
[283] YOR 2019-0149-1350, IR response 8-1; YOR 2019-0149-0773, IR response 9-2
[284] YOR 2019-0149-6797, Surface Water Quality Baseline

to high, low total organic carbon (median value of 2.9 mg/L) and low nitrate, nitrite, and ammonia (classified as oligotrophic to hyper-eutrophic based on median and 95th percentile total phosphorus concentrations).

Median concentrations of all metals (both total and dissolved) at all reference stations were below WQGs for protection of aquatic life, with the exception of total selenium in the Pelly River. Concentrations of total metals in the Pelly River are influenced by higher flows with higher concentrations of total suspended solids:

- In the smaller catchments, the 95th percentile values of total and dissolved aluminum and total cadmium, copper, iron, and zinc were above chronic or 30-day mean (or both) WQGs for protection of aquatic life; these constituents may be naturally elevated in water within and downstream of the Faro Mine site; and
- In the Pelly River, the 95th percentile values of total and dissolved aluminum and total cadmium, chromium, copper, iron, selenium, silver, and zinc were above chronic or 30-day mean (or both) WQGs for protection of aquatic life. The 95th percentile values of total iron and zinc were above BC Ministry of Water, Land, and Resources Stewardship water quality guidelines for the protection of aquatic life. Concentrations of aluminum, cadmium, chromium, copper, iron, silver, and zinc were found to be correlated to total suspended solids. Concentrations of metals were highest in May and sometimes June in response to spring flows and the highest concentrations of total suspended solids.

10.4 Proponent Mitigation Measures

The cornerstone of the proposed surface water management strategy for the site is to collect and treat mine-impacted contact water before discharge to the receiving environment.[285] The term “contact water” refers to water at the site that has been affected through contact with mine waste drainage by metals, acidity, and/or other parameters released during ARD/ML geochemical weathering processes. Near-complete capture and treatment of contact water is required for protection of downstream water quality.[286]

The mitigation and management strategy for surface water includes the following components per the updated project scope:[287]

- Water treatment and discharge from the PWTP
- Groundwater capture systems
- Management of surface water flows (e.g., diversion of non-contact water)
- Consolidation and covering of mine wastes (sources of contaminants to surface water) to help manage surface runoff volumes and reduce contact water volumes (e.g., low infiltration covers)

[285] YOR 2019-0149-1886
[286] YOR 2019-0149-2065
[287] YOR 2019-0149-1886

Contact, non-contact, and high-sediment water will be managed separately to minimize the volume of water requiring treatment at the site. Non-contact water will be diverted around mine facilities and closure activities using diversion channels. Seepage interception systems will collect contact water from impacted groundwater locations to limit off-site release of contact water to the receiving environment. Contact water will be pumped to the Faro pit for storage and treated seasonally to meet effluent requirements. High-sediment water will be collected and conveyed to control ponds for settling of total suspended solids before release to the environment or further water treatment, as necessary. Measures will be taken to minimize erosion potential of natural soils and closure infrastructure, where possible, to reduce the potential for high-sediment water.

The success of this general water management strategy depends on several supporting monitoring and management plans and activities, as summarized in the AMP.[288] Key monitoring and management activities include:

- Monitoring and management of surface and groundwater quantities over time at the site;[289]
- Monitoring and management of surface and groundwater quality over time, including water within the managed infrastructure (e.g., water in control ponds, water treatment effluent) and in the seepage monitoring system;[290] and
- A comprehensive adaptive management strategy.[291] Robust adaptive management is essential in case remediation measures do not perform as designed and/or to manage uncertainties in temporal predictions of water quality and water quantity. The water management strategy is based on predicted water quality and quantity for complex and dynamic conditions with many interconnected inputs.[292] Adaptive management is necessary to formulate and implement sufficient and timely responses to changes in water quality and quantity to protect surface water quality and the downstream receiving environment. For example, if metal, acidity, and/or sulphate loadings are greater than expected, additional quantities of lime may be required for sufficient treatment of impacted water.

As part of current care and maintenance activities, contact and non-contact water quantities and qualities are being monitored, treated, and managed to protect surface water quality. Since submission of the project proposal in 2019, emergency works have been advanced in response to degrading surface water quality and increased water quantities (i.e., adaptive management), including construction and operation of a groundwater seepage collection system in Down Valley, realignment and contact water collection for North Fork Rose Creek, and advancement of PWTP construction.[293]

[288] YOR 2019-0149-1347
[289] YOR 2019-0149-1886
[290] YOR 2019-0149-1886
[291] YOR 2019-0149-1347
[292] YOR 2019-0149-2065; YOR 2019-0149-9310; YOR 2019-0149-0519
[293] YOR 2019-0149-1350; YOR 2019-0149-0773

During the active remediation period, care and maintenance activities, including adaptive management, will continue. Over the long-term, contact water monitoring, treatment, and adaptive management will continue as required. Monitoring and maintenance of landform covers, channels, and water collection systems will also be required to support surface water quality management. Water quality monitoring will be per the Water Management Plan,[294] Performance Monitoring Plan,[295] and Aquatic Effects Monitoring Plan (AEMP).[296] Air quality monitoring results will also be reviewed by the AEMP team to assess potential effects of dust deposition on surface water quality to aid in the interpretation of results, as appropriate.[297]

The updated project scope[298] and AMP[299] documents describe proposed activities to protect and improve surface water quality. These activities are summarized in Table 16. Emergency works already being advanced are also included in Table 16. Note that mitigation measures address both effects of the Project (i.e., active remediation) and legacy effects of former mining (ARD/ML processes in waste rock and tailings) on surface water quality.

With the proposed remediation measures, predictive water quality modeling indicates that the Project is primarily expected to have a positive long-term effect on surface water quality and linked aquatic and terrestrial ecosystems. Proposed mitigation measures are expected to maintain and/or improve downstream surface water quality relative to existing conditions and relative to expected conditions from acidic mine drainage in the absence of remediation.[300] Even with implementation of the Project, ARD/ML processes in tailings and waste rock are expected to continue into the far future; modelling indicates that proceeding with the Project is necessary to maintain and improve water quality.[301] This modelling also indicates that proposed mitigations are expected to result in a reduction in the number of COPCs, the magnitude of COPC maximum concentrations, and the percent of time that water quality constituents exceed WQGs. Implementing the Project is anticipated to improve wetland and riparian ecosystems by capturing and treating contact water and diverting and preventing clean water from becoming contact water.

Furthermore, concentrations of mine-influenced constituents in downstream surface water are lowest in modelled long-term operations and maintenance scenarios when all remediation activities have been completed.[302]

[294] YOR 2019-0149-9964
[295] YOR 2019-0149-9964
[296] YOR 2019-0149-9964
[297] YOR 2019-0149-9964
[298] YOR 2019-0149-1886
[299] YOR 2019-0149-1347
[300] YOR 2019-0149-2065; YOR 2019-0149-7410
[301] YOR 2019-0149-7410
[302] YOR 2019-0149-7410

Table 16: Summary of Proposed Mitigation, Monitoring, and Management Activities

Category	Proposed Mitigation, Monitoring, and Management Activities
Site stabilization, landforming, and covers	• Re-locate and cover various waste rock and tailings areas at site to limit leaching of metals and acidity to surface and groundwater and prevent interference with current and/or planned non-contact water flow paths. This includes relocation of 500 000 m^3 of waste rock, portions of the Rose Creek tailings area, and several smaller areas of tailings. Sludge and contaminated sediment from the drained Cross Valley pond will be permanently stored in the Faro pit. • Covers will be selected for terrestrial waste rock and tailings to prevent contact by people/wildlife, support vegetation, and potentially reduce infiltration volumes. Covers will be either low infiltration, very low infiltration, or isolation covers to reduce loading to the water treatment plant. Cover design is proposed to be based on pilot trials. Choice of cover infiltration level for each area will be based on contaminant levels (e.g., very low infiltration or isolation covers over the most contaminated materials). • Revegetate covered waste rock to reduce erosion and associated sediment loads to water in erosion-prone areas.
Borrow management	• Use geochemical testing to ensure that all borrow sources used in remedial works are appropriate (i.e., not a significant source of contaminants).
Waste management of contaminated surficial materials	• Contaminated surface materials will be moved/consolidated as necessary and capped with very low infiltration covers. Examples of contaminated surface materials may include metal contamination in the mill area, exposed tailings outside containment, and/or where metal concentrations in undisturbed areas are deemed to pose an unacceptable health risk to wildlife and/or people.
Infrastructure for management of non-contact water	• Various creek diversions, refinements, realignments, and supporting construction will be carried out to convey a probable maximum flood around contaminated areas and provide more stable creek channels. These activities apply to various areas at site (e.g., North Fork Rose Creek, Faro Creek, Rose Creek diversion area, Rose Creek confluence area). • The realignment of North Fork Rose Creek was carried out as part of emergency works, along with contact water collection from the former North Fork Rose Creek.[303] Connect the remedial works with the realigned North Fork Rose Creek, grade the area between the North Fork Rose Creek diversion and the toe of re-sloped waste rock to convey surface runoff towards non-contact water channels, and fill in the valley to provide a platform for contact water management infrastructure and a floodplain for

[303] YOR 2019-0149-1350

Category	Proposed Mitigation, Monitoring, and Management Activities
	flows exceeding the capacity of the North Fork Rose Creek diversion.[304]
Infrastructure for management of contact water	• Install and/or upgrade and operate the seepage interception systems (Down Valley, emergency tailings area, North Fork Rose Creek, Zone 2 pit) as required for the very long-term (i.e., >500 years). • Infill the Intermediate pond with coarse rock, landform the tailings, and apply a cover up to the Intermediate dam. Construct a sump to keep contact water level below the base of the tailings cover and to collect infiltration water that contacts tailings. • Operate contact water conveyance systems (pipelines, sumps, and head tank, if required) and transfer water between contact water collection points and the Faro pit, and from the Faro pit to the PWTP. • Use the Faro pit as a surge pond for the PWTP, to store contact water when the PWTP is non-operational and as the permanent repository for water treatment sludge from the PWTP (at depth) • Treat contact water in a permanent HDS lime treatment plant and release treated effluent to Rose Creek. The interim water treatment plant may continue to operate in early active remediation. Discharge from the interim water treatment plant and PWTP will be seasonal such that conditions allow EQSs to be met. EQSs will be defined as part of the project licensing. • Effluent will be continuously monitored. Flow rates will be adjusted as necessary to protect receiving environment water quality. Effluent will be directed back to the Faro pit if effluent water quality does not meet operational targets. The PWTP will discharge using an energy dissipation system to prevent creek erosion. Water treatment is expected to be required for the very long-term (i.e., >500 years). • In the Rose Creek tailings area, direct surface water runoff to water infrastructure per a new watershed divide established during landforming. Remove sediment from runoff prior to discharge through constructed control ponds and backfill the Intermediate pond with rock to create a subsurface sump, capturing water that contacts with tailings. • Manage surface runoff throughout the site through conveyance channels that provide erosion protection, including control ponds upstream of discharge points to the downstream environment. Water in control ponds will be monitored and either discharged or pumped back to the Faro pit for treatment.

[304] YOR 2019-0149-0742; YOR 2019-0149-8532

Category	Proposed Mitigation, Monitoring, and Management Activities
Adaptive Management Plan[305]	• Use water-monitoring results to inform site management and check that protection goals for each water body in the AMP are met by designing action levels to trigger a management response to prevent environmental changes that threaten protection goals. The AMP applies to the active remediation and long-term operations and maintenance phases of the Project. The scope of the AMP includes the following: o Groundwater quality (on the site) and its potential influence on surface water quality through seepage. o Surface water quality monitoring to evaluate the effectiveness of groundwater capture and potential groundwater changes in the North Fork Rose Creek and Down Valley seepage interception system areas, and in the receiving environment along North Fork Rose Creek, the Rose Creek diversion and Rose Creek downstream of the site. o Effectiveness of water treatment for maintaining and improving conditions in the receiving environment. o Cumulative effects of project water quality in Rose Creek. o Cumulative effects of care and maintenance of Vangorda Plateau mine area on the Pelly River. o Water quality in the far-downstream receiving environment (Anvil Creek, Pelly River). • Adaptive management monitoring will be conducted to protect against multiple types of uncertainties, as outlined in monitoring and management plans for the Project. • Details of management and monitoring plans will be fully developed as the Project progresses and will support the AMP. • The AMP is primarily focused on uncertainties related to water quality. Monthly monitoring data will be compared to AMP triggers (data reported quarterly and annually), and the AMP will be updated every three years to address new or emerging concerns.

10.5 Project Effects Characterization

Project effects characterization for surface water quality considers:

- The water quality and quantity predictions provided in the project proposal
- The results of Information Requests and discussions relevant to surface water quality since submission of the project proposal in 2019
- Current emergency works underway[306] to protect surface water quality
- The proposed mitigation measures in the context of current practices in Canada

[305] YOR 2019-0149-1347
[306] YOR 2019-0149-1350

Predictive water quality modelling conducted for locations downstream of the site indicates that proceeding with the Project is necessary to maintain and improve water quality. The Project is attempting to address a complex and dynamic mining legacy at the Faro Mine, and even with successful implementation of the Project, ARD/ML processes in tailings and waste rock from legacy mining activities are expected to continue into the far future.[307]

Determining project effects characterization for surface water quality under the YESAA framework is not straightforward due to the legacy of mining at the Faro Mine and current conditions at the site with ongoing and accelerating ARD/ML processes in tailings and waste rock and deterioration of surface water quality over time. While the Project has some potential effects on surface water quality, not advancing the Project (i.e., doing nothing) is predicted to result in even further deterioration of surface water quality,[308] due to the legacy of historical mining activities (i.e., existing ARD). This legacy has already resulted in advancement of emergency works at the site.[309] The maintenance of existing conditions is not a desirable outcome for protection of the downstream environment and will result in adverse downstream effects.[310]

10.5.1 Project Effect: Reduced surface water quality due to controlled and uncontrolled water discharge

In general, project initiation is predicted to positively influence downstream receiving water relative to conditions at project initiation and relative to future conditions in the absence of any remediation. However, the discharge of treated effluent (controlled) or mine-impacted seepage (uncontrolled) will likely change surface water quality and affect downstream receptors under certain scenarios. While the Project includes many remediation designs and strategies meant to reduce mass loading of COPCs to the receiving environment from the site, the Proponent states that "it is not feasible to eliminate or manage 100 % of the chemical load derived from waste rock and tailings […] due to practical, technological, or economic considerations."[311] The final COPCs after project initiation (i.e., for active remediation and long-term operations and maintenance) are sulphate, iron, and zinc, derived from historical waste rock and tailings affected by ARD processes.[312] Effects on surface water quality from site water discharge may result from one or more of the following scenarios:

- Controlled discharges:
- Treated water from the permanent and interim water treatment plants will enter receiving waterways and affect downstream waters. The chronic site-specific WQOs have been developed to protect water quality in downstream environments. COPC loads discharged from the PWTP will be diluted with enough mixing to meet site-

[307] YOR 2019-0149-7410
[308] YOR 2019-0149-2065
[309] YOR 2019-0149-8843; YOR 2019-0149-1350
[310] YOR 2019-0149-7410
[311] YOR 2019-0149-7410, p.7
[312] YOR 2019-0149-7410

specific WQOs within a licenced distance from the end of pipe, to avoid acute toxicity and creating barriers to upstream fish migration.[313]

- Uncontrolled discharges:
- Mine-impacted seepage bypasses from waste rock dumps and tailings through groundwater and daylights to surface water at the site. This groundwater quality is expected to degrade over time due to ARD/ML processes caused by conditions preceding the Project, and the degradation from ARD/ML cannot be controlled by the Project. The Project is designed to capture almost all groundwater through seepage interception systems, but it is possible that some mine-impacted groundwater will bypass seepage interception systems and affect surface water quality before adaptive management solution can be applied (e.g., installation of new interception systems). Bypass of seepage interception systems by contaminated groundwater was considered in the Project Biophysical Effects Assessment for North Fork Rose Creek (e.g., nodes X2 and X3A) and location X14 but may not necessarily be limited to these locations in the future.[314] Installation and operation of a seepage interception system has already been advanced at X13 as part of project emergency works.[315]
- Non-contact water impacted by mobilized sediment (TSS) or soluble COPCs may be released as a result of active manipulation and movement of mine wastes and other activities and earthworks during remediation. This may result in the release of pulses of constituents to surface water and groundwater.

Concentrations of mine-influenced constituents are generally expected to be highest at project initiation during the active remediation phase.[316] For constituents whose concentrations are primarily derived from treated effluent from the PWTP, peak concentrations will generally be seen downstream when total streamflow is lowest (e.g., during fall).[317,318]

Based on water quality model predictions, during active remediation some exceedances of site-specific WQOs for sulphate, iron, and zinc are generally expected at all the downstream stations from the PWTP effluent discharge, except for Pelly River. For some stations, some of these final COPCs also exceed site-specific WQOs at times during long-term operations and maintenance. Maximum concentrations (and frequency of exceedances) generally decrease farther downstream of the PWTP discharge. The exception to this is total iron at location A1 in lower Anvil Creek, for which concentrations are higher than in upstream locations in Rose Creek, partially due to natural occurrence of total suspended solids (erosion). As well, for all final COPCs at all water quality model nodes downstream of the PWTP discharge, both maximum average monthly concentrations and frequency of site-specific WQO exceedances will decrease over time from project initiation to long-term operations and maintenance and be lower during

[313] YOR 2019-0149-7410
[314] YOR 2019-0149-7410
[315] YOR 2019-0149-1350
[316] YOR 2019-0149-7410
[317] YOR 2019-0149-2065
[318] YOR 2019-0149-7410

the Project than without project implementation ("do-nothing" scenario). For Pelly River downstream of the site (model node P4), iron and zinc concentrations will decrease and site-specific WQOs will not be exceeded after project implementation, including during active remediation and long-term operations and maintenance.[319]

The effectiveness of the PWTP to reduce sulphate concentrations in its effluent is dependent upon magnesium concentrations in influent water, where higher magnesium can reduce the removal of sulphate in the PTWP. Higher-than-modelled magnesium concentrations have been documented at the site (e.g., in Intermediate pond water), which introduces uncertainty associated with the upper limits of sulphate concentrations predicted in effluent.

Adaptive management is a crucial mitigation measure proposed under the Project for effects on surface water quality from uncontrolled or controlled discharges. The degree to which such discharges affect downstream surface water quality and receptors is affected by the lag time between detection of elevated COPCs in monitoring data and adaptive management action to mitigate downstream effects.

10.5.1.1 Significance Determination

The EC determines that the Project may result in significant adverse effects on surface water quality from controlled and uncontrolled water discharge. For controlled discharges, downstream water quality effects associated with PWTP effluent for sulphate, zinc, and iron are generally considered to be localized and reversible, and maximum average monthly concentrations for these parameters are generally expected to be similar or better than current conditions. Significant adverse effects are not expected in predicted water quality results for COPCs downstream of the site in the Pelly River. Both active remediation and operations and maintenance phases have been considered for this significance determination.

The Proponent's proposed mitigation measures rely on predictive water quality and quantity modelling. Uncertainties are inherent in the prediction of water quantity and quality over time at a complex and dynamic site. If monitoring and adaptive management are not sufficiently robust to cope with these uncertainties, there is a risk that the Project may not meet its protection goals due to changes in water chemistry over time, inability to collect all affected surface or groundwater, and/or inability to treat the necessary volume of contact water, potentially resulting in significant adverse effects on downstream surface water. The magnitude, timing, and duration of any such adverse effects are unknown. Adverse effects have already been documented where emergency works have been advanced.[320,321]

The significance of project effects on surface water quality must be assessed in the context of current water quality (existing conditions) during the active remediation phase and pre-mine conditions and the overarching objectives of the Project during the long-term operations and

[319] YOR 2019-0149-7410, Table 7.3-16
[320] YOR 2019-0149-1350
[321] YOR 2019-0149-0773

maintenance phase. Note that pre-mine water quality and quantity are unknown, and the degree to which upstream reference conditions are representative of pre-mine conditions for water quantity and quality is unknown. The site contains legacy tailings and waste rock actively undergoing ARD processes and metal leaching, processes projected to accelerate in the future. Over time, the intention of the Project is to move towards overarching objectives of the Project, including returning the site to pre-mine land use where practicable.

For almost all water quality model nodes and COPCs, the Project is predicted to result in water quality improvements compared to current conditions. For example, even where maximum zinc and iron concentrations are predicted to exceed site-specific WQOs for Rose Creek model nodes at some point during active remediation and long-term operations and maintenance, maximum monthly average concentrations are still predicted to be less than current conditions, with site-specific WQO exceedances less frequent.[322] Overall, water quality model predictions suggest the Project is on a trajectory toward meeting overarching site remediation objectives and not producing significant adverse effects on surface water quality, especially if the Project remains open to improvements and re-evaluation of mitigations and monitoring over time (as technology advances and/or learnings from the Project). The uncertainty surrounding this determination arises from the reliance on monitoring and adaptive management to ensure capture of nearly all contact water in a complex and dynamic surface water system.

The AMP[323] provided by the Proponent plans the introduction of Adaptive Management Initiatives (AMIs):

- To determine if the remediation needs to happen quicker than planned in the construction schedule
- To determine if remediation is working as expected
- To determine if water quality is getting worse (for example, because groundwater is getting worse or daylighting, poor quality water is running off the Faro Mine site before it can be treated during construction, or the water treatment plant is not working as it should)

Through those AMIs, it is expected that potential changes to water treatment or monitoring will be brought in the future to improve water quality at the site as need be. Technology and best practices for surface water, tailings, and waste rock management are evolving over time and it is possible that current proponent mitigation measures could be improved upon in the future in terms of efficacy, cost, carbon emissions and sustainability, and/or other factors. As such, it is important that the Proponent continually review and adapt the plan above to include these developments.

If the Project is unable to capture and adequately treat nearly all contact water, the Project may impact downstream environments. The proposed water management strategy requires strict compliance (i.e., near-complete capture and effective treatment of contact water) and robust

[322] YOR 2019-0149-7410, Table 7.3-16
[323] YOR 2019-0149-1878, p.11

adaptive management to succeed. Robust monitoring, adaptive management, and long-term funding are crucial for the Proponent's proposed mitigations for surface water quality.

The following specific recommendations are provided by the EC to address risks of significant adverse effects to surface water quality from uncontrolled and controlled discharges:

1. The Proponent shall review and revise the water balance, water quality model, water management, and monitoring and adaptive management plans to respond to changing climate and hydrologic conditions, hydrogeological conditions, extreme events, social expectations, water treatment efficacy, industry best practices, and water quality and toxicity monitoring data as set out in the water license for the Project.

2. Effluent quality standards from the permanent water treatment plant shall be protective of receiving water conditions at the time of discharge (e.g., low flow), and the receiving environment downstream of the discharge(s) shall be monitored as identified in the Water Management Plan, Performance Monitoring Plan, and Aquatic Effects Monitoring Plan to ensure that water quality guidelines and site-specific water quality objectives as defined in the Adaptive Management Plan are met beyond any approved mixing zone(s).

3. Adaptive management and monitoring plans for the Project shall provide a clear framework to identify issues quickly and implement timely mitigation as required to meet remediation objectives.

    a. These plans shall include an Adaptive Management Initiative to monitor and confirm whether the site-specific water quality objectives and low and moderate effect benchmarks are as protective as predicted during the assessment process.
    b. Adaptive management measures shall include appropriate monitoring with indicators and thresholds to identify adverse changes in surface water quality before they cause unacceptable effects, including constituents that may not currently be considered contaminants of potential concern. Additionally, adaptive management shall include proactive evaluation of mitigative options so that effective mitigations can be implemented in a timely manner when needed to stop or reverse adverse changes in surface water quality.
    c. The Proponent shall develop a broader adaptive management plan for surface water quality and quantity, with specific goals and objectives for these two surface water aspects and with monitoring frequencies appropriate to these objectives.
    d. The Proponent shall add an Adaptive Management Initiative to monitor water quality and quantity in the Faro Pit.

4. The Proponent shall assess magnesium and its effect on sulphate concentrations in effluent through predictive modelling and address it in future updates of the water quality and water balance models to be developed for the water licence application.

11 FISH AND FISH HABITAT

11.1 Overview

The Project will alter or remove fish habitat at the Rose Creek diversion channel and the North Fork diversion channel, causing significant adverse effects to fish. However, ensuring that offsetting plans sufficiently counterbalance the residual effects from the loss of overwintering habitats as proposed by EC will lead to improved fish habitat features and increased connectivity between waterways.

The EC determines that the Project will result in significant adverse effects to fish and fish habitat during active remediation. These effects can be eliminated, reduced, or controlled through the implementation of the mitigation measure recommended by the EC.

The most adverse and significant project effect to fish and fish habitat is due to the loss of overwintering habitat in fish-bearing channels and creeks due to reduced flow from groundwater to surface water. Thus, it is critical that offsetting plans adequately consider loss of overwintering habitats in areas where groundwater flows to surface waters are predicted to decline.

11.1.1 Reason for Inclusion

Fish and fish habitat are highly valued in the Yukon from spiritual, cultural, recreational, ecological, and nutritional perspectives. Fish and fish habitat were identified as a VESEC in the project proposal based on community and First Nation engagement sessions for the Project:[324]

- Kaska community members indicated that they fish around the Faro Mine site, including at the mouth area of Anvil Creek (known as Fish Hook); and
- SFN communicated the importance of Chinook salmon, historically used near Anvil Creek and Blind Creek.

During screening, the EC heard many concerns about the Project's potential effects on fish and fish habitat. The Faro Mine is located in the Rose Creek watershed, which flows to Anvil Creek before draining to the Pelly River, which is part of the Yukon River watershed. Salmon in the Pelly River are managed under the salmon plan developed by SFN: *Our Way – Salmon from Long Time Ago and Today / Húdé, ak'á dän K'i hats'ech'in'gyó Zhi.*[325]

Fish species reported in surface waters and downstream of the project location include slimy sculpin, arctic grayling, chinook salmon, burbot, round whitefish, and longnose sucker.[326] The following representative species are considered under the Fish and Fish Habitat VESEC: chinook salmon, arctic grayling and slimy sculpin. Chinook salmon is included due to its cultural importance, importance as a food source, and contribution to Indigenous economies. Arctic

[324] YOR 2019-0149-5406
[325] YOR 2019-0149-5145
[326] YOR 2019-0149-5080

grayling is included because it is the most widespread, prevalent fish species in the LAA that could support a commercial, recreational, or Indigenous fishery. Slimy sculpin will be considered because it is the most abundant fish species in the Faro Creek-Rose Creek-Anvil Creek system. Surface water quantity and quality, groundwater quantity and quality, and aquatic health and productivity are considered ICs linked to fish and fish habitat.

Over the long-term, the Project is designed to improve fish health and habitat at the Faro Mine site and in the downstream receiving environment by improving water quality conditions.[327] However, during the Project's active remediation phase, construction activities have the potential to cause adverse effects to fish and fish habitat (e.g., altering existing aquatic habitat, mobilizing sediment, blasting etc.). During the operations and maintenance phase, if the groundwater collection system is unable to capture a sufficient volume of contaminated groundwater, contaminants could be released to surface water. Additional groundwater interception will reduce groundwater flow to creeks, which may affect fish habitat (e.g., overwintering).

11.2 First Nation and Community Input

11.2.1 Ross River Dena Council

As caretakers of their land, RRDC expressed the importance of properly managing the environment:

> The Dena are the caretakers of our territory. All Dena are entrusted with the stewardship of our unceded territory. It is the task of all Dena to ensure the unceded territory is managed in a responsible manner, so that our land will always produce enough game, fish, berries medicines and clean water to support the subsistence, trade and customary needs of all its membership.[328]

As caretakers of the territory, RRDC emphasized the importance of fish and other resources to their culture and survival, highlighting their concerns about the level of protection for fish and fish habitat as suggested in the project proposal. Fish are the primary food source for RRDC, and Chinook salmon an especially important species for its members:

> Blind Creek, near the town of Faro, is home to what was likely the largest King [Chinook] Salmon migration in the entire Kaska territory: The trail up the Mountain from Blind Creek was worn deep from generations of use by the families who harvested in that area" (p. 61, Weinstein, 1992). Chinook salmon spawned along many of the creeks flowing into the Pelly River. Here, they were more common than in any other part of the Ross River area. Three significant traditional summer fish camps were located here. Weinstein (1992) noted that salmon were so abundant here that "nets had to be checked

[327] YOR 2019-0149-7410
[328] YOR 2019-0149-0069, p.2

> three times a day." Migratory salmon were fat, would dry and store well over the winter, and their tough skin served a number of purposes.[329]

RRDC was disappointed with the project proposal because it did not align with the objective to "protect, and to the extent possible, restore the environment" especially when it came to impacts on wildlife and fish and their habitats. RRDC questioned the choice to use current conditions as a baseline when assessing impacts on wildlife and fish habitat with that restoration objective in mind.[330]

11.2.2 Selkirk First Nation

During the adequacy review, SFN raised concerns about "past and ongoing adverse impacts to the Pelly River fish stocks and in particular Chinook salmon and water quality and aquatic health of the system over the long-term."[331] SFN have used and still use the Pelly River to meet subsistence needs and practice traditional activities. Due to this proximity to the river, SFN citizens have noticed direct and indirect effects of the Faro mine on salmon and freshwater fish as well as water quality and aquatic health.

In general, SFN believe that the assessment of project effects on fish and fish habitat and aquatic health in the project proposal is complete and supported by baseline data, including an assessment of risk and cumulative effects. However, SFN raised concerns about uncertain compensation and restoration of salmon and freshwater fish stocks that have been impacted for decades by the Faro mine:

> it is not clear whether the assessment is limited to the project proposal for remediation of the Faro site and mitigation of current and future adverse impacts or whether the federal government as the agency that licensed and approved the Faro mine developments and now the owner of the project has any intent or obligation to provide compensation and restoration of salmon and freshwater fish stocks that have been adversely impacted by decades of mining and deteriorating water quality in the area and in the Pelly River downstream.[332]

SFN also raised concerns about the high level of uncertainty associated with water quality modeling and predictions of water quality in the long-term, as well as the uncertainty that remains in the event that water quality declines in the future and the impacts it would have on fish and other aquatic organisms and aquatic health. The AMP and mitigation options proposed may not be sufficient to react if water quality declines or unanticipated adverse impacts arise at the site in the future. To this effect, SFN added:

> Given the high level of uncertainty associated with the magnitude and rate of deterioration of the Faro site and the effectiveness of proposed remediation and

[329] YOR 2019-0149-0555, p.16
[330] YOR 2019-0149-0555, p.7
[331] YOR 2019-0149-1865, p.1
[332] YOR 2019-0149-1865, p.1

> mitigation measures over the very long term and potential risks and consequences to fish, habitat and aquatic health a precautionary approach is needed. Such an approach would include proactive remediation measures at the planning and early implantation stages that go beyond the minimum requirements and cost considerations to address modelled effects and proactive fish and fish habitat restoration and compensation measures and projects that will provide a level stock and habitat banking as a contingency for unexpected future adverse developments.[333]

Following the 2021 PSOA, SFN suggested:

> Merging all fish and fish habitat and aquatic health issues associated with the Faro project into one VESEC, that of Aquatic Life, with 3 sub-components - Chinook salmon, Arctic grayling and Slimy Sculpin - is inadequate. Fish should be treated in the same way as wildlife and wildlife habitat with a stand-alone Fish and Fish Habitat VESEC. Broader aquatic life and aquatic health issues should be dealt with under a separate Aquatic Life and Aquatic Health VESEC with sub-components that at a minimum include a) Benthic Invertebrate Abundance and Diversity; b) Abundance, Growth and Condition of Slimy sculpin which are the only year-round resident fish species in the mine area; and c) Metal Concentrations in Sediments, Slimy Sculpin Tissue and Benthic Invertebrates.[334]

Throughout the assessment, SFN has emphasized the cultural and socio-economic importance of Chinook salmon[335] and advocated for the protection of the fish and its habitat. For example, during the adequacy review, SFN wrote: “The Pelly River Chinook salmon stock is of critical social-economic and cultural importance to SFN and SFN citizens.” [336]

Clearly salmon are both life and culture to SFN and past, ongoing or potential future adverse effects of the Faro mining project on salmon are of very high concern. In terms of direct impacts of the mine on Chinook Salmon the Anvil-Rose drainage was an important salmon rearing system as well as providing for some spawning. The SFN Traditional Use Study 2017 indicates a 60 percent decline in the SFN Chinook salmon harvest over the last 30 years.[337] This is reflective of population level declines in these stocks.

11.2.3 Liard First Nation

LFN expressed concern that fish health monitoring (among other monitoring regimes) had no evidence “provided to substantiate the suggestion that monitoring and public information sessions are effective in eroding and changing long-held perceptions.”[338]

[333] YOR 2019-0149-1865, p.2
[334] YOR 2019-0149-5667, p.4
[335] YOR 2019-0149-5145
[336] YOR 2019-0149-1865, p.1
[337] YOR 2019-0149-9030, p. 122.
[338] YOR 2019-0149-8863

At SATAC III, LFN brought up concerns about comparing small-bodied (i.e., slimy sculpin) to large-bodied (i.e. Arctic grayling and Chinook salmon) fish.[339]

11.3 Existing Conditions

RRDC noted a decline in most fish species due to a range of factors:

> Habitat destruction and displacement of animals, compounded by excessive harvest, resulted in declines of most fish and wildlife species, according to Elders and land users. Depletions of lake trout and grayling were noted, and declines in ground hogs, gophers, marten, fox, lynx, wolf and wolverine were observed (Weinstein 1992, Ross River Elders, 2009).[340]

In the 2017 fish community characterization study, limited numbers of juvenile Chinook salmon were identified in Rose Creek downstream from the Faro Mine and, in 2018, none were observed or captured.[341]

11.3.1 Chinook Salmon

RRDC described the historical abundance of Chinook salmon in their Traditional Territory and its importance as a primary food source for the northern Kaska.[342] SFN discussed the importance of Chinook salmon with respect to traditional use, community well-being, and culture, and stated that Chinook salmon were an underrepresented valued component in the project proposal.[343] LFN raised questions related to loss of fish habitat.[344]

A study published by Weinstein[345] thirty years ago described how Chinook salmon runs had significantly declined over several decades, and that this was likely due to heavy commercial fishing in the Alaska fishery. Further, Weinstein[346] suggested that the development of the Faro Mine impacted salmon fishing.

More recently, juvenile Chinook salmon have sporadically been observed in Rose Creek. Adult Chinook salmon have been observed infrequently in the lower section of the Rose Creek diversion. For example, a pair of Chinook salmon were observed spawning within the Rose Creek diversion in 2009.[347] Also in 2009, an adult Chinook salmon carcass was observed in the Rose Creek diversion; however, there was no evidence of spawning nests (redds) at that location.[348]

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[339] YOR 2019-0149-9549, p. 65
[340] YOR 2019-0149-0555, p.18
[341] YOR 2019-0149-5080
[342] YOR 2019-0149-0555
[343] YOR 2019-0149-9158
[344] YOR 2019-0149-9691
[345] Weinstein, *The Ross River Dena: A Yukon Aboriginal Economy*, p. 146.
[346] Weinstein, *The Ross River Dena: A Yukon Aboriginal Economy*, p. 146.
[347] Minnow Environmental Inc., *Aquatic Ecosystem Monitoring Program, Faro Mine, Yukon,* 2010, 476.
[348] Mackenzie-Grieve, *Fisheries and Oceans Canada Memorandum: Chinook Spawning – Rose Creek Diversion* Channel, 2009; YOR 2019-0149-5080

11.3.2 Arctic Grayling

A comprehensive 2013 to 2014 telemetry study found that Arctic grayling were distributed throughout the LAA during the open-water season.[349] By October, most of the tagged Arctic grayling that were downstream of the fish barriers migrated 40 to 130 km downstream to overwinter in the Pelly River, though some did remain in Rose Creek near the mine site.[350] Arctic grayling tagged upstream of the barriers in the North Fork Rose Creek overwintered in available lentic habitat; however, habitat conditions were poor and mortalities were suspected. Arctic grayling tagged in the upper South Fork Rose Creek overwintered in Dixon Lake.[351]

Telemetry data and fish capture indicated that Arctic grayling return to spawn at multiple sites in Rose Creek, peaking in late-June. In the summer, adult Arctic grayling were throughout Rose Creek in pool and riffle habitats, and juvenile Arctic grayling were found in slow-flowing, shallow, backwater reaches.[352]

Arctic grayling habitat was used to estimate the amount of fish habitat within the potentially affected LAA. Arctic grayling was selected due to its importance and prevalence within the assessment area, and because of available published Arctic grayling information on both habitat suitability and assessment protocols.[353] Using a variety of habitat characteristics (stream gradient, water depth, stream morphology, and substrate composition) for areas with available data, habitat units were calculated for four Arctic grayling life-stages: young-of-year, adult spawning, adult feeding, and adult overwintering.[354] Arctic grayling habitat characterization was completed for seven reaches within the LAA[355] and used to represent habitat for each species contemplated in the fish and fish habitat VESEC: Arctic grayling, Chinook salmon, and slimy sculpin.[356]

Participants expressed concerns that the use of Arctic grayling habitat as a measure for slimy sculpin and Chinook salmon habitat was an oversimplification since each species has its own

[349] EDI Environmental Dynamics Inc*., Faro Mine Site Re-vegetation Study: Waste Rock Dumps and Tailings Impoundment*, 2008, https://emrlibrary.gov.yk.ca/aam/faro-mine-site-re-vegetation-study-waste-rock-dumps-and-tailings-impoundment-2008.pdf.
[350] EDI Environmental Dynamics Inc., *Faro Mine Site Re-vegetation Study: Waste Rock Dumps and Tailings Impoundment*.
[351] YOR 2019-0149-5080
[352] EDI Environmental Dynamics Inc., *Faro Mine Site Re-vegetation Study: Waste Rock Dumps and Tailings Impoundment*.
[353] Larocque, Hatry and Enders, *Development of Habitat Suitability Indices and Bioenergetics Models for Arctic Grayling (Thymallus Arcticus)*, 2014, 64; Stewart, et al., "Fish Life History and Habitat Use in the Northwest Territories: Arctic Grayling (Thymallus Arcticus)," *Canadian Manuscript Report of Fisheries and Aquatic Sciences,* 2007, 63.
[354] Larocque, Hatry and Enders, *Development of Habitat Suitability Indices and Bioenergetics Models for Arctic Grayling (Thymallus Arcticus), 64*; Stewart, et al., "Fish Life History and Habitat Use in the Northwest Territories: Arctic Grayling (Thymallus Arcticus)", 63; Minnow Environmental Inc., *Aquatic Ecosystem Monitoring Program, Faro Mine, Yukon*, 476.
[355] YOR 2019-0149-5080
[356] YOR 2019-0149-7410

unique habitat requirements for each life stage.[357] In their response (IR1-19), the Proponent noted that the three species have been found in similar habitats in Rose Creek and prepared a table comparing the habitat requirements for each species and life stage.[358]

Arctic grayling caught in 2017 were within or above the expected weight when compared to Arctic grayling of similar length from previous datasets.[359] In addition, there were no obvious site-specific differences in condition.[360] In the 2019 sampling program, adult Arctic grayling in Rose Creek were targeted via angling (fly fishing). A total of 109 Arctic grayling were collected, of which 77 were measured. Compared to 2018, when electrofishing was used for the sampling program, angling captured more adults and large juveniles. Of the Arctic grayling that were collected, two had PIT tags from the 2018 survey. These fish were scanned and tagged again prior to release. In 2018, both fish had been collected from North Fork Rose Creek; in 2019, one was captured in the pumphouse pond and the other at Site 1 in the Rose Creek diversion channel.[361]

11.3.3 Slimy Sculpin

Slimy sculpin are widely distributed throughout the LAA, including within Faro Creek.[362] Slimy sculpin can be a useful species for aquatic biomonitoring because benchmarking data are available; they are collected from operational mining reference sites throughout Canada to meet environmental effects monitoring (EEM) requirements under the *Canadian Metal and Diamond Mining Effluent Regulations*.[363]In addition, at SATAC III, SFN noted their value as an indicator:

> One reason for that is because it [slimy sculpin] is one of the most abundant species in the system, so it is a good indicator. Another reason is that it's site-specific. They don't migrate in and out of the system, they spend most of their life history within 200-300m. If you monitor them, it's very specific to where it is found in the downstream drainage or on site. The third reason is slimy sculpin are very sensitive to contaminants. The things we need to look at are standard - abundance, growth, and condition. In fish biology, the first function impaired by environmental conditions is reproduction. We have a large enough sample size, we can look at whether all year classes are represented. At the first sign year classes are missing, it is a sign that there are concerns in the environment in terms of reproduction. Lastly, there is so much historical data on slimy sculpin. Aside from benthic diversity and abundance, it will be one of the most important indicators.[364]

Slimy sculpin caught in 2017 met or exceeded the expected weight when compared to a slimy sculpin of similar length. In addition, there were no obvious site-specific differences in

[357] YOR 2019-0149-7985
[358] YOR 2019-0149-5406
[359] YOR 2019-0149-5080
[360] YOR 2019-0149-7410, pg. 140; YOR 2019-0149-5080, pg. 78
[361] YOR 2019-0149-7010, pg. 310-317
[362] YOR 2019-0149-5080
[363] YOR 2019-0149-5080
[364] YOR 2019-0149-9549, p.45

condition.[365] Although the weight of evidence suggests that there have been some effects from discharges from the Faro Mine site on the fish community, slimy sculpin were found at most sites sampled during the 2017 field program.[366] This continued presence is notable because slimy sculpin are particularly sensitive to elevated metal concentrations; this suggests that the effects of the Faro Mine site on the slimy sculpin population were subtle.[367] Although conclusions drawn from the 2017 data were uncertain due to only a single reference site and fish-capturing challenges (i.e., higher water levels and flow rates), increased replication in 2018 (nine reference sites) generated consistent results, suggesting limited effects of water quality changes at the Faro Mine site on the condition of slimy sculpin.[368]

11.3.4 Chronic Toxicity

Tissue metal content at exposure areas of Rose Creek was slightly elevated in slimy sculpin (cadmium, cesium, cobalt, lead, mercury, and zinc) and up to 15 times elevated in Arctic grayling compared to reference sites (most notably for cobalt, chromium, and aluminum).[369] As part of the second Information Request, LFN asked how metal concentrations in fish tissues were used in determining the COPCs, how they could adversely affect fish, and what effects they could have on wildlife and human health.[370] The Proponent responded that the elevated substances in slimy sculpin and Arctic grayling can be adequately screened using water quality guidelines and, consequently, body burdens of metals in fish were not used when selecting COPCs in the Aquatic Health Risk Assessment (AHRA). Instead, fish tissue metals were used to provide context for existing conditions and to assess changes due to the Project.[371] The COPCs are not subjected to strong bioaccumulation or biomagnification and two can be internally regulated (iron and zinc).[372] The Proponent suggests that “Tissue concentrations provide one potential means of quantifying exposure but are not the appropriate basis for assessing potential harm (adverse effects).”[373]

A non-lethal small-bodied monitoring program has been selected for future monitoring in order to reduce large-bodied fish mortality and because environmental effects detected in small-bodied fish may occur prior to detection in higher trophic levels. Further, limited numbers of slimy sculpin were detected in 2018, suggesting that lethal surveys may not provide adequate statistical power and could deplete populations at some sites.[374] Therefore, if after reasonable electrofishing effort inadequate numbers of slimy sculpin have been captured, then fish tissue chemistry samples will not be collected.[375]

[365] YOR 2019-0149-5080
[366] YOR 2019-0149-5080
[367] YOR 2019-0149-5080
[368] YOR 2019-0149-5080
[369] YOR 2019-0149-5080
[370] YOR 2019-0149-7010, pg. 83
[371] YOR 2019-0149-7010, pg. 84
[372] YOR 2019-0149-7010, pg. 85
[373] YOR 2019-0149-7010, p.76
[374] YOR 2019-0149-9964 pg. 192
[375] YOR 2019-0149-9964 pg. 192

Chronic toxicity testing was completed in 2019 with a focus on zinc. Fathead minnow (*Pimephales promelas*) toxicity tests showed no evidence of statistically adverse effects on mean biomass or survival or viability. Similarly, Rainbow trout (*Oncorhynchus mykiss*) toxicity tests showed no evidence of statistically adverse effects on survival or viability.[376]

11.3.5 Reference Sites

Reference sites at operating mines across Canada have collected data on slimy sculpin. From this information, a preliminary standard weight equation has been developed, providing a benchmark from which to measure slimy sculpin at the Faro Mine site. This is particularly useful given the limited numbers of slimy sculpin that have been collected at the site.[377]

Fish tissue chemistry was measured for slimy sculpin and Arctic grayling. However, there was only one reference site sampled in each of the 2014 and 2017 surveys.[378] Fish tissue metal data collected as part of the 2014 and 2017 AEMP will be used to provide context for existing conditions and to assess changes due to the Project.

In 2014 and 2017, Arctic grayling lengths from the Faro Mine site were compared to those from Toolik Field Station in Alaska as there was not enough data from more local reference areas.[379]

In 2018, electrofishing was conducted at 18 reference sites, resulting in variable catch-per-unit-effort results for slimy sculpin.[380]

11.4 Proponent Mitigation Measures

As summarized in the project proposal, the Project is expected to improve fish survival and reproduction through the improvement of surface water quality by diverting and treating contact water, and to increase the carrying capacity for fish through the improvement of flow and habitat in diversion channels.[381]

The proposed mitigation, monitoring, and management measures for water and sediments are relevant to protection of fish and fish habitat. Measures related to water, including adaptive management, are summarized in the surface water quality VESEC. Measures related to sediment are summarized in the aquatic health and productivity VESEC. Proposed mitigation measures to reduce fish mortality and loss of fish habitat include the following:[382]

- Prior to altering fish habitat quantity (e.g., constructing, decommissioning, or widening channels, changing the flow to creek channels), develop and implement an

[376] YOR 2019-0149-7458 pg. 411
[377] YOR 2019-0149-5080 pg. 22
[378] YOR 2019-0149-5080 pg. 79
[379] YOR 2019-0149-5080 pg. 55
[380] YOR 2019-0149-5080 pg. 52
[381] YOR 2019-0149-7410
[382] YOR 2019-0149-7410

Offsetting Plan that compensates for loss of fish habitat and obtain a *Fisheries Act* authorization;

- Prior to stream realignment and in consultation with DFO, conduct fish salvage operations according to established protocols and adhere to the requirements of *Fisheries Act* authorization;
- Prior to blasting near fish-bearing watercourses, adhere to blasting requirements to avoid fish injury and mortality, wherever possible, and schedule work during timing windows with the least risk to fish, to the extent possible;
- Design fish habitat features into new channel to equal or exceed quality and quantity of habitat in original channel, where possible;
- Maintain fish passage during active remediation, where practical, and provide fish passage during long-term operations and maintenance;
- Schedule work to limit the time between habitat disruption and the construction of the new channels, where practical;
- Remove any culverts that are not required once the construction access roads are no longer required;
- Adhere to guidelines for installation of new culverts on fish-bearing watercourses to maintain fish passage as directed by DFO;
- Avoid developing construction access roads across watercourses with high-quality habitat, where practical;
- Prior to development of borrow pits, establish a 30-m setback from a stream's high-water mark and conduct a detailed assessment of fish habitat conditions if work must encroach within the 30-m setback. A *Fisheries Act* authorization will be obtained if there is a potential to cause serious harm to fish or fish habitat; and
- Implement the Water Management Plan, Adaptive Management Plan, and Sediment and Erosion Control Plan.

As part of the AEMP, fish and fish health monitoring include a non-lethal slimy sculpin health survey with the following variables: catch-per-unit effort, presence/absence, length, weight, condition factor, and length-frequency.[383] If adequate numbers of slimy sculpin are collected,[384] a subset will be retained for tissue analysis of whole-body total metals and percent moisture.[385] The slimy sculpin fish health and tissue chemistry components will be monitored every three years, during a three-week low-flow period in mid- to late August or early September.[386] Slimy sculpin, a small-bodied fish, was selected for monitoring to reduce large-bodied fish mortality. Further, due to the typically low capture rate of slimy sculpin, a lethal survey would be unlikely to have enough power to detect differences.[387]

[383] YOR 2019-0149-9964, p. 168
[384] YOR 2019-0149-9964, p. 192
[385] YOR 2019-0149-9964, p. 168
[386] YOR 2019-0149-9964, p. 177
[387] YOR 2019-0149-9964, p. 192

The Offsetting Plan and the *Fisheries Act* authorization (v. II, s. 7.4) will be used to support the monitoring of fish habitat offset works and habitat recovery.[388]

Acute and chronic aquatic toxicity will be monitored yearly[389] using early life stages of Rainbow trout and/or Arctic grayling.[390] During a standard year, chronic toxicity samples will be collected once from two exposure stations in Rose Creek and one upstream reference station. During a comprehensive year (every three years), chronic toxicity samples will be collected twice from three exposure stations, one downstream station on Anvil Creek, and one upstream reference station. During standard and comprehensive years, acute toxicity samples will be collected four times from three exposure stations.[391]

Monitoring stations will be consistent with current and historical stations, including exposure stations in the receiving environment within the Faro Mine site, exposure stations in the receiving environment downstream of the Faro Mine site, and reference stations upstream of the Faro Mine site or in separate watersheds.[392]

11.5 Project Effects Characterization

The Project is predicted to improve surface water quality. Further, site-specific WQO exceedances for iron, sulphate, and zinc are not expected to result in impacts to populations of sensitive fish and amphibians or communities of invertebrates and aquatic plants. Since surface water quality is predicted to improve and not expected to negatively affect fish and fish habitat, project effects on surface water quality are discussed in the surface water quality VESEC (section 10).

Chinook salmon nutrient input from the Pacific to the Pelly River drainage is discussed in the aquatic health and productivity VESEC as it relates more directly to the effect on productivity (section 12).

11.5.1 Project Effect: Habitat alteration

To improve water quality, reduce interactions between contact and non-contact water, and increase capacity for maximal storm events, the Proponent has recommended realignment, extension, and development of channels around the Faro Mine site (discussed below). For example, the existing North Fork diversion channel south of the haul road will be decommissioned, a North Fork diversion channel north of the haul road will be developed, and the Rose Creek diversion channel realignment will be constructed. Channels and diversions will be constructed in non-fish-bearing northwest collection channels. Although this activity will not directly affect fish or fish habitat, it will increase the flow of non-contact water during the open-water period to Rose Creek downstream of the channel and reduce flows during the low-flow

[388] YOR 2019-0149-9964, p. 150
[389] YOR 2019-0149-9964
[390] YOR 2019-0149-9964
[391] YOR 2019-0149-9964
[392] YOR 2019-0149-9964

period. These altered flows, however, are expected to be minor following hydrological modelling predictions. Overall, the new habitats constructed as part of the Project are predicted to be an improvement to those currently available.

In designing the project proposal, First Nations (Kaska Faro Secretariat, LFN, RRDC, SFN) input at prior meetings and workshops led to the incorporation of fish habitat features (maintenance, migration, rearing, and overwintering ponds) into the design plans for the fish offsetting plan.[393] At the SATAC III[394] meeting, SFN highlighted that habitat should be considered independently for each species and life-stage:

> Slimy Sculpin complete their entire life cycle within 100m of stream. It's easy to do a habitat inventory. Arctic Grayling are different, they migrate. The habitat considerations for Chinook are most complex. I am talking about the Rose/Anvil system. Rose Creek probably has a limited amount of Chinook rearing. I don't think it has any habitat for Chinook spawning, but Anvil Creek does. Spawning was documented there in 2006-2007. My point is that we can't speak about habitat in a generic sense. We have specific habitat requirements for spawning and overwintering and incubation. It wouldn't be hard to figure out where it's going to happen. I would do a fly-over and look where there is open water, which is where we have upwelling groundwater. That's a likely spot for Chinook spawning. I wouldn't expect a lot of juvenile Chinook in Rose Creek, because there is no spawning there. The juvenile Chinook that are there have migrated. Chinook juveniles for summer rearing will go hundreds of kilometres to find a suitable rearing spot. Based on past survey work, there have been high densities of rearing Chinook on the lower end of Anvil and Vangorda creeks. The whole placer system has modeled Chinook rearing habitat, so the most valuable rearing habitat is in the lower 5kms of the system. Medium value rearing habitat in the next 20 km and low value habitat is in the upper 30km and beyond to the mine site. The other thing we have no data on is overwinter rearing habitat, which is the most critical habitat for Chinook. Winter is a very hard time for Chinook. Overwintering habitat is critical and right now we can't answer the question of whether juvenile Chinook overwinter in Anvil Creek or the lower section of Vangorda Creek. I expect they do, but we're not sure. We need to look at Chinook habitat by life history functions, on both Rose and Anvil creeks. It's not habitat in a generic sense, it's different between the three species, and that consideration needs to be built into how we evaluate, assess, and monitor impacts to Chinook habitat.[395]

In addition, SFN highlighted some biological characteristics of slimy sculpin and Arctic grayling and their importance as species assessed within the fish and fish habitat VESEC: "Slimy Sculpin are a bit different. They are abundant and don't migrate, they are sensitive to contaminants, so they are an important fish species for monitoring and assessing aquatic health. They are under the *Fisheries Act* now."[396] For Arctic grayling, SFN explained that:

[393] YOR 2019-0149-7010, p. 21 Table R2-2-1
[394] YOR 2019-0149-9549
[395] YOR 2019-0149-9549, pp.49-50
[396] YOR 2019-0149-3563, p.25

> Arctic grayling has a history of ephemeral use of tributaries especially at higher altitudes. After not using habitats for a number of years, probably due climate factors, they have been known to return in large numbers. Therefore, it is important to address fish habitat as a SC of this VESEC and that it is monitored and maintained in a healthy state as part of the management process.[397]

In response to the adequacy review, SFN indicated in a memo that CIRNAC has and will continue to violate legislative requirements under the *Fisheries Act*, ultimately requesting documentation of relevant correspondence with Environment Canada and DFO:

> It is understood that CIRNAC has been, is presently and will continue to be in violation of s.36(3) of the Fisheries Act due to the deposition of deleterious substances into the North Fork of Rose Creek and into Rose Creek below the confluence of the North and South Forks of Rose Creek. Moreover, it is understood that Environment Canada, at the delegation of the Department of Fisheries and Oceans Canada, has issued a letter of direction to Canada to address the on-going deposition. The letter of direction is not included in the proposal to allow for understanding of the implications of the direction and potential enforcement on the project over the period of the assessment of project activities.[398]

11.5.1.1 Decommissioning of the North Fork Rose Creek diversion channel

The decommissioning of the North Fork Rose Creek diversion will result in the loss of fish habitat, leading to serious harm to fish.[399] The diversion was built to direct sediment-laden water away from the pumphouse pond during freshet[400] and did not incorporate fish habitat features during its construction. As such, loss of fish habitat in the North Fork Rose Creek will be limited, representing just over a third (36 %) of suitable fish habitat in the creek.

Within the North Fork Rose Creek diversion channel, there were limited Arctic grayling spawning and young-of-year habitats, and no overwintering or feeding habitats for adults.[401] The dominant substrate, as identified in Appendix 7G, included boulder, cobble, and gravel, with boulders and deep pools as the dominant instream cover.[402] Habitat requirements for each fish and fish habitat VESEC were listed in Table R1-19-1.[403] According to this table, spawning, embryo development, young-of-year, and juvenile substrates for each species may be found within the original North Fork Rose Creek diversion channel. Similarly, the cover component for the young-of-year and juveniles for each species is also found within the diversion channel. However, there is insufficient stream area coverage for chinook salmon overwintering (11 % cover and ≥15 % required), similar to the finding that there were no overwintering habitats for

[397] YOR 2019-0149-8931, p.3
[398] YOR 2019-0149-1865, p.10
[399] YOR 2019-0149-7410
[400] YOR 2019-0149-5080
[401] YOR 2019-0149-5080
[402] YOR 2019-0149-5080
[403] YOR 2019-0149-5406

adult Arctic grayling.[404] Water depth and velocity[405] in the diversion channel are also within the range of each species' young-of-year and juvenile stages.[406]

11.5.1.1.1 Proponent Mitigation Measures

To mitigate the loss of habitat, the Proponent has developed an offsetting plan whereby fish habitat features are incorporated into the new North Fork diversion channel. Work will be scheduled to limit the disruption between decommissioning of the old channel and construction of the new one. Where practical, fish passages will be maintained during active remediation and will provide passage during long-term operations and maintenance. To maintain fish passage, culverts may be installed following appropriate guidelines and, when construction access roads are no longer required, unneeded culverts should be removed. Finally, constructing access roads over high-quality habitat should be avoided.[407]

11.5.1.2 North Fork Rose Creek Diversion Channel Realignment

The North Fork Rose Creek flowed through the Faro Mine site collecting contaminated water and transporting it downstream to other water bodies. To improve water quality in the North Fork Rose Creek and reduce non-contact and contact water interactions, emergency works began in 2018 to construct a parallel diversion channel. The realignment was to provide a means of fish passage and habitat.[408]

Due to the realignment, 30 654 m^2 of fish habitat was predicted to be lost, including riffles, glides, and pools.[409] Further, a mine access road culvert was to be replaced, resulting in an additional loss of habitat (688 m^2).

11.5.1.2.1 Proponent Mitigation Measures

The realigned channel was designed to have a flow that will minimize the potential for glaciation and blockage, permitting open-water flow conditions year-round for fish passage.[410] The North Fork Rose Creek Offsetting Plan aimed to create overwintering habitat pools and a connection to the South Fork Rose Creek. Additional habitat will be generated by removing a partial barrier to fish passage (the culvert at the mine access road) and a complete barrier to fish passage (the North Fork rock drain) that has been in place since 1998.[411] Although the realignment is expected to have reduced adult foraging, juvenile rearing, and spawning habitats, the improved connectivity will allow fish to access the upper non-mine-impacted reaches of North Fork Rose Creek and downstream areas in the South Fork Rose Creek.[412]

[404] YOR 2019-0149-5080
[405] YOR 2019-0149-5080
[406] YOR 2019-0149-5406
[407] YOR 2019-0149-7410
[408] YOR 2019-0149-0026
[409] YOR 2019-0149-0026
[410] YOR 2019-0149-0026
[411] YOR 2019-0149-0026
[412] YOR 2019-0149-0026

11.5.1.3 Rose Creek Diversion Channel Realignment and Extension

The existing Rose Creek diversion channel was designed to separate Rose Creek from the creek tailings area,[413] and its design did not include fish habitat features.[414] Further, the existing diversion channel does not have sufficient capacity to accommodate a maximal flow event around the southern perimeter of the site. As such, during active remediation, the Rose Creek diversion channel will be widened to provide sufficient capacity for maximum flood flows.[415] In addition, an extension of the channel was proposed that would connect with Rose Creek further downstream than the current configuration, bypassing 10 200 m^2 of Arctic grayling habitat.[416] Overall, the realignment and extension of the Rose Creek diversion channel would affect 49 200 m^2 of habitat, with construction taking place over a 12-year period.[417] However, since the project proposal submission, engineering design work on the Rose Creek diversion channel has led to a revised design plan, in that the extension will no longer go forward.[418] With the updated design, predictions now are that there will be no loss of water, change of channel depth, or reduction in the functionality of fish habitat in Rose Creek where the extension was originally planned, just downstream of the Fare Mine site.[419]

Construction of the widened Rose Creek diversion channel will remove the existing channel. Over the past 40 years, the Rose Creek diversion channel has been used as fish habitat by Arctic grayling and slimy sculpin, with occasional adult chinook salmon in the downstream end of the channel.[420] In addition, a chinook salmon redd was reported just upstream of the Intermediate pond and a juvenile was caught in Rose Creek, upstream of the confluence of the North and South Forks of Rose Creek.[421]

In the closing comments at SATAC II, SFN said:

> If we are managing fish versus managing habitat, they may disappear from the system, but that doesn't mean they won't come back, and we don't need to maintain that habitat. Fish populations come and go over time, not just because of climate change. We can't predict where the fish are going to be or how abundant they are going to be. The only option we have is to manage fish habitat for if and when they return in abundance. That's why we need to focus on habitat as a fundamental component of aquatic health and productivity and fish health and productivity. In terms of monitoring, our fundamental tool has been looking at benthic invertebrate diversity and abundance

[413] YOR 2019-0149-7410
[414] YOR 2019-0149-5406
[415] YOR 2019-0149-7410
[416] YOR 2019-0149-7410
[417] YOR 2019-0149-7410
[418] YOR 2019-0149-7458
[419] YOR 2019-0149-7458
[420] YOR 2019-0149-7410
[421] YOR 2019-0149-7410; de Graff, *Aquatic Habitat Characterization of the North Fork of the Rose Creek and Rose Creek Diversion Channel Faro Mine Complex,* 2013, https://emrlibrary.gov.yk.ca/aam/aquatic-habitat-characterization-of-the-north-fork-of-the-rose-creek-and-rose-creek-diversion-channel-2009.pdf.

> and composition. It's a well-developed science and there is a lot of information there. That will be the fundamental tool, but we need to look at fish and fish habitat separately, and specifically look at habitat, especially as it relates to Chinook.[422]

In IR No. 2, LFN asked whether there were habitat offsetting contingencies if new habitat could not be incorporated in the Rose Creek diversion channel.[423] The Proponent responded that a detailed offsetting plan would be included with the *Fisheries Act* authorization application, and that possible contingency measures could include "additional overwintering habitat in the Rose Creek watershed,[424] use of depleted borrow sites, and offsite opportunities."[425] In addition, LFN requested additional information regarding overwintering habitats within the primary channel of the Rose Creek diversion channel. The response indicated that overwintering habitat in the existing channel is minimal and pool development in the new Rose Creek diversion channel will be limited, although design engineers will continue to collect geotechnical data along the channel. There may be other opportunities for developing overwintering pool habitats by excavating off-channel features in the floodway of the Rose Creek diversion channel, depending on the geotechnical conditions, or in the vicinity of the confluence of North and South Fork Rose Creeks.[426]

11.5.1.3.1 Proponent Mitigation Measures

An initial primary channel would be constructed to meander within the probable maximum flood channel to slightly reduce the overall gradient, with built-in fish habitat features (e.g., pools, runs, riffles, boulders, side/off-channel areas for rearing; see[427] for more details). If spawning fish are observed in the area where blasting is occurring, blasting will be controlled to meet DFO guidelines.[428] To minimize sediment inputs into the Rose Creek diversion channel, erosion and sediment control measures will be implemented.

11.5.1.4 Significance Determination

The EC determines that the Project will not result in significant adverse effects to fish habitat by way of habitat alteration. As such, no mitigations are recommended.

Although project activities on the North Fork Rose Creek diversion channel and the Rose Creek diversion channel will result in the loss of fish habitat and harm to fish, the offsetting plans have included the construction of fish habitat features, which should provide important habitat features for fish species. Further, the North Fork Rose Creek Offsetting Plan aims to improve connectivity among waterways around the Faro Mine site, offering access to habitats and non-

[422] YOR 2019-0149-3563, p.38
[423] YOR 2019-0149-4555
[424] YOR 2019-0149-7010
[425] YOR 2019-0149-7010, p.54
[426] YOR 2019-0149-7010
[427] YOR 2019-0149-7410
[428] YOR 2019-0149-7410

contact water that were previously inaccessible. This improved connectivity could be particularly beneficial to migratory fish such as Arctic grayling and Chinook salmon.

The Proponent is encouraged to follow guidance provided in *Preferred practices for works affecting Yukon waters*[429] and DFO's *Interim Standard: In-Water Site Isolation,*[430] and adhere to freshwater timing windows identified for the Yukon.[431]

11.5.2 Project Effect: Reduced groundwater quantity and loss of overwintering habitat

Without completion of the Project, groundwater quality is predicted to worsen over time. However, installation of seepage interception systems and water treatment systems will collect and treat groundwater prior to discharge into the environment.

During long-term operations and maintenance, contaminants could be released to surface water if the groundwater collection system is unable to capture a sufficient volume of contaminated groundwater. Groundwater interception will reduce groundwater flow to creeks, which may affect fish habitat (e.g., overwintering).[432]

The SATAC II concept maps for potential project effects pathways focused on surface water quality.[433] At the meeting and in follow-up correspondence,[434] SFN stressed the importance of groundwater and the potential effects of groundwater interception (thereby affecting water quantity) on overwintering habitat for chinook salmon.[435]

> Groundwater plays a major and special role in maintaining overwinter flows in streams for spawning and overwinter incubation and juvenile rearing in the Yukon with its long and cold winters. This is especially important for a species like Chinook that spawns in fall with the egg and juvenile fry incubation over the winter period. Ground water is a few degrees warmer than surface water in winter that is critical for maintaining surface flows and open water in tributary streams like Anvil. The groundwater collection in winter at the mine site will affect groundwater and surface flows downstream and potentially impact overwinter incubation and juvenile rearing of a species like Chinook. Groundwater inflows will be dramatically influenced by the Project due to lined stream channels and ground water collection (as is already the case for the new North Fork Diversion Channel which has no groundwater inflow now for two kilometres downstream. [436]

[429] Government of Yukon, *Preferred practices for works affecting Yukon waters*, 2019, https://open.yukon.ca/sites/default/files/env-preferred-practices-works-affecting-yukon-waters.pdf.
[430] Government of Canada, *Interim standard: in-water site isolation*, 2013, https://www.dfo-mpo.gc.ca/pnw-ppe/codes/interim-provisoire/site-isolation-confinement-aire-travail-eng.html.
[431] Government of Canada, *Freshwater Timing Windows Identified for the Yukon*, 2014, https://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/yk-eng.html.
[432] YOR 2019-0149-7410, p. 131
[433] YOR 2019-0149-3584
[434] YOR 2019-0149-8931, p. 5
[435] YOR 2019-0149-9549
[436] YOR 2019-0149-8931, p.5

At SATAC III,[437] SFN brought up concerns related to the lack of knowledge surrounding chinook salmon habitat use in the Pelly-Anvil system and the effects of groundwater interception and fish overwintering habitat:

> With respect to groundwater, winter is a really tough time for stream fish species in the Yukon, especially salmon, in part because of our very cold winter conditions and lack of flows. Chinook spawn in Anvil Creek, at least in the past. You need to have sufficient flow - and it's mainly groundwater flow - and quality of flow to incubate the eggs over a six-month period of time to provide them with enough thermal units. Overwinter water temperature is a big deal in the Yukon. At zero degrees you're not going to get hatching of salmon eggs, you need warmer water. Juvenile Chinook overwinter in many of these tributary streams, and that's very specialized habitat as well. My main concern with the groundwater issue is how the interceptions of groundwater and storage of groundwater in the winter will affect all aquatic health, but specifically Chinook habitat, and specifically Chinook incubation habitat and Chinook overwintering juvenile habitat. It's not a question of the amount of stream and surface flows, it's also temperature. How will we determine whether functionally we are meeting those requirements? [438]
>
> One of the main points I want to make is that right now we don't even know where salmon spawn on the Anvil Creek. We don't know the extent of the rearing areas, and we have absolutely no information on the overwintering of Chinook or other species in Rose and Anvil. Some basic baseline data should be built into the initial monitoring and assessment work to get some idea of the location and extent of Chinook spawning on Anvil Creek. If we can say that interceptions of groundwater at the mine site are going to have no impact on those spawning areas, that's great, but we have to know where those areas are before we can make that statement. [439]
>
> The point I wanted to make earlier regarding groundwater and overwintering habitat was that areas important for groundwater will be open in wintertime, because that's where upwelling of groundwater will be. Those waters will be warmer and that's of critical importance to Chinook. It's easy to do an inventory of where these areas might be.[440]
>
> No one on SFN's team would suggest that removing the groundwater as proposed should be impeded. The question is, have the effects of that action during the winter low-flow period been properly accounted for so that mitigations such as offsetting is appropriately designed? [441]

[437] YOR 2019-0149-9549
[438] YOR 2019-0149-9549, p.42
[439] YOR 2019-0149-9549, p. 51
[440] YOR 2019-0149-9549, pp.50-51
[441] YOR 2019-0149-9549, p. 68

At SATAC III,[442] Golder (for CIRNAC) explained that change in groundwater volumes was factored into the water modelling as part of the assessment and, under a permit for a *Fisheries Act* authorization, available habitat and fish habitat calculations will be refined for DFO.

The Arctic grayling habitat assessment identified limited overwintering habitat within and just downstream of the Rose Creek diversion channel, none in the existing North Fork Rose Creek diversion channel, and suitable overwintering habitat in the groundwater recharge ponds. The latter location, however, did not have a detailed fish survey performed at the time of the 2018 field program, so there is a limited understanding of fish occupancy in the groundwater recharge ponds.[443] Of the areas identified as containing Arctic grayling overwintering habitat, the annual net water flow in 2017 moved from the subsurface to surface at each location (groundwater recharge ponds, upstream portion of the Rose Creek diversion channel, and Rose Creek upstream and downstream of the discharge point), except in the Rose Creek diversion channel from the overflow structure to CVS1/NW-SW003, where the water had a net flow from the channel to the subsurface.

At the groundwater recharge ponds, groundwater modeling predicted that the net flow direction will change at each of the two future milestones—active remediation and long-term operations and management—and instead flow from the surface to subsurface (e.g., in 2017, the flow was 110 m^3/day from the subsurface to surface, but water is predicted to flow 1 210 m^3/day from the ponds to subsurface during long-term operations and maintenance).[444] The upstream portion of the Rose Creek diversion channel and upstream Rose Creek will continue to have a net flow from the subsurface to surface, but this flow will be reduced during future milestones compared to 2017 (e.g., a predicted reduction in flow by 380 and 140 m^3/day during long-term operations and maintenance, respectively). In contrast, Rose Creek south of the discharge point will have increased flow at the two milestones (e.g., a predicted increase in flow by 1 050 m^3/day during long-term operations and maintenance). The Rose Creek diversion channel (from the overflow structure to CVS1/NW-SW003) is predicted to have an increased flow from the surface to subsurface during the two future milestones (e.g., a predicted increase in flow to the subsurface by 1 870 m^3/day during long-term operations and maintenance). Overall, net water flow into fish habitat will be reduced at all current fish overwintering locations at the two future project milestones, except at Rose Creek downstream of the discharge point.

11.5.2.1 Proponent Mitigation Measures

The Conceptual Offsetting Plan for the Rose Creek diversion channel described in the project proposal indicated that additional sites for deeper pools for overwintering above the Rose Creek diversion channel would be considered. Creation of overwintering pools within the primary channel itself may be limited due to geotechnical constraints.[445] The Rose Creek diversion channel's limited habitat (pool depths limited to around 1 m) may be further impacted by a loss

[442] YOR 2019-0149-9549
[443] YOR 2019-0149-5080
[444] YOR 2019-0149-0519
[445] YOR 2019-0149-7010

of surface water to the subsurface, with greater loss at each subsequent phase of the Project. Other possible overwintering habitat construction areas (e.g., North Fork Rose Creek and South Fork Rose Creek confluence, floodway off the Rose Creek diversion channel) were being considered.

11.5.2.2 Significance Determination

The EC determines that the Project will likely result in significant adverse effects to fish and fish habitat as a result of impacts to groundwater quantity at localized areas that may contain fish overwintering habitat. Groundwater modeling suggests that there will be a reduction in water flow in several fish-bearing areas, thus decreasing the availability of adequate volumes and flows of water for successful overwintering at these sites. This could be particularly challenging for species with smaller home ranges, such as slimy sculpin that have been shown to only move 11 metres over a 10-month period.[446]

The loss of overwintering habitats due to geotechnical constraints during the Rose Creek diversion channel construction will result in significant effects to fish and fish habitat. However, it should be noted that the loss of groundwater input may be highly localized. The following mitigation is recommended to reduce, control, or eliminate significant adverse effects:

5. The Proponent shall include offsetting measures to address loss of overwintering habitats if groundwater flows to surface waters are predicted to cause a measurable decline in the amount of existing overwintering habitats.

11.5.3 Project Effect: Reduced groundwater quantity due to the use of liners

To prevent interaction between groundwater and surface water, streams may be lined with low permeability basal liners that minimize leachate generation and restrict infiltration of leachate.[447] Due to the installation of liners in the proposed Rose Creek diversion channel, water flow is predicted to decrease during active remediation.[448] If the groundwater collection improvements do not adequately capture non-contact water, lining the remainder of North Fork Rose Creek and upper reaches of Rose Creek diversion channel may be necessary.[449]

11.5.3.1 Proponent Mitigation Measures

At locations in which contaminated groundwater is determined to be a risk, a liner will be installed, which could result in possible loss of fish habitat due to reduced stream flow in the winter base flow period.[450] However, hydrogeology models predict a negligible loss in base

[446] Gray, Cunjak, and Munkittrick, “Site Fidelity of Slimy Sculpin (*Cottus Cognatus*): Insights from Stable Carbon and Nitrogen Analysis.” *Canadian Journal of Fisheries and Aquatic Science 61,* (2004):1717-1722.
[447] YOR 2019-0149-0519
[448] YOR 2019-0149-7410
[449] YOR 2019-0149-8532
[450] YOR 2019-0149-7410

flow.[451] Follow-up and monitoring programs will be employed to ensure that liners are functioning as intended.[452] In the project proposal, it was indicated that the use of liners in the receiving environment would be refined based on 2019 and subsequent investigations. As a conservative approach, there will be a limited number of liners in the creeks and diversions.[453]

11.5.3.2 Significance Determination

The EC determines that the Project will not result in significant adverse effects to fish habitat due to reduced water flow in fish-bearing channels where liners are installed. Although fish and fish habitat may be affected due to reduced flow from liners, modeling predicts this reduction will be minor. As such, no mitigations are recommended.

11.5.4 Project Effect: Reduced accessibility or habitat use due to road development

In the project proposal road development was listed as an effects pathway that could lead to potentially adverse effects to fish and fish habitat, including permanent alteration of fish habitat quantity, quality, and connectivity.[454] Further, blasting involved in road construction may also cause adverse effects in fish.

In IR No. 3, DFO asked for a description of measures to avoid impacts to fish and fish habitat at stream crossings.[455] However, at the time of the response, the design of the internal road networks had not yet been completed.

11.5.4.1 Proponent Mitigation Measures

To avoid impacts to fish and fish habitat when constructing road crossings, which will typically include small creeks around the Faro Mine site, appropriate best management practices, codes of practice, and other appropriate measures will be employed.[456] In particular, when a watercourse contains high-quality habitat, road development should be avoided, installation of culverts should be conducted according to DFO; culverts should be removed when no longer required, and the Water Management Plan, AMP, and Sediment and Erosion Control Plan should be implemented.[457]

11.5.4.2 Significance Determination

The EC determines that the Project will not result in significant adverse effects to fish habitat due to road development. As such, no mitigations are recommended.

[451] YOR 2019-0149-7410
[452] YOR 2019-0149-0519
[453] YOR 2019-0149-0742
[454] YOR 2019-0149-7410
[455] YOR 2019-0149-6193
[456] YOR 2019-0149-7458
[457] YOR 2019-0149-7410

Although roads over waterways will be constructed as part of the Project, with the implementation of the mitigation strategies proposed by the Proponent, these effects will be limited and should only result in site-specific effects to fish health and survival.

11.5.5 Project Effect: Increased fish mortality from noise and vibrations

Blasting near water bodies during development of borrow areas, road construction, and the Rose Creek diversion channel may result in barotrauma, affecting fish survival and reproduction. Blasting may also affect lower trophic levels, resulting in impacts to species considered within the aquatic health and productivity VESEC. For fish, explosives in or near water can cause damage to the swim bladder or other soft organs and can lead to changes in fish behaviour. Furthermore, different life stages may be more susceptible to damage, particularly fish eggs.[458]

11.5.5.1 Proponent Mitigation Measures

Mitigations include adhering to blasting requirements and scheduling work during windows that pose the least risk to fish. Specifically, where possible follow the *Fisheries and Oceans Canada guidelines for Set-Back Distances, Size of Charges, and Sequencing of Detonation.*[459]

11.5.5.2 Significance Determination

The EC determines that the Project will not result in significant adverse effects to fish habitat due to road blasting. As such, no mitigations are recommended.

Blasting will occur throughout the active remediation phase of the Project, resulting in possible barotrauma to fish and other aquatic organisms. However, with the implementation of the mitigation strategies as proposed by the Proponent, effects are limited and these should only result in site-specific change to survival and reproduction.

11.5.6 Project Effect: Increased fish mortality from salvaging prior to stream realignment

Fish-bearing water bodies that will be altered as part of the Project may require fish relocation to mitigate adverse effects on fish. As such, a fish salvage plan is required by DFO under a scientific collection licence. Activities employed to salvage and relocate fish may pose a risk to fish survival and reproduction.

11.5.6.1 Proponent Mitigation Measures

To mitigate the process, salvage operations should be conducted according to established protocols and should adhere to the requirements of the *Fisheries Act* authorization.[460]

[458] YOR 2019-0149-7410
[459] YOR 2019-0149-7410
[460] YOR 2019-0149-7410, p. 147 Table 7.4-1

11.5.6.2 Significance Determination

The EC determines that the Project will not result in significant adverse effects to fish habitat due to fish salvaging. As such, no mitigations are recommended.

Fish salvaging poses risks to fish survival. Due to the implementation of the DFO-approved mitigation and salvage plan, effects will be limited and site-specific.

11.5.7 Project Effect: Loss of riparian and wetland habitat function

Riparian and instream habitat may be adversely affected following the development of borrow areas.[461] In the project proposal, borrow areas were identified that contain materials suitable for covering tailings and waste rock piles.[462] Most of these potential borrow areas are from upland, riparian, and wetland ecosystems, with the Project resulting in a maximum loss of 0.9 to 6.4 % of these ecosystems in the RAA.[463] During active remediation, 62.7 ha of wetlands are predicted to be lost, primarily due to development of borrow pits and, to a lesser extent, due to disturbance near roads (mine access and haul roads) and west of the Cross Valley dam.[464] The area of disturbance for wetlands represents 3.7 % of wetland area in the LAA and 0.5 % of wetland area in the RAA.[465]

As part of the fourth Information Request, LFN asked for additional information on a wetland management plan.[466] The Proponent provided a Conceptual Wetland Reclamation Management Plan (attachment R4-12-1; details below).[467] LFN responded that the conceptual plan failed to identify pre-disturbance wetland types and rested on the return of marsh and open-water wetlands that were previously peat-based wetland types.[468]

11.5.7.1 Proponent Mitigation Measures

As outlined in section 5.1 of the Conceptual Wetland Reclamation Management Plan (attachment R4-12-1),[469] riparian wetlands, primarily in the North Fork Rose Creek and Rose Creek diversion channel/Rose Creek, will be restored or enhanced as per the *Fisheries Act* and as outlined in the Conceptual Offsetting Plan. Wetland restoration activities were designed to "create the conditions necessary to establish an ecologically appropriate trajectory and ultimately self-sustaining native riparian wetland communities similar to those… existing prior to modification."[470] Wetland reclamation will be undertaken where borrow material will be removed

[461] YOR 2019-0149-7410 p. 159
[462] YOR 2019-0149-8532 p. 19 Fig 5.4-4
[463] YOR 2019-0149-7010 p. 275
[464] YOR 2019-0149-7410 p. 229
[465] YOR 2019-0149-7410 p. 148
[466] YOR 2019-0149-7828 **This is their follow-up; the original document is not present**
[467] YOR 2019-0149-0742 p. 153
[468] YOR 2019-0149-7828 p. 4
[469] YOR 2019-0149-0742 p. 153
[470] YOR 2019-0149-0742

from naturally occurring wetlands. A complete Borrow Management Plan will be submitted during the water licence application process.[471]

Section 4.1 of the Conceptual Wetland Reclamation Management Plan (attachment R4-12-1) outlines several mitigation strategies (i.e., avoidance, minimization, and offsetting for unavoidable residual effects) to achieve "no net loss" of wetland function, including the implementation of Environmental and Socio-Economic Management and Monitoring Framework, Sediment and Erosion Control Plan, Water Management Plan, and the Materials Management Plan.[472] To address the uncertainties and time lag in restoring wetland function, an offsetting ratio greater than 1:1 (area of restored or created wetlands : area of impacted wetlands) is typically applied and normally a minimum of 2:1 is used.[473] This 2:1 ratio has been proposed as the goal for wetland offsetting for the Project.[474] The success of restoration, enhancement, and reclamation activities will be evaluated compared to baseline wetland function data, as described in section 5.6 of the Conceptual Wetland Reclamation Management Plan (attachment R4-12-1).[475] The Proponent has committed to ongoing engagement with affected First Nations and inclusion of information gathered during the update of the Conceptual Revegetation Plan to inform detailed revegetation, restoration, and reclamation plans.[476]

11.5.7.2 Significance Determination

The EC determines that the Project will not result in significant adverse effects to fish habitat due to changes in riparian and wetland habitat. As such, no mitigations are recommended.

The Project may result in effects to fish and fish habitat due to changes to riparian and wetland habitats from project activities, primarily due to development of borrow pits. During active remediation and borrow area development, the effects to wetlands and riparian areas are likely. However, through implementation of the Wetland Management Plan and ongoing engagement with affected First Nations, wetland restoration, enhancement, and creation are intended to help the Project reach the goal of achieving "no net loss" of wetland function.

[471] YOR 2019-0149-0742
[472] YOR 2019-0149-0742
[473] YOR 2019-0149-0742
[474] YOR 2019-0149-0742
[475] YOR 2019-0149-0742
[476] YOR 2019-0149-0742

12 AQUATIC HEALTH AND PRODUCTIVITY

12.1 Overview

Habitat alteration and altered groundwater flows are significant adverse effects to aquatic health and productivity. With the proposed mitigation strategies, particularly habitat offsetting plans, and by following all standards and best practices for instream construction, these effects will be localized and temporary. Increased sedimentation and mobilization of sediment could occur due to project activities, however effects are expected to be localized and minor with implementation of the Proponent's mitigation strategies. During long-term operations and maintenance, aquatic health and productivity are anticipated to improve relative to existing conditions and be on a trajectory towards achieving the overarching objectives of the Project.

The EC determines that the Project will result in significant adverse effects to aquatic health and productivity during active remediation. The mitigations identified by the Proponent coupled with terms and conditions previously identified in this document.

12.1.1 Reason for Inclusion

Potential project effects on groundwater quantity and quality and surface water quantity and quality may affect aquatic health and productivity. Sediments, benthic invertebrate communities, and aquatic vegetation components of aquatic health and productivity that contribute to fish habitat. Linkages will be made between the aquatic health and productivity and the fish and fish habitat VESECs, recognizing the potential for overlap and duplication with these two interconnected VESECs. Fish health and productivity are integral to aquatic health and productivity, and vice versa.

12.1.1.1 Sediment

The levels, composition, and nature of sediments within a system can inform and impact biological productivity. Sediments are considered because they facilitate understanding effects to aquatic health and productivity due to changes in the levels, composition, and nature of sediments through a system. Changes in sediments could also affect wildlife that may ingest or be in direct contact with sediments.

Project activities during construction could change surface water runoff, cause erosion, and increase sedimentation in water bodies.[477] Sediment release during construction, effluent discharge, seepage of contaminated groundwater, disturbance of contaminated sediments, mobilization of contaminants, and subsequent downstream precipitation or release of acidity could affect water and sediment quality, and subsequently affect the aquatic ecosystem (e.g., fish, benthic invertebrates, aquatic vegetation) and wildlife (e.g., waterbirds, mink, otter, beaver, muskrat, moose, bear).

[477] YOR 2019-0149-7410

The Proponent assessed potential effects on aquatic organisms from direct toxicity through ventilation/respiration of water and not through sediment exposure.[478] Project-related effects on sediment concentrations were not predicted. The Proponent used measured sediment concentrations to characterize existing conditions, active remediation, and long-term operations and maintenance, and considered that this approach provided a conservative assessment.[479]

12.1.1.2 Benthic Invertebrates

Understanding the benthic invertebrate community is foundational to determining biophysical effects of the Project. Benthic invertebrate communities can serve as indicators for aquatic health and productivity.[480] In the project proposal,[481] the availability of food sources, such as benthic invertebrates, was considered in the assessment of project effects on fish and fish habitat (i.e., changes in the quality of fish habitat).

12.1.1.3 Aquatic Vegetation

The health, abundance (or lack thereof), distribution, and diversity of aquatic vegetation within a system can impact and inform the overall health and productivity of aquatic systems.

In the project proposal,[482] aquatic vegetation was considered in the assessment of:

- Vegetation (i.e., wetland and riparian ecosystems)
- Fish and fish habitat (i.e., habitat quality, availability of food sources)

Project activities could cause changes in the chemistry and availability of aquatic vegetation ingested by wildlife and adversely affect wildlife health, survival, and reproduction.[483]

The availability, distribution, and condition (health) of aquatic vegetation in adjacent or downstream wetland and riparian ecosystems may be affected by physical and chemical changes in surface water and sediments because of the Project.[484]

> Changes in water quality from release of treated contact water into Rose Creek, and leaching of constituents such as metals from tailings, waste rock, or borrow areas and downstream precipitation or acidification could adversely affect soil and vegetation chemical concentrations, and subsequently wetland and riparian ecosystem availability, distribution and condition (e.g., plant health and diversity).[485]

[478] YOR 2019-0149-0329
[479] YOR 2019-0149-7760
[480] YOR 2019-0149-0822
[481] YOR 2019-0149-7410
[482] YOR 2019-0149-7410
[483] YOR 2019-0149-7410
[484] YOR 2019-0149-7410
[485] YOR 2019-0149-7410, p.202

Sedimentation may affect germination rates, photosynthesis, growth, or survival of aquatic vegetation.[486]

12.2 First Nation and Community Input

12.2.1 Ross River Dena Council

RRDC has particularly highlighted the need for careful monitoring in the long-term to ensure contaminated water does not enter Rose Creek and to inform adaptive management. They also note the interest of the Ross River lands office and land guardians to be involved in monitoring and the need for appropriate funding. RRDC raised concerns about contamination of effluents and its effects on fish and wildlife and the fact that RRDC members have deserted the affected areas. RRDC raised issues and concerns related to water contamination because of events that occurred in the past:

> From 1969-75 half a dozen leaks in tailing impoundments were monitored and indicated high acidity, and elevated levels of lead, zinc, and arsenic into Rose Creek (Weinstein 1992). An impoundment failure in 1975 released 54 million gallons of tailings effluent into Rose Creek. Then in 1976 highly toxic cyanide was accidentally released into Rose Creek. An additional tailings spill occurred in 1979, and in 1988 more sodium cyanide was released into one of the tailings ponds.[487]

RRDC is skeptical when it comes to water monitoring because contamination has occurred despite rigorous monitoring and repeated assurances that the water was safe. Despite some effects being temporary, repeated contamination has left some permanent scars on RRDC members, the environment, and traditional land-use activities. Some RRDC members no longer use the affected lands, referred to as Tsē Zūl/Blind Creek area, and if they do so it is to check the state of the environment and the health of animal populations. The area is too important personally and culturally to the community to be abandoned.

To summarize: “The outcome of such perceived and actual contamination was a widely held belief that the food chain was poisoned – fish resources, and moose and other birds and mammals using the water, were believed to be contaminated. Also, with fears of contamination of plants, people stopped berry picking.”[488]

To recover the land and be able to use it again in a way that respects Dena ethics, RRDC wants the Ross River lands office and land guardians to be directly involved in monitoring the Faro Remediation Project.[489] RRDC wants the authority of Ross River land guardians to be recognized on-site and shared the following thoughts on monitoring at the Faro Mine site:

[486] YOR 2019-0149-7410
[487] YOR 2019-0149-0555, p.18
[488] YOR 2019-0149-0555, p.18
[489] YOR 2019-0149-0555, p. 20, p.40, p. 56, p. 57

- RRDC needs more capacity to manage the Faro Project (the Project team has over 20 staff members, RRDC currently has one staff person and part-time consultants to review and manage the Faro Project). Programs or funding for increased capacity need to be planned as long-term rather than on an annual basis, as RRDC will need to manage/oversee the Faro Project long into the future.
- RRDC Elders and leadership have noted that they are particularly concerned about long-term monitoring, funding, and ensuring clear governance/oversight roles.
- One mitigation tool proposed is the hiring of environmental monitors. It should be made clear that such monitors should be hired in coordination with, and support from, a land guardian program through RRDC. Traditional land use work that has been completed by the First Nation should be meaningfully and respectfully supported and included in remediation planning.
- There are no strong commitments to integration of cultural programs, mental health support, land guardians, etc., on the site. A plan should be established to maximize employment opportunities for RRDC through advanced training on hazardous-waste handling, water-treatment plant operation, environmental monitoring, equipment operation, and health/safety.[490]

12.2.2 Selkirk First Nation

In their response to the adequacy review,[491] SFN raised concerns about direct and indirect project effects on water quality and fish stocks, particularly chinook salmon, in the Pelly River and downstream. SFN are concerned with the management of water quality in the future due to the uncertainty in the long-term:

> Selkirk First Nation (SFN) concerns with respect to the Faro Mine Remediation Project center around past and ongoing adverse impacts to the Pelly River fish stocks and in particular Chinook salmon and water quality and aquatic health of the system over the long term. […] The Faro mine project has had both direct and indirect effects on salmon and freshwater fish as well as water quality and aquatic health which continue and are predicted to continue at some level for the foreseeable future.[492]

In general, SFN believes that the assessment of project effects on fish and fish habitat and aquatic health in the project proposal is complete and supported by baseline data, including an assessment of risk and cumulative effects. However, SFN raises concerns about uncertain compensation and restoration of salmon and freshwater fish stocks that have been impacted for decades by the Faro mine:

> It is not clear whether the assessment is limited to the proposal for remediation of the Faro site and mitigation of current and future adverse impacts or whether the federal government as the agency that licensed and approved the Faro mine developments and

[490] YOR 2019-0149-0555
[491] YOR 2019-0149-1865
[492] YOR 2019-0149-1865, p.1

> now the owner of the project has any intent or obligation to provide compensation and restoration of salmon and freshwater fish stocks that have been adversely impacted by decades of mining and deteriorating water quality in the area and in the Pelly River downstream.[493]

SFN also raised concerns about the high level of uncertainty associated with water quality modeling and predictions of water quality in the long-term and the uncertainty that remains in the case water quality declines in the future and the impacts it would have on fish and other aquatic organisms and aquatic health. The AMP and mitigation options proposed may not be sufficient to react if water quality declines or unanticipated adverse impacts arise at the site in the future.[494] To this effect, SFN added:

> Given the high level of uncertainty associated with the magnitude and rate of deterioration of the Faro site and the effectiveness of proposed remediation and mitigation measures over the very long term and potential risks and consequences to fish, habitat and aquatic health a precautionary approach is needed. […] Aquatic health indicators such as growth and condition of fish, abundance, diversity and composition of benthos and periphyton, contaminants and heavy metals concentrations in fish and benthos and sediments in fish and benthos tissues and in sediments are reported as being in or near reference conditions but these are all relatively short-term indicators that would quickly recover with any improvements in water quality after cessation of mining.[495]

In their comments on the PSOA,[496] SFN wrote about the importance of the sub-components in an aquatic life and aquatic health VESEC to address fish habitat and aquatic health issues properly as discussed below:

> Merging all fish and fish habitat and aquatic health issues associated with the Faro project into one VESEC, that of Aquatic Life, with 3 subcomponents - Chinook salmon, Arctic grayling and slimy sculpin - is inadequate. Fish should be treated in the same way as wildlife and wildlife habitat with a stand-alone Fish and Fish Habitat VESEC. Broader aquatic life and aquatic health issues should be dealt with under a separate Aquatic Life and Aquatic Health VESEC with subcomponents that at a minimum include a) Benthic Invertebrate Abundance and Diversity; b) Abundance, Growth and Condition of slimy sculpin which are the only year-round resident fish species in the mine area; and c) Metal Concentrations in Sediments, slimy sculpin Tissue and Benthic Invertebrates.

At SATAC II, SFN suggested the title “aquatic health and productivity” instead of the “aquatic life” label, which is not descriptive, explaining that “We need both those terms because these are distinct, but both need to be considered in tandem.”[497] Habitat factors and aquatic health

[493] YOR 2019-0149-1865, pp.1-2
[494] YOR 2019-0149-1865
[495] YOR 2019-0149-1865, p.2
[496] YOR 2019-0149-5667, p.4
[497] YOR 2019-0149-3563, p.16

included in the aquatic health and productivity VESEC are essential to understand how fish are doing, as discussed in the following statement:

> This is more than biotic factors; it also includes chemical and physical factors. Groundwater flow is also a concern. Oxygen levels in winter is an issue in tributary streams. That's a specific example, but as I pointed out yesterday aquatic health and aquatic productivity are two different things. We can have a healthy environment that isn't productive for other reasons, including the project. I'm in favour of re-labelling it. I feel strongly that we need to look at fish habitat factors as well, aside from aquatic health (e.g., flow, changes to habitat itself). Looking at fish habitat is fundamental to looking at how fish are doing.[498]

In the closing comments at SATAC II, SFN reiterated the importance of looking at fish habitat as a component of aquatic health and productivity in the following statement:

> If we are managing fish versus managing habitat, they may disappear from the system, but that doesn't mean they won't come back, and we don't need to maintain that habitat. Fish populations come and go over time, not just because of climate change. We can't predict where the fish are going to be or how abundant they are going to be. The only option we have is to manage fish habitat for if and when they return in abundance. That's why we need to focus on habitat as a fundamental component of aquatic health and productivity and fish health and productivity. In terms of monitoring, our fundamental tool has been looking at benthic invertebrate diversity and abundance and composition. It's a well-developed science and there is a lot of information there.[499]

And in a follow-up SATAC II document, SFN recommended that "Aquatic health and productivity should be two distinct [sub-components] of the VESEC Aquatic Life and monitored using appropriate indicators like diversity and abundance,"[500] stating that:

> While aquatic health and aquatic productivity are often conflated in considerations of aquatic life, this is not always the case. The aquatic environment may be healthy in terms of the diversity of organisms, including sensitive organisms, but overall abundance and productivity may be impacted and reduced by water and habitat quality. Alternatively, aquatic productivity may be high in situations while aquatic health is impacted. Therefore, it is important that indicators are established and monitored for both [sub-components] of Aquatic Life.

At SATAC III, SFN suggested that slimy sculpin and chinook salmon be considered sub-components of aquatic health and productivity, noting that "They are not only an important

[498] YOR 2019-0149-3563, p.24
[499] YOR 2019-0149-3563, pp.38-39
[500] YOR 2019-0149-8931, p.3

VESEC, but they are also an important indicator of aquatic health"[501] and "Aside from benthic diversity and abundance, it [slimy sculpin] will be one of the most important indicators."[502]

12.2.3 Liard First Nation

LFN identified interests, issues, and concerns related to the VESEC similar in theme to remarks by RRDC and SFN. These include concerns related to benthic invertebrates and sediment chemistry at SATAC III:

> There has been a lot of discussion of the benthic invertebrate population, and in the baseline studies it was concluded that there hasn't been an impact of the project on benthic invertebrates. My concern is that while there's been some discussion of reference versus exposure sites, I'm not seeing a lot of comparison between habitat features in those two types of locations. This gets to benthic invertebrates, where population dynamics are driven by habitat and the chemistry of the project versus receiving environment. This also has to do with sediment chemistry, which is also one of your indicators. In that case, I haven't seen a fulsome discussion of particle size and how that affects the sediment chemistry. Can you provide a discussion on how habitat differences between reference conditions and the exposure sites have been considered for a number of indicators, specifically benthic invertebrates and sediment chemistry?[503]

12.3 Existing Conditions

12.3.1 Sediment

In 2017, sediment at reference (R7) and far-field (R5 & A1) sites was dominated by sand, with silt as a subdominant component. Sediment at the pumphouse and haul road ponds had the most silt, which was attributed to reduced water flow leading to particle settlement.[504,505] The near-field site (X2) had an equal ratio of sand and silt, with the site characterized as a flowing stream channel with a backwater eddy.

Metal content in sediment was elevated compared to relevant guidelines (e.g., CCME; British Columbia Ministry of Environment) at exposure sites, particularly for arsenic, cadmium, copper, lead, manganese, and zinc. However, sediment toxicity testing on *Hyalella azteca* (an amphipod crustacean) and *Chironumus dilutes* (a midge) indicated no mine-related toxicological effects.

Chronic toxicity testing was completed in 2019 with a focus on zinc. *Ceriodaphnia dubia* (water flea) showed no evidence of significant adverse effects on mean survival, with the exception of one test treatment from X14/RC-SW014. Reproduction of *C. dubia* was not significantly adversely affected following May 10, 2019, tests, but reduced reproduction was observed for the

[501] YOR 2019-0149-9549, p.45
[502] YOR 2019-0149-9549, p.45
[503] YOR 2019-0149-9549, p.47
[504] YOR 2019-0149-5080
[505] AECOM, *2017 Aquatic Effects Monitoring Program Report for the Faro Mine Site*, 2018.

highest treatments on May 25, 2019. In 2021, water from X14/RC-SW014 caused a reduction in reproductive output in *C. dubia* at three time points.[506]

Sediment has been collected from the Rose Creek watershed since 1973, including from three reference sites (R6, R7, and R1) upstream of the Faro Mine site.[507] In 2017, sediment from the R7 reference site had no elevated metal concentrations compared to relevant guidelines, suggesting it was of high quality.[508] Sediment contents of lead, manganese, nickel, and zinc at R7 in 2017 were similar to those in 2008 and 2014. In contrast, arsenic, iron, and cadmium concentrations at R7 in 2017 were elevated compared to 2008 and 2014 but remained below sediment guidelines.[509]

12.3.2 Benthic Invertebrates

Benthic invertebrate data from reference sites (collected in 2014[510] and 2017[511]) and exposure sites (collected in 2017[512]) indicated that there were no significant differences among sites for the measured endpoints (taxon richness, Simpson's Diversity Index, Simpson's evenness, Ephemeroptera Plecoptera Trichoptera taxa, abundance, community structure/BCI, essential macronutrients). Further, the same endpoints measured at sites that were consistently sampled over multiple years (2008, 2010, 2014, and 2017) showed comparable temporal patterns between reference and exposure sites.

Together, these data suggest that, as of 2017, exposure site benthic invertebrate communities were generally unaffected by discharge from the Faro Mine site. However, a temporal comparison of the Bray-Curtis Index (BCI; i.e., 2008, 2010, and 2014 vs 2017) of the benthic invertebrate community structure showed that BCI values were higher at exposure than reference sites. This suggests that the Faro Mine discharge-exposed benthic invertebrate community structure varied more over time than at reference sites. Further, metal cations (zinc, cobalt, lead, nickel, chromium) were elevated in benthic invertebrate tissue at exposure sites.

Reference conditions were assessed during the 2014 AEMP[513] at 22 reference sites, with data from eight of those sites updated in 2017.[514] The upper and lower limits of endpoints (taxon richness, total abundance, Simpson's Diversity Index, Simpson's evenness, EPT relative abundance, chironomid relative abundance) for benthic invertebrate conditions can be found in Table 7G.3-11 of Appendix 7G[515] of the project proposal.

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[506] YOR 2019-0149-2475 p. 239
[507] YOR 2019-0149-5080 p. 17
[508] YOR 2019-0149-5080 p. 23
[509] YOR 2019-0149-5080 p. 25
[510] Minnow Environmental Inc., *Aquatic Baseline Characterization, Faro Mine Interim Works, (Appendix 6E to the interim works project proposal).* 2014, 313.
[511] AECOM, *2017 Aquatic Effects Monitoring Program Report for the Faro Mine Site*, 2018.
[512] AECOM, *2017 Aquatic Effects Monitoring Program Report for the Faro Mine Site.*
[513] Minnow Environmental Inc., *Aquatic Baseline Characterization, Faro Mine Interim Works, (Appendix 6E to the interim works project proposal).* 2014, 313.
[514] AECOM, *2017 Aquatic Effects Monitoring Program Report for the Faro Mine Site*.
[515] YOR 2019-0149-5080

12.3.3 Aquatic Vegetation

In 2017,[516] periphyton taxon richness, Simpson's Diversity Index, and Simpson's evenness were not significantly different between reference and exposure sites or when compared to data collected in 2014. Diatoms (bacillariophytes) and/or blue-green algae (cyanophytes) dominated all sites, with diatoms being the more abundant organism at reference sites (six of eight sites) and exposure sites (12 of 15 sites). Thus, algal dominance was variable among sites in 2017, which is in contrast to that observed in 2014, when diatoms had increased dominance at the exposure sites relative to reference. The diatom *Achnanthes minutissima* was in high abundance at many 2017 reference and exposure sites and was considered the dominant species.

Periphyton density was higher at exposure sites compared to reference sites in 2014 and 2017, suggesting enrichment from the Faro Mine discharge. However, nutrient discharges have not increased over the period of record, so the cause of the periphyton density increase is uncertain.

Comparing periphyton community data at reference sites between years (2014 and 2017) showed such high temporal variation that the communities could almost be considered entirely different. Seasonally, algal community structure and growth can vary rapidly in response to environmental changes (e.g., light regime, water level, flow rate, turbidity, nutrients, contaminants) therefore collection of a single periphyton sample at one point in time is inadequate. Periphyton results are also sensitive to minor differences in methodology. Based on these challenges, inclusion of periphyton in the field program for monitoring environmental effects at the Faro Mine site was considered ineffective.[517]

Chronic toxicity testing was completed in 2019 with a focus on zinc. *Pseudokirchneriella subcapitata*, an alga, was significantly growth-inhibited in all four tests.[518] In 2021, water from X14/RC-SW014 caused a reduction in growth for duckweed (*Lemna minor*) at two time points.[519]

12.4 Proponent Mitigation Measures

The proposed mitigation, monitoring, and management measures for water and sediment are relevant to aquatic health and productivity and the protection of sediments, benthic invertebrates, and aquatic vegetation. Measures related to water, including adaptive management, are summarized in the surface water quality VESEC. Measures related to sediment include the following:[520]

[516] AECOM, *2017 Aquatic Effects Monitoring Program Report for the Faro Mine Site.* 2018
[517] YOR 2019-0149-508,
[518] YOR 2019-0149-7458, p. 411
[519] YOR 2019-0149-2475, p. 239
[520] YOR 2019-0149-9964

- To prevent the discharge of sediment-laden water to the receiving environment, water management controls will be implemented and maintained during active remediation and long-term operations and maintenance. High-sediment water will be collected and conveyed to sedimentation ponds using collection channels, treated for total suspended solids (if that is the only parameter of concern from a water quality perspective), and discharged to the receiving environment. If required, flocculants may be added to improve sedimentation;
- To account for uncertainty in surface runoff water quality, sediment control ponds will be designed for two active phases and then decommissioned;
- Phase 1 is for surge control (prior to cover placement) and includes capacity for a 100-year storm event and a system to pump storm water back to the Faro pit for treatment;
- Phase 2 is for sediment control (after cover placement) when only sedimentation is required prior to discharge of runoff to the receiving environment; and
- Phase 3 is for control pond decommissioning (after revegetation) when water quality is expected to improve and sediment control is not required;
- Erosion control measures focus on controlling the impacts of rain and runoff erosion. Temporary measures may be required during any disturbance of surface materials to limit mobilization of sediment. The Sediment and Erosion Control Plan will manage erosion and runoff from non-contaminated sediments;
- Sediment controls, such as sediment fencing, check dams (e.g., sandbags), sediment traps, sediment control ponds, and geotubes (tubes with permeable geotextile), will be implemented during construction to reduce sediment loads and achieve discharge objectives;
- Mine site areas, waste rock covers, tailings covers, and borrow areas will be revegetated to reduce sediment release;
- Dam stabilization will be completed to provide adequate safety against potentially liquefiable loose sediments following a maximum credible earthquake;[521] and
- Routine practices (e.g., sediment removal from ponds), inspections, monitoring, and preventative maintenance will be required to ensure sediment control performance, including a monitoring plan detailing water quality sampling intervals, continuous water level monitoring installations, and inspection intervals.

The AEMP will be required for a water licence for the Project. The overall objective of the AEMP is to monitor short- and long-term effects of the Project on aquatic resources, including characterization of surface water quality, aquatic toxicity, surface water quantity, sediment chemistry, benthic invertebrates, fish health, and fish tissue. The AEMP will provide a framework to allow for the incorporation of Indigenous knowledge, with continued consultation and engagement with First Nation communities throughout the development and implementation of the AEMP. The design of the AEMP will be re-evaluated and adjusted at intervals specified in the water licence. In accordance with the principles of adaptive

[521] YOR 2019-0149-6622

management, additional monitoring and mitigation will be identified, if needed. As part of the AEMP, the monitored variables for sediment include physical constituents, nutrients, total organic carbon, and total metals.[522] The monitored variables for benthic invertebrates include abundance, taxonomic richness, sum of EPT relative abundance, chironomidae relative abundance, and Bray-Curtis Index.[523] The benthic invertebrate and sediment components will be monitored every three years, during a three-week low-flow period in mid- to late August or early September.[524]

Periphyton will not be used as an indicator for monitoring aquatic health and productivity because the results were highly variable from year to year.[525] Water fleas and green algae will be used to monitor chronic aquatic toxicity once during a standard year from water samples collected at two exposure stations in Rose Creek and one upstream reference station. During a comprehensive year (every three years), chronic toxicity will be tested twice a year from water collected from four exposure stations, one downstream location on Anvil Creek, and one upstream reference station.[526]

Monitoring stations will be consistent with current and historical monitoring stations, including exposure stations in the receiving environment within the Faro Mine site, exposure stations in the receiving environment downstream of the Faro Mine site, and reference stations upstream of the Faro Mine site or in separate watersheds.[527]

12.5 Project Effects Characterization

The Project is predicted to improve surface water quality. Further, site-specific WQO exceedances for iron, sulphate, and zinc are not expected to result in impacts to populations of sensitive fish and amphibians or to communities of invertebrates and aquatic plants.[528] Since surface water quality is predicted to improve and not expected to negatively affect aquatic health and productivity, project effects on surface water quality are discussed in the surface water quality VESEC (section 10).

12.5.1 Project Effect: Habitat alteration

Geomorphological changes and their effect on aquatic habitats are described in detail within the fish and fish habitat section. In addition to impacting fish and fish habitat, North Fork Rose Creek and Rose Creek diversion channel realignments will impact aquatic health and productivity.

[522] YOR 2019-0149-9964, p. 189
[523] YOR 2019-0149-9964, p. 191
[524] YOR 2019-0149-9964, p. 177
[525] YOR 2019-0149-9964, p. 165
[526] YOR 2019-0149-9964, p. 177, 183
[527] YOR 2019-0149-9964, p. 169
[528] YOR 2019-0149-7010, p. 103

12.5.1.1 Significance Determination

The EC determines that the Project will not result in significant adverse effects to aquatic health and productivity as a result of habitat alteration.

Project activities on the North Fork Rose Creek diversion channel and the Rose Creek diversion channel will result in effects to each of the three components contemplated in this assessment of aquatic health and productivity: sediment, benthic invertebrates, and aquatic vegetation. Sediment input into waterways may increase during construction. Although the newly constructed diversion channels will take time to recuperate benthic invertebrate and aquatic vegetation communities, productivity is expected to be superior to current conditions, improving by 20 %. In addition, the Proponent's mitigation measures to follow the Sediment and Erosion Control Plan will limit sediment input into the creeks.

The EC encourages the Proponent to follow guidance provided in Preferred Practices for Works Affecting Yukon Waters and DFO's Interim Standard for In-Water Site Isolation.

12.5.2 Project Effect: Changes in groundwater and effects on aquatic habitat and lifecycle activities

As described in detail in the project effects characterization of the fish and fish habitat VESEC (section 11), groundwater will be intercepted and treated prior to discharge into the environment. While this will ultimately improve water quality, the flow from groundwater to surface water will be impacted, thus affecting surface water quantity in several locations at the Faro Mine site. There was considerable discussion regarding the impacts of groundwater interception and fish overwintering habitat at SATAC III, however this interception may also affect lower trophic levels, such as benthic invertebrates. This is primarily due to loss of habitat quantity and the loss of the warmer groundwater during winter conditions.

12.5.2.1 Significance Determination

The EC determines that the Project will result in significant adverse effects to aquatic health and productivity as a result of changes to groundwater. However, these effects will be mitigated with term and condition number 5 found in section 11.5.2.2: "The Proponent shall include offsetting measures to address loss of overwintering habitats if groundwater flows to surface waters are predicted to cause a measurable decline in the amount of existing overwintering habitats."

The reduction in groundwater input in localized areas during winter is likely to adversely impact benthic invertebrates. Adverse effects are localized and ensuring that offsetting plans compensate for the loss of groundwater will increase available habitat for benthic invertebrates and aquatic vegetation that could be lost due to changes in groundwater quantity.

12.5.3 Project Effect: Reduced productivity

At SATAC III, SFN commented that chinook salmon have linkages with the aquatic health and productivity VESEC, in that chinook salmon introduce nutrients from the Pacific Ocean to the Pelly River drainage, which may impact aquatic and terrestrial productivity:

> A second point is that Chinook Salmon is obviously an important VESEC under Fish and Fish habitat, but they are also an important subcomponent of Fish Health and Productivity. The 5 000 - 6 000 salmon that come back to the Pelly River drainage - some of them to Anvil Creek - they carry the nutrients from the Pacific Ocean to the Yukon. They are not only an important VESEC, but they are also an important indicator of aquatic health. I sat in on a presentation last week that showed how tree growth in riparian areas was correlated to Chinook abundance and contributed as much as 25 % to tree growth. That is something that needs to be considered. I'm not sure how you measure it as an indicator, but it needs to be considered. When you lose Chinook Salmon in the Pelly River drainage, or the Anvil/Rose drainage, you affect aquatic and riparian productivity. You could make a case for bears, birds, and other species that feed directly on salmon; it affects wildlife productivity as well. It needs to be considered somewhere.[529]

12.5.3.1 Proponent Mitigation Measures

Mitigation measures employed and recommended for the protection of chinook salmon and other fish are described in section 11. For example, implementing habitat offsetting plans, erosion and sediment control measures, removal of barriers to fish passage, appropriate best management practices during road construction, and blasting during windows that pose the least risk to fish.

12.5.3.2 Significance Determination

The EC determines that the Project will not result in significant adverse effects to aquatic health and productivity from reduced productivity. As such, no additional mitigation is recommended.

The Project is predicted to increase productivity through improved surface water quality and habitat quantity. There have been few reported sightings of chinook salmon within the MDF and LAA, at least according to recent records. As such, project activities are unlikely to drastically alter chinook salmon nutrient input or reduce productivity into the aquatic or terrestrial environments.

12.5.4 Project Effect: Increased sedimentation and sediment mobilization

Several project activities may lead to a high-sediment water classification due to the high erosion potential of waste rock dump slopes and due to planned project activities, which could impact fish and fish habitat. Increased sedimentation may physically impact aquatic habitat. For example, sedimentation could result in a decline in benthic invertebrate abundance, thus impacting fish food resources. Excessive sedimentation may lead to a loss of habitat for slimy sculpin, which utilizes interstitial spaces of the substrate. Of particular concern would be the mobilization of contaminated sediments.[530]

[529] YOR 2019-0149-9549, p.45
[530] YOR 2019-0149-7410

Increased concentrations of metals in sediments may elicit sub-lethal or lethal effects in aquatic organisms, particularly to those that are more susceptible to these elevated levels. The effects of this could be seen within the food web; for example, fish or other wildlife can consume benthic invertebrates that live directly in contaminated sediment, thus bioaccumulating higher levels of metal through their diet.

12.5.4.1 Significance Determination

The EC determines that the Project will not result in significant adverse effects to aquatic health and productivity from increased sedimentation. As such, no additional mitigation is recommended.

Although the construction, road development, and increased activity from the Project may result in increased sediment transport in the waterways at the Faro Mine site, the Proponent's mitigation strategies (e.g., sedimentation ponds, Sediment and Erosion Control Plan, sediment controls, revegetation, dam stabilization) and following best practices for instream construction reduce the likelihood and magnitude of effects.

13 ATMOSPHERIC GREENHOUSE GASES

13.1 Overview

The project proposal indicates that primary sources (89 % of total project emissions) of greenhouse gas (GHG) emissions are related to land clearing and vehicles.[531] This results in a sizable increase to the territory's total emissions. Examining the effects of the Project on territorial GHG emissions is important to ultimately understand the resulting effects on environmental and socio-economic systems in the Yukon. The implementation of the Project will increase the Yukon's GHG emissions by up to approximately 46 % annually during the 15-year active remediation period.

The Mine was one of the world's largest open-pit lead-zinc mines, and the site is now one of Canada's largest contaminated sites, making the Project one of Canada's most high-profile remediation projects. The Project is unique because of its history, as the largest mine and remediation site in the Yukon with a multifaceted remediation and perpetual care requirement. It is this uniqueness, coupled with the Project's scale and degree of public interest, that GHG emissions have been closely considered.

The EC determines that the Project will result in significant adverse effects to territorial GHG emissions in Yukon during the active remediation phase.

13.1.1 Reason for Inclusion

The Council of Canadian Academies released in 2019 Canada's Top Climate Change Risks, whereby 12 major areas of risk were identified at the national level. Climate risks to northern communities was among the top,[532] identifying impacts and concerns for both natural and human systems.

Led by NRCan, *Canada in a Changing Climate: Regional Perspectives Report (2020-2022)*[533] highlights the impacts that regions across Canada are already experiencing and can expect to face due to a changing climate. Chapter 6 of the document specifically examines the unique impacts that northern communities and ecosystems face due to climate change. Reducing GHG emission can help reduce some of the future impacts caused by a changing climate.

> Climate change impacts include changing snow and ice conditions, shrubs invading the tundra, shifts in species distribution, increased extreme weather events, and changing disturbance regimes, such as pests and wildfires that are impacting northern ecosystems in unpredictable ways.

[531] YOR 2019-0149-7410
[532] Council of Canadian Academies, *Top Climate Change Risks: The Expert Panel on Climate Change Risks and Adaptation Potential,* 2019, https://cca-reports.ca/wp-content/uploads/2019/07/Report-Canada-top-climate-change-risks.pdf
[533] Warren, Lulham and Lemmen, *Canada in a Changing Climate: Regional Perspectives Report*, 2021, https://changingclimate.ca/regional-perspectives/

> Health impacts are intensifying…Not all climate change impacts on health are direct. Physical health impacts include disrupted access to country foods, increased exposure to contaminants and wildfire smoke, and increased travel hazards. Mental health challenges arise from changing land access, disruptions to cultural activities and knowledge sharing opportunities, shifting place-based identities, and loss of important species, plants or ecosystems.[534]

The accumulation of green house gases in earth's atmosphere is the primary driver of climate change. This accumulation results in a warming effect due to trapped heat in the atmosphere. Green house gas emissions primarily occur from fossil-fuel combustion and from other industrial processes.

In November 2023, the Office of the Auditor General of Canada, Commissioner of the Environment and Sustainable Development to the Parliament of Canada released Report 6 – Canadian Net-Zero Emissions Accountability Act - 2030 Emissions Reduction Plan.[535] A performance audit, the report summarizes the findings that the federal government "is not on track to meet the 2030 target to reduce greenhouse gas emissions by at least 40 % below the 2005 level by 2030."

Further, the Auditor General of Canada, Commissioner of the Environment and Sustainable Development, in May 2024, released Report 1 – Contaminated Sites in the North.[536]

> Complex sites that require ongoing care and maintenance—such as the large, abandoned Faro and Giant mines— present immediate and long-term risks to the environment and health of Canadians.

This report found that management of contaminated sites in the north continues to see gaps in "practices intended to reduce the risks to the environment and human health for current and future generations"[537] as well as challenges with reducing financial liabilities. The Auditor General also finds that "large abandoned mines in the North pose significant costs and environmental risks for current and future generations" noting that this finding is relevant as "[remediation projects] can cause significant greenhouse gas emissions, which should be

[534] Warren, Lulham and Lemmen, *Canada in a Changing Climate: Regional Perspectives Report*. Chapter 6.
[535] Office of the Auditor General of Canada. *Commissioner of the Environment and Sustainable Development. Report 6-Canadian Net-zero Emissions Accountability Act- 2030 Emissions Reduction Plan*. 2023. https://www.oag-bvg.gc.ca/internet/docs/parl_cesd_202311_06_e.pdf
[536] Office of the Auditor General of Canada. *Commissioner of the Environment and Sustainable Development. Report 1-Contaminated Sites in the North*. 2024. https://www.oag-bvg.gc.ca/internet/docs/parl_cesd_202404_01_e.pdf
[537] Office of the Auditor General of Canada. *Commissioner of the Environment and Sustainable Development. Report 1-Contaminated Sites in the North*. 2024. https://www.oag-bvg.gc.ca/internet/docs/parl_cesd_202404_01_e.pdf

avoided and reduced."[538] The Auditor General recommends that improving the accessibility and quantity of public information on project process, as well as reporting on specific program commitments, such as GHG emissions, with greater frequency would improve transparency.

13.1.2 Greenhouse Gas Emissions

Human-led activities like fossil fuel combustion and other industrial activities, contribute to higher concentrations of GHGs in the atmosphere. The higher concentrations cause an increase in global temperatures. The effects of changing climate are felt unevenly across the globe, with northern regional and local levels experiencing greater effects, "climate change is producing severe, and in many cases irreversible, changes to northern landscapes."[539] The Canadian Climate Institute report titled *Due North: Facing the costs of climate change for Northern infrastructure* captures the climate change impacts faced by northern Canada:

> Climate change in the North is happening faster and having a greater impact than in the rest of Canada. In the past 50 years, the average global temperature has increased by 0.8 degrees Celsius. In that time, Canada's average temperature has risen 1.7 C—and the North has warmed by 2.3 C, roughly triple the rate of the global average (Bush and Lemmen 2019). Furthermore, the North faces unique climate-related hazards such as permafrost thaw and changes to sea ice conditions that could have devastating effects on Northern communities and livelihoods. [540]

GHG emissions are a quantifiable unit to predict a contribution to climate change and to estimate the corresponding impacts to human health, the environment, and the economy. GHG emissions are predominantly the result of fossil fuel combustion, but also come from fugitive emissions (e.g., agriculture or waste management) and other indirect sources like land clearing.

13.2 Spatial Boundaries

The effects of increasing GHG emissions are best examined at a scale that is larger than the spatial boundaries that have been defined for other VESECs for this Project.

The project proposal does not identify a spatial boundary for GHG emissions effects. Instead, the proposal identifies the spatial boundaries for those activities that contribute to GHG emissions (i.e., sources of GHG; identified in the project proposal as the MDF) and correlates GHG emissions to parameters established at the federal legislative and regulatory level.[541]

The EC's assessment of effects of the Project's GHG emissions will use a spatial boundary that allows the examination of GHG emissions from the project in relation the total GHG emissions

[538] Office of the Auditor General of Canada. *Commissioner of the Environment and Sustainable Development. Report 1-Contaminated Sites in the North*. 2024. https://www.oag-bvg.gc.ca/internet/docs/parl_cesd_202404_01_e.pdf
[539] Andersen et al. *Chapter 6 Regional Perspectives Report – Northern Canada Chapter.*2022
[540] Clark et al. *Due North: Facing the costs of climate change for Northern infrastructure.* 2022
[541] YOR 2019-0149-9937

for the Yukon. The spatial boundary used by the EC's assessment to examine GHG emissions is the boundary of the Yukon Territory.

13.3 Legislative and Other Requirements

13.3.1 *Our Clean Future – A Yukon Strategy for Climate Change, Energy and a Green Economy*[542]

Issued in 2020, the Territorial government established a strategy for tackling climate change, outlining specific goals, such as reducing GHG emissions, and further outlining the various sectors contributing to climate change in the territory - notably (road) transportation (54 % of Yukon's emissions), heating (21 %) and mining (10 %).

This strategy targets a 2030 reduction of total GHG emissions by 45 % of 2010 emissions. The associated targets are intended to lead the territory to net-zero GHG emissions by 2050. Annual reports[543] are published by the government to capture the progress and status of the specific various sector commitments.

13.3.2 *Pan-Canadian Framework on Clean Growth and Climate Change*[544]

Yukon is a signatory to this framework that was established in 2016 as a collective effort to achieve emissions reduction by 2030. The framework outlines measures, such as carbon pricing and other actions, to reduce emissions across the country in several economic sectors within federal, provincial, and territorial jurisdictions.

The Project has several activities that fall within the industrial and transportation sectors to which the framework applies. The framework details efforts like continued and increasingly stringent emission standards, new requirements and innovations for heavy-duty equipment/trucks, investments in industry technologies and improving industrial energy efficiencies.

13.3.3 *2030 Emissions Reduction Plan: Clean Air, Strong Economy*[545]

This plan is the specific sector-by-sector blueprint for achieving emission reduction targets "of 40 percent below 2005 levels by 2030 and net-zero emissions by 2050,"[546] which builds on the *Pan-Canadian Framework*. This includes various funds, research and development

[542] Government of Yukon, *Our Clean Future*, 2020, https://our-clean-future.service.yukon.ca/
[543] Government of Yukon, *Our Clean Future,* 2021 Annual Report, 2022, https://yukon.ca/sites/yukon.ca/files/env/env-our-clean-future-2021-annual-report.pdf
[544] Government of Canada, *Pan-Canadian Framework on Clean Growth and Climate Change*, 2018, https://www.canada.ca/en/services/environment/weather/climatechange/pan-canadian-framework/climate-change-plan.html
[545] Government of Canada, *2030 Emissions Reduction Plan: Clean Air, Strong Economy*, 2023, https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/climate-plan-overview/emissions-reduction-2030.html
[546] Government of Canada, *2030 Emissions Reduction Plan: Clean Air, Strong Economy*.

investments, certifications, such as offset credit system and a *Clean Fuels Regulation*[547] and the development of a carbon capture and utilization strategy.

13.3.4 *Canadian Environmental Protection Act*[548]

This legislation was enacted to regulate pollution prevention, protect the environment and human health, and contribute to sustainable development. This act and regulations concern information-gathering (pollution monitoring and reporting) as well as the control of pollution, toxic substances, and wastes.

The Greenhouse Gas Reporting Program operates under this act, with mandated facilities required to report annually. For example, the most recent notice is the *Notice with respect to reporting of greenhouse gases for 2022 and 2023* [549] specifies the gases subject to mandatory reporting, as well as the reporting criteria and other requirements. The territory and the federal government are required to report yearly under the act. This program promotes accurate GHG emission tracking, contributes to policy and strategies pertaining to climate change, industrial activities and energy use.

13.3.5 *Canadian Net-Zero Emissions Accountability Act*[550]

Enacted in June 2021, the *Canadian Net-Zero Emissions Accountability Act*[551] is the federal commitment to net-zero GHG emissions by 2050. This act establishes GHG targets for 2030 and requires national emissions targets for future five-year increments in 2035, 2040 and 2045. The 2030 target commits Canada to cutting GHG emissions by 40 to 45 % below 2005 levels. The 2005 GHG emission level is 741 megatonnes, 40 % to 45 % below that is approximately 443 megatonnes or 443 000 kilotonnes (kt).

The timelines and target dates in this act overlap with the project activities. The scale and scope of the Project, coupled with the GC both funding and leading the project, makes this federal legislation relevant and important context for the project.

13.3.6 *Federal Sustainable Development Strategy 2022 to 2026*[552]

Goal 13 of the *Federal Sustainable Development Strategy 2022 to 2026* is to “Take action on climate change and its impacts”, which includes reducing GHG emissions and short-lived

[547] Government of Canada, *Clean Fuel Regulations*, 2023, https://laws-lois.justice.gc.ca/eng/regulations/SOR-2022-140/index.html
[548] Government of Canada, *Canadian Environmental Protection Act*, 1999, https://laws-lois.justice.gc.ca/eng/acts/c-15.31/
[549] Government of Canada, “Department of the Environment Canadian Environmental Protection Act, 1999,” *Canada Gazette 157, no.4*, 2023, https://canadagazette.gc.ca/rp-pr/p1/2023/2023-01-28/html/sup1-eng.html
[550] Government of Canada, *Canadian Net-Zero Emissions Accountability Act*, 2021, https://laws-lois.justice.gc.ca/eng/acts/c-19.3/fulltext.html
[551] Government of Canada, *Canadian Net-Zero Emissions Accountability Act*.
[552] Government of Canada, *Federal Sustainable Development Strategy 2022 to 2026*, 2022, https://www.fsds-sfdd.ca/en

climate pollutants. Further this strategy outlines targets, indicators and milestones on several climate change related fronts related to Goal 13. It also refers to *Canadian Environmental Sustainability Indicators: Land-Based Greenhouse Gas Emissions and Removals,*[553] examining the concept of climate change mitigation using carbon-sink creation.

The myriad layers of territorial and federal legislation, regulations and plans collectively target GHG emission reduction by 2030, and beyond. They serve as the backdrop for this project and the regime in which it expects to operate.

13.4 First Nation and Community Input

SFN, LFN, and RRDC raised concerns that relate to climate change and the impacts that climate change itself may have on the Project. This is not the perspective from which effects to this VESEC are considered. Comments pertaining to the effects of the project on GHG emissions were limited. SFN raised the evolution of GHG emission targets and guidance within federal and territorial strategies and frameworks and how that relates to the data, targets and information used to inform the project proposal in contrast with the date and timing of the assessment. SFN, in addition to ECCC, raised the *Strategic Assessment of Climate Change* guidance document, and its use as a valuable resource for climate change in assessments.

During IR No. 4 and again in their comment[554] submission on the DSR, SFN raised concerns regarding the GHG inventory and the lack of consideration and data pertaining to lime-usage in water treatment (its production, transportation, and use) for the life of the Project. SFN also highlighted that improved planning to reduce the reliance on lime for water treatment purposes would contribute to reductions in atmospheric carbon into the future. The production of lime and the associated contributions to GHG emissions are outside of the scope of the assessment of the Project. Its transport, along with the transport of other resources to be used at the site, are considered broadly in transportation and vehicle GHG contributions associated with the Project. Water treatment activities are captured in electricity and fuel combustion emissions.

13.5 Existing Conditions

The existing conditions for GHG emissions are tied to territorial GHG emissions, which includes the inventory of monitoring and reporting data.

Annually, GC publishes a national inventory of GHG emissions in kt of equivalent carbon dioxide (CO_{2e}) units, a standardizing measure to compare various GHG emissions based on their global warming potential. GC reports the national inventory annually according to the United Nations Intergovernmental Panel on Climate Change under the Framework Convention on Climate Change. Canada's 2024 submission identifies a GHG emission increase of 18 % in the Yukon.

[553] Government of Canada*, Land-based greenhouse gas emissions and removals*, 2022, https://www.canada.ca/content/dam/eccc/documents/pdf/cesindicators/land-based-ghg-emissions-and-removals/2022/Land-based-GHG-emissions-removals.pdf
[554] YOR 2019-0149-6564

The Proponent applied the 2016 reported data from the National Inventory Report in the project proposal. The EC considers the most recent information from the National Inventory Report (NIR) [555,556] to best understand the existing conditions. This data also adds context to the 2016 data in the project proposal. The NIR identifies emission for the years of 1990 to 2022 and are occasionally re-calculated based on best available science and data. As noted in the Executive Summaries of these reports,

> Continuous improvement is good inventory preparation practices (Intergovernmental Panel on Climate Change [- IPCC], 2006) and essential to ensure Canada's inventory estimates are based on the best available science and data. Recalculations of inventory estimates often result as part of continuous inventory improvement activities…[557]

This is additional and added context to understanding the data and information used to inform the existing conditions of GHG emissions at the territorial level.

Table 17 presents data related to Yukon territorial emissions. The information in Table 17 comes from Annex 9 (Table A9-2) and Annex 11 (A11-22 – Yukon) which conform to the IPCC guidelines and international reporting obligations. The effects assessment examines the project in relation to territorial totals.

Table 17: 2016, 2021 and 2022 GHG Emissions in Yukon[558]

Year	GHG Emissions (Kt of CO_{2e} per year)
	Yukon
2016[a]	529
2021	651
2022	662

a. The Proponent provided 2016 data, from the 1990-2016 Inventory Report[559] identifying the values (kt of CO_{2e}) for Yukon as 426 kt, however when 2016 data is presented in the 2023 report, it lists those values presented in the table above.

[555] Government of Canada, "National Inventory Report 1990-2022: Greenhouse Gas Sources and Sinks in Canada."

[556] The National Inventory Report containing the 2022 emissions data, was released May 2, 2024. At the time of drafting the FSR, only 2021 emissions data was available, however with additional inventory data at time of drafting the final Screening Report, this data has been updated accordingly.

[557] Government of Canada*, National Inventory Report 1990-2021: Greenhouse Gas Sources and Sinks in Canada Part 1*, 2023, https://publications.gc.ca/collections/collection_2023/eccc/En81-4-2021-1-eng.pdf; Government of Canada*, National Inventory Report 1990-2021: Greenhouse Gas Sources and Sinks in Canada Part 2*; Government of Canada, *National Inventory Report 1990-2021: Greenhouse Gas Sources and Sinks in Canada Part 3*.

[558] Government of Canada, *National Inventory Report 1990-2022: Greenhouse Gas Sources and Sinks in Canada Part 1*; Government of Canada, *Environment and Climate Change Canada Data Catalogue,* Data compiled from supporting data – Table A9-2 and A11-22.

[559] Government of Canada, *National Inventory Report 1990-2016: Greenhouse Gas Sources and Sinks in Canada*.

In their comments[560] on the DSR, YG identified that YG's annual reporting as part of *Our Clean Future* provides data showing Yukon's emissions for mining and non-mining sectors. The values provided in *Our Clean Future* differ from those in the NIR. The EC is, however, relying on data provided through the NIR to inform its assessment, as this provides consistency with the data source provided by the Proponent in the project Proposal.

13.6 Proponent Mitigation Measures

The Proponent proposes mitigation measures that will contribute to reducing or avoiding GHG emissions:

- Through the Terrestrial Management and Effects Monitoring Plan, practices to reduce combustion emission will be implemented including a no idling policy (during the winter period) and limiting hauling distances; and
- Vehicles and equipment will be regularly maintained and will comply with appropriate emissions criteria (for on and off-road vehicles), this includes the on-site industrial (non-hazardous waste) incinerator.

Emissions will be better understood through monitoring efforts. The Air Quality and Meteorological Monitoring Plan will further supplement understanding of the nature of project activities and impacts. This plan will guide environmental management activities throughout the course of the Project's 25-year period.

Monitoring and reporting for GHG emissions will be implemented throughout the Project in order to meet yearly federal reporting requirements: Greenhouse Gas Reporting Program, pursuant to the *Canadian Environmental Protection Act*. The Proponent has also noted their intention to improve mitigation over time, and though an adaptive management approach identify and apply new mitigations over the course of the Project.

Additionally, other mitigations proposed in the project proposal may indirectly contribute to mitigating climate change impacts.

- **Borrow Management Plan:** Outlines measures intended to be taken as they relate to borrow materials, such as minimizing transportation distances to destination areas, and reclaiming any disturbances that cannot be avoided after the required material has been sourced; and
- **Revegetation Plan:** By implementing both a limit on the amount and time that soil is disturbed and by applying a timely progressive revegetation will indirectly alleviate some effects of GHG emissions, by contributing to vegetation offsets/carbon re-capture.

[560] YOR 2019-0149-7895

13.7 Project Effects Characterization

13.7.1 Project Effect: Increase in Yukon's GHG emissions during the 15-year active remediation phase

There are several project activities that will contribute to the increase in GHG emissions that will occur with greater intensity and frequency, and at a larger scale during the active remediation 15-year phase. Table 18 outlines the various project activities and activity components which are expected to lead to increases in GHG emissions.[561]

Table 18: Project Activities and Their Components Contributing to an Increase in GHG Emissions

Project Activity	**Activity Components**
Active Remediation Phase	
Remediation Activities	Land Clearing
	Blasting (borrow materials, road construction and diversion channels)
	Heavy duty on and off-road vehicle and equipment use – construction (e.g., major earthworks, diversion works), hauling, crushing and screening
Fuel Combustion	Generators
	Incineration of waste
	Landfilling of non-combustible wastes
	Transportation (goods, supplies and personnel to and from the site
Electricity Consumption	Electricity usage and energy consumption
Operation and maintenance Phase	
	Transportation* (goods, supplies and personnel to and from the site)
	Light-duty off-road vehicle use
	Heavy duty off-road vehicle and equipment use
	Generators*
	Electricity usage and consumption*
* During the operation and maintenance phase, the transportation, generator and electricity usage will be substantially reduced in comparison to the active remediation phase but should nevertheless be noted as a contributor to GHG emissions during this period.	

Territorial GHG emissions will increase during active remediation from the above noted activities. The Proponent carried out a detailed GHG inventory, which examined indicator compounds CO_2, CH_4 and N_2O.[562] for the Project, expressed as tonnes or kilotonnes of CO_{2e} following accepted values and process outlined by ECCC.

Emissions for the project activities are compiled in Table 19 from the Proponent's inventory. Discussion in the Greenhouse Gas Emissions Inventory [563] captures the more nuanced

[561] YOR 2019-0149-9937
[562] YOR 2019-0149-9937
[563] YOR 2019-0149-9937

assumptions that contribute to the calculations and projections; the assumptions for each activity are summarized for simplification.

Table 19: Summary of Emissions by Project Activities

Activity	Notes and Assumptions	Emission (CO_{2e}) (kt)*	Source as percent of the Project Total
Land clearing	Clearing activities assumes slash and burn as the sole mechanism for clearing; all new roads will be established on undisturbed areas	109	56.3
Vehicle Combustion	All light duty and heavy-duty vehicles (peak vehicle numbers) are assumed conservatively to be operating 310 days out of the year with a total estimated fuel (diesel and gasoline) of 23 M Litres.	64	32.8
Stationary Combustion	Emergency generators are assumed to be operating 5 % of the time which is approximately 438 hours/year. Diesel pumps have been assumed to be operating all day for 310 days/year.	15	7.9
Landfill Emissions	Assuming no landfill gas collection system will be in place, and a conservative landfill volume applied for a 25 year period	4	2.2
Blasting	Assuming all carbon in explosives will be converted to CO2 during the explosion	1	0.3
Electricity Consumption	Energy consumption (electricity from Yukon's power grid) is projected at 19 000 000 kWh	1	0.5
ANNUAL PROJECT TOTAL		194	100
*Amounts rounded to the nearest whole number for simplicity.			

Many of the assumptions presented by the Proponent are conservative in nature. To capture maximum emissions and worst-case scenarios, the GHG emissions estimates are for the highest peak activity year of the Project. The Proponent has noted for example that while slash and burn was assumed for all land clearing, that this method will be minimized as much as possible. The proponent's projections estimate that during active remediation the maximum annual emissions will be 194 kt of CO_{2e}. The EC supports the Proponent's assertion that "[p]otential effects associated with the operation and maintenance phase are anticipated to be

minimal due to the presence of fewer emissions sources. The active remediation phase is sufficient to capture the maximum effects of the Project."[564]

Table outlines a comparison of the estimated annual project total from Table to the data provided in the NIRs as summarized by Table 20. The active remediation phase of the Project is expected to result in a 30 % increase from 2021 territorial levels.

Table 20: Total Project CO_2 Emissions in Relation to 2016 and 2021 Emission Totals at the Territorial Level

Emission Source	CO_{2e} (kt)[565]	Increase in total from the Project (%)
Yukon Total 2016*	529	37
Yukon Total 2021	651	30
Yukon Total 2022	662	29
*Data provided in the project proposal by the Proponent for 2016 identifies the Yukon total as 426 kt. Using these values, the percent increase resulting from the project would be 46 % increase over the 2016 total for Yukon.		

The major contributors are the extensive earth works and vehicle and transportation combustion to support the remediation efforts. The Project is expected to contribute (depending on the data employed) between 29 % and 46 % annually to the territory's total GHG emissions during the 15 years of active remediation. Recognizing that all assumptions and modelling for GHG emissions were based on worst-case scenarios and maximum values (e.g., number of vehicles) the actual emission contributions are expected to be less than projected throughout the life of the project. Nevertheless, this is a marked increase to emission totals across the territory, for a prolonged period of time.

The government of Yukon has set a goal of net-zero by 2050 and this is in-line with Federal targets per the *Canadian Net-Zero Emissions Accountability*. As the Project would increase in emissions contributions by between 29 % and 46 %, the 15-year active remediation phase will see annual contributions of substantial magnitude to Yukon emission totals.

13.7.1.1 Significance Determination

A suite of project activities, in particular the major earth works (land clearing and material movement), will result in an increase of GHG emissions over the 15-year active remediation phase. Recognizing that all assumptions and modelling for GHG emissions were based on worst-case scenarios and maximum values (e.g., number of vehicles), the increase in GHG emissions throughout active remediation will contribute between 29 % to 46 % to Yukon's total

[564] YOR 2019-0149-9937, p.6
[565] Government of Canada*, National Inventory Report 1990-2021: Greenhouse Gas Sources and Sinks in Canada Part 1*; Government of Canada, *National Inventory Report 1990-2021: Greenhouse Gas Sources and Sinks in Canada Part 2*; Government of Canada, *National Inventory Report 1990-2021: Greenhouse Gas Sources and Sinks in Canada Part 3.*

annual emissions as the Yukon moves towards implementing aggressive emission reduction targets.

This will result in the inability of the Yukon to meet the goals set out in territorial climate change frameworks and plans without significant reductions in other Yukon GHG emissions. Although the Proponent has provided mitigations measures that will serve to curtail some of the contributions, emission levels will substantially alter Yukon's total annual emissions over the active remediation phase.

Increases in GHG emissions for over a 15-year period from a single project will markedly contribute to GHG emissions at the territorial scale. This contribution to territorial emission levels leads the EC to determine that effects to GHG emissions at the territorial level are significant.

The following mitigations are recommended to reduce, control, or eliminate significant adverse effects:

6. The Proponent shall establish a Greenhouse Gas Emission Reduction Plan for the Project.
    a. The Greenhouse Gas Emission Reduction Plan will evaluate and implement alternative ways to reduce greenhouse gas emissions during the life of the project.
    b. This plan will be developed within three years of issuance of the Decision Document and be updated every 5 years.
    c. This plan will set out how the Proponent will make efforts to reduce emissions during the 15-year active remediation phase. Efforts to reduce emissions will be achieved through measures informed by best available technologies, best practices and emerging technologies.
    d. The Plan will reflect Federal and Territorial regulatory programs and commitments
7. The Proponent shall develop a Carbon Offsetting Plan.
    a. This plan will establish the actual annual emission values that are required to be offset.
    b. This plan will be developed within 5 years of the issuance of the Decision Document. Updates will be reflective of updates made to the Greenhouse Gas Reduction Plan and informed by annual reporting from the emissions tracking, quantification and monitoring system.
    c. The plan will detail how the carbon offset planning is informed by the *Draft Technical Guide Related to the Strategic Assessment of Climate Change: Guidance on Quantification of Net Greenhouse Gas Emissions, Impact on Carbon Sinks, Mitigation Measures, Net-Zero Plan and Upstream Greenhouse Gas Assessment*.

d. The plan will detail how carbon offset planning aligns with the Government of Canada's and the Yukon Government's legislated net-zero by 2050 targets.
e. The plan will detail possible carbon offsets within local communities, affected First Nations' Traditional Territories and Yukon as a whole.

8. The Proponent shall establish an emissions tracking, quantification and monitoring system.

    a. Emissions tracking, quantification and monitoring will be made publicly available through annual reporting. This information will be provided to the independent review body.
    b. The annual report will:
        i. Be carried out for the life of the Project;
        ii. Present data, including predicted emission values, actual emitted values and their sources, and annual projections and targets;
        iii. Present information pertaining to the Greenhouse Gas Reduction Plan and the Carbon Offsetting Plan and their implementation; and,
        iv. Present and discuss tracking and monitoring mechanisms, provide supporting data, and address any adaptive management approaches implemented to findings.

9. Every three years, an audit shall be conducted by the independent review body, as established by term and condition number 24, to examine the effectiveness of greenhouse gas emission reductions and offset planning and implementation by the Proponent. These audit reports shall be made readily and publicly available in a timely manner.

The monitoring, adaptive management and auditing frameworks outlined in the recommendations will better support reduction and offset planning, management and implementation, and will further contribute to adaptive management resulting in relevant and responsive emission abatement. This will also contribute to greater transparency and accountability, further serving to strengthen public trust. Additionally, these recommended mitigations will ensure that extensive emissions reduction and offset planning and implementation that reflect regulatory programs, commitments and best available and emerging technologies will reduce and offset emissions below predicted levels and curtail their contributions to territorial emission levels.

14 WILDLIFE AND WILDLIFE HABITAT OVERVIEW

Wildlife and wildlife habitat comprise the terrestrial animals in the project area and the natural environments on which they rely for their survival. The assessment considered the mammals and bird species and associated effects listed in Table 21.

Table 21: List of Species and Project Effects Assessed[566]

Component Section	Project Effects
General Wildlife	• Health, survival, and reproduction issues due to ingestion of untreated surface water • Health, survival, and reproduction issues from consumption of tainted vegetation due to dust deposition • Health, survival, and reproduction issues due to increased emissions of criteria air contaminants • Health, survival, and reproduction issues due to exposure to chemical hazards resulting from spills
Moose	• Disturbance or displacement due to sensory disturbance • Increase in injury or mortality from increased predation, collisions, and hunting pressure from linear development and from entrapment • Increase in habitat loss, fragmentation, and degradation from earthworks
Woodland Caribou	• Disturbance or displacement due to sensory disturbance • Increase in injury or mortality from increased predation, collisions, and hunting pressure from linear development and from entrapment • Increase in habitat loss, fragmentation, and degradation from earthworks
Thinhorn Sheep	• Disturbance or displacement due to sensory disturbance • Increase in injury or mortality from increased collisions and hunting pressure from linear development and entrapment • Increase in habitat loss, fragmentation, and degradation from earthworks

[566] The EC acknowledges that there is repetition in project effects assessment for the different species considered. However, it was deemed appropriate to assess the project effects separately as the habitat and context are different for each species.

Grizzly Bear	• Increase in human-bear conflicts from habituation and presence of attractants on-site • Increase in habitat loss, fragmentation, and degradation from earthworks
Small Mammals	• Disturbance or displacement due to sensory disturbance • Increase injury/mortality from entrapment, increased harvest pressure, entrapment, and contact with contaminated waste rock and tailings
Avian Wildlife (Bank Swallow, Horned Grebe, and Olive-sided Flycatcher)	• Increase in habitat loss, fragmentation, and degradation from earthworks • Injury, mortality, and reduced health from increased collisions with aircraft • Injury, mortality, and reduced health from clearing or demolition during nesting • Health effects due to ingestion of contaminants from surface water

15 GENERAL WILDLIFE

15.1 Overview

The EC determines that the Project is unlikely to result in significant adverse effects to general wildlife. While effects are likely to occur, they are anticipated to be reversible in nature and to not affect the long-term viability of the species in the region.

15.1.1 Reason for Inclusion

The project proposal characterizes the existing conditions and potential effects of the Project on wildlife and wildlife habitat.[567] The Proponent states that "Emphasis was placed on aligning wildlife valued environmental and socio-economic components with species that are harvested or identified as important by Indigenous residents."[568]

The species listed above have been included because of their socio-economic and cultural importance to the First Nations and general population of the Yukon. No changes to the wildlife VESECs were proposed by participants or by the assessment team/consultants.

15.2 Spatial Boundaries

Three assessment areas are defined in the Biophysical Environment Effects Assessment[569] provided by the Proponent: MDF, LAA, and RAA. For the purposes of this assessment, the EC considers the RAA as the spatial boundaries for effects characterization on wildlife and wildlife habitat because wildlife behaviours will be affected beyond the MDF. These disturbances are highlighted in the individual sections under existing conditions. Disturbances will vary based on wildlife movement through the project areas, including wildlife key areas (WKAs), migratory paths, and special habitat.

15.3 Legislative and Other Requirements

15.3.1 *Constitution Act* (1982)

Section 35 of the *Constitution Act* (1982) provides constitutional protection for Aboriginal rights and treaty rights. These rights encompass the use of land and resources for traditional harvest. First Nations' comments highlight their concern that project effects may compromise the sustainability of key wildlife populations, including moose, and consequently impinge upon traditional harvest and the exercise of this constitutionally protected right.

15.3.2 *Wildlife Act* (Yukon)

The *Wildlife Act* sets out rules for interactions with wildlife. The Yukon *Wildlife Act* prohibits the harassment of wildlife, specifically prohibiting the capturing, handling, or manipulation of wildlife

[567] YOR 2019-0149-7410
[568] YOR 2019-0149-7410, p.202
[569] YOR 2019-0149-7410

and the operation of any vehicle in a manner that might harass wildlife. The Yukon *Wildlife Act* also provides a regulatory framework for licensed harvest of big and small game animals, including moose, caribou, thinhorn sheep, and grizzly bears, and outlines habitat protection areas throughout the territory.[570]

15.3.3 *Migratory Birds Convention Act* and *Migratory Birds Regulations*

The *Migratory Bird Regulations* (*MBR*) under the *Migratory Birds Convention Act* (MBCA) specifically prohibits, unless authorized:

- The disturbing, destruction, or taking of a "nest, egg, nest shelter, eider duck shelter or duck box of a migratory bird"
- The possession of a "live migratory bird, or a carcass, skin, nest or egg of a migratory bird"[571]

15.3.4 *Species at Risk Act* (SARA)

The *Species at Risk Act* prohibits killing, harming, or harassing the species listed in the act and the damage or destruction of the residence of endangered or threatened species and of their habitat in some cases. Bank swallows are listed on Schedule I of *SARA* as threatened. Northern mountain woodland caribou, grizzly bear (western population, which includes the Yukon), horned grebe (western population, which includes the Yukon), and olive-sided flycatcher are listed as species of special concern.[572]

15.3.5 *Environment Act*

The Yukon *Environment Act* prohibits the disposal of solid wastes and special wastes contrary to the *Solid Waste Regulations*, *Special Waste Regulations*, or *Spills Regulations*.[573] By setting out these rules, the *Environment Act* protects the natural environment and its natural resources, including wildlife, from contamination.

15.4 First Nation and Community Input

15.4.1 Ross River Dena Council

RRDC wishes to see the topic of food security, in connection to wildlife, wildlife monitoring, and public trust, be addressed and considered in the assessment. RRDC members either "don't have access to hunting areas because of the mine, because of over-hunting, or because they

[570] Government of Yukon*, Wildlife Act c. 229*, 2002.
[571] Government of Canada, *Migratory Birds Regulations, 2023*, https://laws-lois.justice.gc.ca/eng/regulations/SOR-2022-105/index.html.
[572] Government of Canada, *Species at risk public registry, 2022*, https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html.
[573] Government of Yukon, *Environment Act RSY 2002*, c.76, 2002, https://laws.yukon.ca/cms/images/LEGISLATION/PRINCIPAL/2002/2002-0076/2002-0076.pdf.

don't trust that the animals are healthy to eat. Wildlife and vegetation monitoring is an important part of that."[574]

RRDC mentioned in their comment submission on PSOA that:

> Dena Cho would like to see vegetation and wildlife monitoring programs (if and how vegetation and wildlife are 'taking up' metals or other contaminants, in addition to more public information about dust contamination/exposure) be implemented as soon as possible, and for such programs to be co-managed with Ross River. Such a program is essential to public trust, traditional land use, and wildlife/habitat assessment, and health risk assessments, and should not be delayed.[575]

Wildlife accessing tailings and dust contamination in the areas surrounding the Faro mine site has been a cause of great stress to RRDC Elders and community members: "Elders would like to see more consideration and work completed in regards to keeping wildlife safe and designing for future land uses that will support wildlife health."[576] RRDC members want to be involved in minimizing the impact to wildlife generated by borrow sourcing that will increase the footprint of the site.[577] To RRDC, the Terrestrial Wildlife Baseline Report[578] submitted by the Proponent, and specifically the wildlife section, "does not fully address residual impacts on wildlife and habitat and has given little attention to species that were present before mining (blue grouse, ptarmigan, and marmots) or to species that are significant to the local ecology (microtines, Arctic ground squirrels, and snowshoe hares)."[579] RRDC believes that "there are few clear links between the wildlife/fish habitat assessment and Indigenous knowledge."[580] Wildlife concerns, as well as lists outlining both concerns and recommendations, were partially incorporated into IR No. 3.[581]

Wildlife is very important to RRDC members, and Elders have noticed substantial changes to wildlife in the Faro Mine area, including displacement and/or disappearance of some species after operations started at the site. There is a lack of data available on the impacts of the mine on wildlife and how baselines for remediation were determined as a result of these previous impacts. RRDC are concerned with the safety of gathering/eating food from areas and have mentioned that overhunting by non-RRDC members puts pressures on wildlife. In this context, access control is pivotal.[582]

[574] YOR 2019-0149-3563, p.38
[575] YOR 2023-0149-7773, p.3
[576] YOR 2019-0149-0555, p.3
[577] YOR 2019-0149-0555
[578] YOR 2019-0149-4148
[579] YOR 2019-0149-0555, p.7
[580] YOR 2019-0149-0555, p.7
[581] YOR 2019-0149-0555
[582] YOR 2019-0149-0616

15.4.2 Selkirk First Nation

According to SFN, adverse effects on the health of human and wildlife populations come from mine-sourced contamination. Therefore, the most important information surrounding baselines for wildlife and fish species is historical.[583] There are horror stories known to SFN about contaminants in the water getting into vegetation and then impacting wildlife. Concerns for the health of fish and wildlife near the mine site result in people not going near the mine site anymore.[584]

SFN further emphasize that availability of wildlife resources is essential to meet domestic needs for traditional foods. The sustainability of wildlife resources and the continuation of harvesting activities is primordial to obtain traditional foods for SFN households to meet the needs of future generations.[585] Selkirk peoples harvest a wide variety of fish and wildlife species. Moose is the wildlife species the most relied on by SFN citizens living in the community of Pelly Crossing for meeting household food needs.[586]

SFN citizens surveyed as part of the SFN Traditional Use Study depended mostly on Chinook salmon amongst the fish species. Disturbance and displacement of traditionally harvested wildlife (including fish) near the Faro Mine site is a theme that is often brought up in the interviews conducted as part of the study.[587] Fish, including Chinook salmon, are discussed in the fish and fish habitat VESEC (section 11).

Additionally, SFN raised the potential for significantly high levels of dust deposition and the possible effects on wildlife, particularly caribou. Subsistence activities, including hunting and fishing, have already been deeply impacted by the Faro Mine.[588]

Lastly, SFN highlighted their concerns around gaps and flaws of most standard methods of impact assessment, sharing how they consider and apply TK and the “failures to recognize that traditional uses related to harvesting fish and wildlife are Aboriginal and treaty rights-based[589] SFN also mentioned while participating in the screening process that:

> linkages and interactions between VESECs are typically poorly understood in project assessments, especially the effects pathways from direct project impacts on land and water and their knock-on effects that extend to fish and wildlife, subsistence-based economic well-being, food security, cultural wellness and social cohesion.[590]

[583] YOR 2019-0149-2880
[584] YOR 2019-0149-9158
[585] YOR 2019-0149-2240
[586] YOR 2019-0149-9030
[587] YOR 2019-0149-9030
[588] YOR 2019-0149-5339
[589] YOR 2019-0149-9030, p.111
[590] YOR 2019-0149-4384, p.1

15.4.3 Liard First Nation

LFN wondered whether and how Indigenous/TK was incorporated into the wildlife cumulative effects assessment[591] conducted by the Proponent and how Indigenous/TK informed wildlife assessment endpoints and significance thresholds.[592] LFN raised the possibility that plants could take up metals and other contaminants from mine-influenced groundwater, which could then cause exposure to wildlife.[593] Concerns were also raised around the exercise of Kaska Aboriginal rights in relation to the return of wildlife to the area as a result of the Project.[594] LFN also raised the desire for waterfowl to be identified as a sub-component of the wildlife VESEC and stated that waterfowl are an important part of the traditional Kaska diet. LFN recommended assessment of impacts to furbearers beyond marten and squirrel. LFN sought a high degree of clarity around the extent to which the Project seeks to re-establish intact ecosystems necessary to support the Kaska exercise of Aboriginal rights.[595] Lastly, they identified the need for the Terrestrial Effects Monitoring Plan to monitor the abundance and condition of terrestrial wildlife and habitat.[596]

15.5 Existing Conditions

15.5.1 Wildlife Key Areas

Figure 9 shows the WKAs overlapping the RAA. WKAs are geographic locations or areas in the Yukon that are important to wildlife for critical or seasonal life functions.[597] Further details on the WKAs within the RAA are provided below:

- Moose: Three early winter ranges WKAs (October to January) overlap the northern and eastern edges of the RAA. One of these ranges also overlaps the northern edge of the LAA;
- Thinhorn sheep: 50+ WKAs occur within the project area RAA (four of which occur within the LAA), including mineral licks (year-round), lambing (April to June), breeding (October to January), winter and early winter WKAs (October to April), and migration corridors (year-round);
- Grizzly bear: WKA (all seasons) for grizzly bears present immediately west of the RAA;
- Ungulate: Mineral lick in the northwest portion of the RAA may be important to all ungulates. There is no other WKA for caribou within the LAA or RAA, but the Tay River, Pelly, and Tatchun herd ranges overlap the RAA.[598]

[591] YOR 2019-0149-7227
[592] YOR 2019-0149-9007
[593] YOR 2019-0149-0359
[594] YOR 2019-0149-8773
[595] YOR 2019-0149-7999
[596] YOR 2019-0149-6483
[597] Government of Yukon, *Yukon Wildlife Key Area Inventory: User's Manual April 2014.* 2014, https://map-data.service.yukon.ca/GeoYukon/Metadata/Wildlife_Key_Areas_250K_Manual.pdf.
[598] YOR 2019-0149-7410

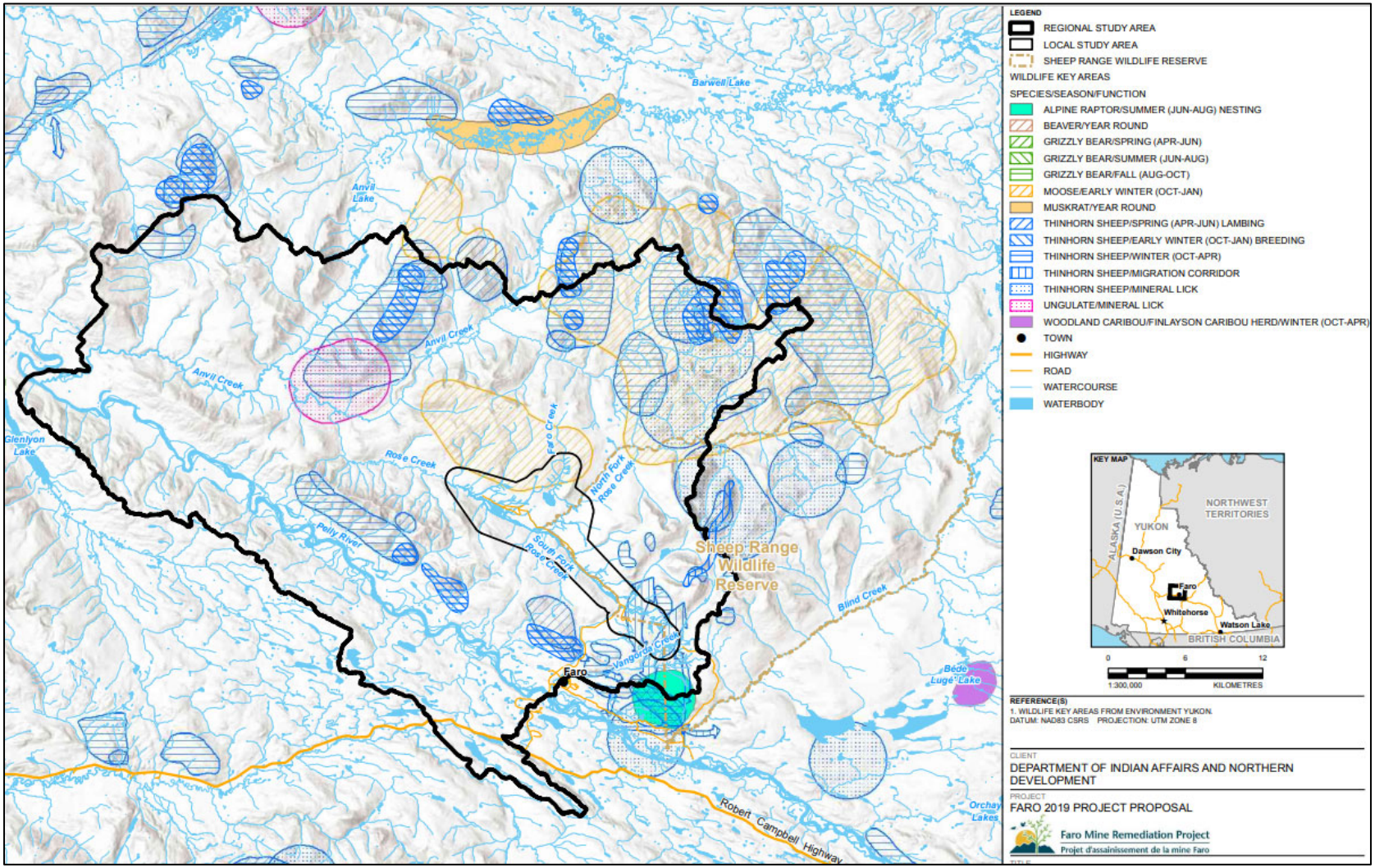

Figure 9: Wildlife Key Areas near Project[599]

[599] YOR 2019-0149-7410

15.5.2 Climate Change Vulnerabilities

Climate change scientists predict distributional shifts for many species and changes in habitat composition. Such ecological changes have already been observed in the North, including upward migration of treelines and increasing shrub density.[600] Climate change is worsening some types of natural disasters, including heat waves, forest fires, and floods. These natural disasters will increase in frequency and intensity, threatening wildlife and wildlife habitat.[601]

During summer 2023, many wildfires were reported across the country, and more specifically within the territory, making it one of the most significant fire seasons ever. A wildfire was reported about 50 km north of the project site in June 2023.[602] While the causes of wildfires may vary, scientists have linked climate change and the hotter and drier climate with the increased likelihood of wildfires in North America.[603] The difference between the temperatures recorded during summer 2023 in the Yukon and the data from 1961-1990 was over 3°C, making it one of the warmest summers ever recorded.[604]

15.5.3 Traditional Knowledge

SFN communicated that, from the very beginning of the Project, inadequate consideration was given to TK. SFN raised that "giving [TK] equal consideration to technical and scientific information in land use and resources development decisions affecting fish and wildlife and habitat is the law in Yukon under Land Claims agreements."[605] Questions were raised by First Nations in IR No. 2 on "how the views and interests of affected First Nations, inclusive of traditional knowledge, informed the vegetation and wildlife cumulative effects assessment […]" and "whether and how affected First Nations were involved in and/or verified, and traditional knowledge integrated into, the definition of thresholds of resilience and acceptability, in relation to vegetation and wildlife."[606]

According to the Proponent:

> Traditional knowledge information included descriptions of historical and existing environmental conditions and habitat use for valued environmental and socio-economic components such as moose, caribou, sheep, grizzly bear, and marten […]. Additional

[600] Danby and Hik, "Evidence of Recent Treeline Dynamics in Southwest Yukon from Aerial Photographs," Arctic 60 no.4, 2007:341-462, https://doi.org/10.14430/arctic198.
[601] National Wildlife Federation*, Climate Change, Natural Disasters, and Wildlife*, 2019, https://www.nwf.org/-/media/Documents/PDFs/Environmental-Threats/Climate-Change-Natural-Disasters-fact-sheet.ashx.
[602] Government of Yukon, *What is the current wildlife situation*?, 2024, https://wildfires.service.yukon.ca/
[603] Rannard, "Is climate change fuelling Canada's wildfires," *BBC*, June 8, 2023, https://www.bbc.com/news/science-environment-65837040.
[604] Government of Canada, *Climate Trends and Variations Bulletin - Summer 2023*, 2023, https://www.canada.ca/en/environment-climate-change/services/climate-change/science-research-data/climate-trends-variability/trends-variations/summer-2023-bulletin.html.
[605] YOR 2019-0149-1865
[606] YOR 2019-0149-6359, p.29

> existing information from Weinstein[607] and recently provided traditional use studies by the SFN[608] on the abundance of wildlife and numerous types of plants and berries in the Mye Mountain and Pelly River valley region have also been used to increase knowledge of the resilience and adaptive capacity of vegetation and wildlife valued environmental and socio-economic components. Traditional knowledge on how animals respond to roads and mines was also incorporated into the response to IR R2-92 […].[609]

In their comment on IR No. 2 response, LFN replied that:

> The responses to IRs have referred to the incorporation of Kaska TK linked to LFN. LFN has not shared any traditional knowledge as it would only be done within the context of a TK Protocol Agreement. […] In the case that Kaska people who are holders of TK are present in meetings, without a TK Protocol Agreement in place, they would not have a mandate to share TK, and indeed, doing so may violate Kaska legal traditions. TK is not the same as community or cultural knowledge.[610]

Based on the communications between First Nations and the Proponent related above, the EC considers that the information related to wildlife provided by First Nations represents community or cultural knowledge rather than TK.

15.5.3.1 Community or Cultural Knowledge

RRDC referred to the broader area that has been impacted by the Faro Mine, which is home to the majority of animals they rely on, as the Tsē Zūl area (the Kaska word for “Hollow Rock” ..[611] Stable high densities of moose, wolves, and grizzly bears are reached in this unique ecological area, contrary to scientific opinion that moose are at low densities in areas highly populated by wolves and grizzly bears. The Tintina Trench at the foot of Tsē Zūl is a route for thousands of migrating birds.[612]

According to Elders, declines of most fish and wildlife species in the area are a result of habitat destruction and displacement of animals, due to historic mining activities in the area and worsened by excessive harvest. Declines in gophers, marten, fox, lynx, wolf, and wolverine populations have been observed. Furthermore, groundhogs (marmots) have disappeared entirely from Tsē Zūl. Changes to their range and activity patterns affected the unique Fannin’s sheep population. The range of grizzly bears is believed to have considerably decreased

[607] Weinstein, *Just Like People Get Lost: A Retrospective Assessment of the Impacts of the Faro Mining Development on the Land Use of the Ross River Indian People*.
[608] YOR 2019-0149-9030; YOR 2019-0149-5184
[609] YOR 2023-0149-7010, p.263
[610] YOR 2019-0149-8773, p.5
[611] Faro Mine Remediation Project*, History of Mine*, 2022, https://faromineproject.ca/history-of-mine/.
[612] YOR 2019-0149-0555; *Weinstein, Just Like People Get Lost: A Retrospective Assessment of the Impacts of the Faro Mining Development on the Land Use of the Ross River Indian People*; Weinstein, *The Ross River Dena: A Yukon Aboriginal Economy.*

compared to historical range. A population of wintering caribou is also believed to have disappeared from the area.[613]

15.6 Proponent Mitigation Measures

Mitigation measures adopted by the Proponent to reduce potential adverse effects to wildlife are outlined in Table 22. Measures are grouped under the different potential adverse effects they are mitigating. The mitigation measures listed are considered when determining significance in each species below. Some measures presented are intended to reduce, control, or eliminate significant adverse effects to wildlife and wildlife habitat.

Table 22: Mitigation Measures[614]

Project Effect	Mitigation
Habitat loss and degradation due to earthworks and other construction activities	• Avoid new project footprint disturbances to the extent practicable (e.g., use previously disturbed areas); • Design roads to be the minimum possible width while accounting for safety regulations; • Reclaim access roads once construction activities are complete and roads are no longer required for ongoing maintenance; • Spread topsoil, grade, re-contour, and revegetate borrow areas with natural vegetation after use as soon as feasible; • Implement the Revegetation Plan, the Terrestrial Management and Effects Monitoring Plan, the Materials Management Plan, the Borrow Management Plan, and the Adaptive Management Plan; • For invasive species mitigation, revegetate with native or non-persistent non-native species; • Adhere to the Federal Policy on Wetland Conservation to ensure no net loss of wetland functions; • In accordance with final landform and cover designs, re-contour and scarify terrain to create terrain diversity to promote seed retention and establishment of varied plant ecosystems; • Restrict access to newly rehabilitated areas until target vegetation associations have established, as documented by monitoring; • Check construction materials and test seed mixes for the presence of invasive plants prior to use; • Cover waste rock and tailings with enough material to adequately limit uptake of metals by vegetation;

[613] YOR 2019-0149-0555; *Weinstein, Just Like People Get Lost: A Retrospective Assessment of the Impacts of the Faro Mining Development on the Land Use of the Ross River Indian People*; Weinstein, *The Ross River Dena: A Yukon Aboriginal Economy.*
[614] YOR 2019-0149-7410

	• Develop and follow specific environmental protection plan prior to start of construction activities on-site; • Employ environmental monitors at site during active remediation to monitor adherence to mitigation measures; • Implement a contaminant monitoring program for wildlife and vegetation as described in the Terrestrial Management and Effects Monitoring Plan; • Limit the effects of direct removal or alteration of vegetation by implementing the Borrow Management Plan and the Terrestrial Management and Effects Monitoring Plan; and • Limit the potential for wetland or riparian ecosystem desiccation or inundation by implementing the Water Management Plan, the Sediment and Erosion Control Plan, the Materials Management Plan, and the Emergency Response Plan.
Alterations to movement and behaviour due to sensory disturbance during active remediation	• Limit light pollution to the extent practicable for built infrastructure (e.g., use shielded light fixtures; preferably use amber light, with a spectrum >500 nm; minimize blue spectral light and do not use white light; turn off lights when not in use [Dick 2016]); • Avoid flying over known caribou calving areas during the calving period; • To limit impacts to nesting migratory birds, calving woodland caribou and moose, and lambing thinhorn sheep, avoid clearing vegetation during sensitive time periods for wildlife (per *Migratory Birds Convention Act* 1994); if sensitive periods cannot be avoided, pre-clearance surveys and buffers would be applied, as required; and • Avoid clearing mature forests and hollow wildlife trees from March 11to July 31 to avoid destruction of active American marten natal and maternal den. • Conduct clearing activities outside of the migratory bird nesting period (May 4 to August 22), which would also mitigate effects to calving ungulates; • Implement a no-harassing, feeding, or approaching wildlife policy; and • If vegetation clearing is required between May 4 and August 22, use non-intrusive passive methods or pre-clearance nest searches to determine presence of bird nests; protect bird nests with an appropriate setback; commence clearing activities outside nest buffer zones no more than 24 hours following the completion of the final survey to determine no new nests are initiated after that time.
Injury or mortality during nesting, denning, and hibernation	• Survey for grizzly bear dens and develop management strategies to avoid known active dens; • If vegetation clearing is required between May 4 and August 22, use non-intrusive passive methods or pre-clearance nest

	searches to determine presence of bird nests; protect bird nests with an appropriate setback; commence clearing activities outside nest buffer zones no more than 24 hours following the completion of the final survey to determine no new nests are initiated after that time; and • Mitigate potential effects to bank swallow nesting habitat in vertical banks created by erosion: do not disturb active bank swallow colonies while bank swallows are present; limit opportunities for bank swallows to nest in active work areas as per ECCC where appropriate; if a bank swallow nesting site is removed after the birds leave in fall, consult with ECCC in advance regarding habitat offsetting requirements. • To limit impacts to nesting migratory birds, calving woodland caribou and moose, and lambing thinhorn sheep, avoid clearing vegetation during sensitive time periods for wildlife (per *Migratory Birds Convention Act* 1994); if sensitive periods cannot be avoided, pre-clearance surveys and buffers would be applied, as required; and • Avoid clearing mature forests and hollow wildlife trees from March 11 to July 31 to avoid destruction of active American marten natal and maternal dens.
Injury or mortality due to vehicle/equipment collisions	• Implement the Roads and Traffic Management Plan; • Design above-ground pipeline water conveyance systems similar to existing pipelines (i.e., small to moderate diameter, directly along the ground, often through low points such as small ditches) such that the need for wildlife crossing structures will be limited; • Maintain gaps in the banks to facilitate wildlife crossing and escape routes; • Provide wildlife with the right of way; • Identify wildlife use areas and migration corridors/crossings along the road and provide appropriate signage in high wildlife use areas; • Stop and report/communicate when wildlife is observed on or adjacent to the road and allow animals to move away before continuing to drive; • Provide and maintain signage where wildlife encounters are most likely to occur; and • Implement speed limits of 50 km/h or less throughout the project footprint on roads controlled by the Proponent other than the haul road, which will have a speed limit of 70 km/h.
Health, survival, or reproduction issues due to exposure to CACs	• Limit air emission effects on wildlife to the extent practicable by implementing mitigations in the Air Quality and Meteorological Monitoring Plan and the Dust Management Plan (e.g., no-idling policy during non-winter period, minimizing hauling distances, maintenance of equipment and vehicles on a regular schedule).

Health, survival, or reproduction issues due to ingestion of contaminated surface water	• Maintain roadside ditches and culverts so they are operating and draining properly to limit the risk of road wash-out or sediment release to the environment; • Test water in the sedimentation pond; if water quality meets water licence discharge criteria, release to the environment; if water does not meet discharge criteria, pump to the Faro pit for treatment or allow to settle until it meets discharge criteria; • Conduct routine inspections on non-contact water channels, diversions, and sedimentation ponds; conduct supplemental inspections after large rainfall events; • Separate non-contact water from contact water diversions and capacity upgrades, as well as sedimentation ponds that will prevent surface water runoff from entering creeks and diversions; • Implement the Sediment and Erosion Control Plan; • Adhere to guidance from regulators, such as DFO, as to the allowable rate and timing of withdrawals from the point of supply for fish-bearing water bodies; • Follow all mitigations outlined in the surface water quality VESEC; • Establish down gradient seepage interceptions systems to collect contaminated groundwater as described in the Remediation Plan; • Implement a contact water management system prior to moving contaminated waste rock and tailings within the local sub-catchment; • Under normal operations, discharge water from the PWTP within May to October window; • To the extent practicable, capture and treat contaminated groundwater before it mixes with surface water in the receiving environment, using appropriate technologies for the circumstance; • As required, deploy waterbird deterrents (e.g., Bird Balls, Goosinator robots) to deter landing, foraging, or breeding on or near contaminated water that may be suitable for birds during key migratory periods; and • Conduct wildlife patrols once per day during key waterbird migratory periods (from ice-out to June 15 and from August 1 to September 30) to monitor effectiveness of deterrents and supplement automated deterrent systems with nonlethal shooting as necessary.
Injury or mortality due to collision with fly rock during blasting	• Implement and follow blasting guidelines (e.g., *Yukon Occupational Health and Safety Act and Regulations* Part 14; Occupational Health and Safety Plan, unless otherwise authorized); and

	• Survey the blast pattern for large mammals prior to blasting. Do not blast if large mammals are within the blast pattern. Deter wildlife from the blast pattern, if required.
Injury or mortality due to limited mobility along roadways due to snowbanks and above-ground pipelines	• Design above-ground pipeline water conveyance systems similar to existing pipelines (i.e., small to moderate diameter, directly along the ground, often through low points such as small ditches) such that the need for wildlife crossing structures will be limited; and • Have periodic gaps along pipelines, including sections near game trails.
Health, survival, or reproduction issues due to exposure to chemical spills	• Limit exposure of wildlife to harmful chemical substances (e.g., spills) by implementing the Waste Management Plan and the Occupational Health and Safety Plan to correctly handle, contain, store, transport, recycle, and dispose of the different types of hazardous, solid, and special waste materials used and generated on-site; • In the event of a spill, conduct all remediation activities in accordance with Emergency Response Plan and follow the spill response procedure by containing and remediating spills or leaks by handling materials in an appropriate manner; and • If herbicides are used, follow best practices for storage, transport, use, and disposal of hazardous substances.
Health, survival, or reproduction issues due to dust deposition	• Implement mitigations in the Dust Management Plan; • Limit fugitive dust emissions by reshaping, covering, revegetating, and establishing surface water drainage on waste rock and tailings as described in the Remediation Plan; and • Implement the Dust Management Plan and the Air Quality and Meteorological Monitoring Plan to reduce the deposition of dust and minimize the potential for effects to wildlife habitat.
Mortality from increased harvest pressure or predation due to more access roads	• Reclaim access roads once construction activities are complete and roads are no longer required for ongoing operations and maintenance; • All personal firearms will be banned from the project site for employees and contractors; and • Prohibit staff from hunting or fishing while on work rotation and living in camp or during work hours.
Injury or mortality due to interaction or collision with, or entrapment in, permanent site infrastructure	• Monitor the Faro pit and other operations and maintenance permanent infrastructure to confirm mammal and bird use of areas that may pose risk to wildlife; • Design new on-site water conveyance and storage systems (e.g., sedimentation ponds, clean water diversions) or modifications to existing systems to limit potential for wildlife

	entrapment and allow for easy escape by animals (e.g., ungulates able to climb out); and • Fence areas or build escape paths for wildlife where water conveyance or storage systems must have steep sides by design to prevent access by wildlife, if the potential for wildlife interaction exists.
Alterations to movement and behaviour due to sensory disturbance during active remediation from fixed-wing and rotary aircraft	Avoid and maintain the greatest distance possible from wildlife and WKAs when fixed-wing and rotary aircraft are used in support of potential project-specific research studies, including: • Wherever possible, avoid flying within 3.5 km of known sheep ranges; • Avoid flying in known caribou calving areas; • Avoid known lambing areas (WKAs) and mineral licks during the lambing period (May 1 to June 15); • Avoid flying directly toward, following, hovering over, or circling wildlife (e.g., if flying near sheep, fly below the level of the sheep and at an angle—not directly towards the sheep). Ascend to higher flight path or veer away from caribou if running, panicking, or other startle responses are observed; • Where possible, avoid flying in sheep country between 11 a.m. and 3 p.m.; • Maintain overflight altitudes of >300 m above ground level at all times of the year; • Maintain overflight altitudes of >600 m above ground level from May 1 to July 31 and October 1 to January 31 (i.e., sensitive times of the year for ungulates), to the extent practicable; and • Sequence activities such that they limit the number of flights and concentrate the flights into as short a time period as possible.

15.6.1 Monitoring Project Design Features

The Proponent identifies the following project design features to monitor project effects during the lifespan of the project:

- Conduct a functional ecosystem assessment to confirm wildlife species are using revegetated areas through wildlife monitoring
- Terrestrial Management and Effects Monitoring Plan, AMP, and Conceptual Revegetation Plan
- Additional monitoring during active remediation:
- Monitor the Faro pit and other operations and maintenance permanent infrastructure to confirm mammal and bird use of areas that may pose risk to wildlife;
- Implement the Air Quality and Meteorological Monitoring Plan to reduce the deposition of dust and minimize the potential for effects to wildlife habitat;

- Conduct wildlife patrols once per day during key waterbird migratory periods (from ice-out to June 15, and August 1 to September 30) to monitor effectiveness of deterrents and supplement automated deterrent systems with nonlethal shooting as necessary;
- Implement a contaminant monitoring program for wildlife and vegetation as described in the Terrestrial Management and Effects Monitoring Plan; and
- Employ environmental monitors at the site during active remediation to monitor adherence to mitigation measures.[615]

15.7 Project Effects Characterization

Health, survival, and reproduction issues due to exposure or ingestion of contaminants are assessed in this section for general wildlife. Health, survival, and reproduction issues are likely to occur for all wildlife species assessed. Causes include:

- Ingestion of untreated surface water
- Consumption of tainted vegetation due to dust deposition
- Increased emissions of CACs
- Exposure to chemical hazards resulting from spills

15.7.1 Project Effect: Health, survival, and reproduction issues due to ingestion of untreated surface water

Contaminated water use and ingestion from water infrastructure features (e.g., the Faro pit) are possible, although unlikely to be the only source of drinking water for animals in the region. The geography of the Faro pit represents a greater risk of entrapment than a risk of contamination because of the high walls that surround the water. An assessment was conducted by the Proponent and found that the risk from contaminated water was not significant. The Faro pit use is predicted to be low during active remediation but will likely increase once the surrounding area becomes revegetated. Sulphate levels in the Faro pit are predicted to be above livestock drinking guidelines, but below the chronic effect concentrations of 2 500 mg/L. There is no commitment by the Proponent to erect a fence around the Faro pit, but it will be monitored to see if the fence would be necessary.[616] The HHERA performed by the Proponent showed negligible to low risks associated with COPCs for wildlife receptors that use other water bodies, ponds, or open wetlands, including moose.[617] Contamination of nearby aquatic resources (watercourses, fish, etc.) is possible if flooding or other accidents and malfunctions occur, but the AMP is in place to help mitigate these potential effects.

An exhaustive list of mitigations proposed to reduce potential effects to wildlife, including effects from on-site contamination by water, dust/air emissions, or chemicals, is set out in section 15.

[615] YOR 2019-0149-7410
[616] YOR 2019-0149-7410
[617] YOR 2019-0149-7760

15.7.1.1 Significance Determination

The EC determines that the Project will not result in significant adverse effects to general wildlife from the ingestion of untreated surface water. Although the project may affect the health, survival, and reproduction of species from the ingestion of contaminants, the use of the Faro pit as a source of drinking water will be low during active remediation, and other water bodies, ponds, or open wetlands showed low risks of contamination. As such, no further mitigation is recommended to reduce, control, or eliminate significant adverse effects.

15.7.2 Project Effect: Health, survival, and reproduction issues from consumption of tainted vegetation due to dust deposition

Metal contamination of nearby vegetation and invertebrates is possible due to dust deposition, although a Dust Management Plan is in place to mitigate this potential effect and dust deposition is limited to active remediation. The HHERA included calculations for input concentrations of COPCs in soil and terrestrial vegetation, as well as terrestrial invertebrates and the tissues of small and large mammals that might consume vegetation or invertebrates. The assessment found there were negligible risks from COPCs for moose, caribou, sheep, grizzly bear, marten, and squirrel.[618] The Proponent committed to implementing a Dust Management Plan and air quality and meteorological monitoring program to reduce dust mobilization and transport (from traffic, wind, material handling activities) and adopt adaptive management activities if necessary.[619]

15.7.2.1 Significance Determination

The EC determines that the Project will not result in significant adverse effects to general wildlife from consumption of tainted vegetation due to dust deposition. Although it is likely to result in effects to the health, survival, and reproduction of all wildlife species resulting from dust deposition, effects to health, survival, and reproduction issues from contaminants in nearby vegetation or soils are not significant due to mitigations in place by the Proponent, as well as the calculated low to negligible risk, as identified in the HHERA, for all species.

15.7.3 Project Effect: Health, survival, and reproduction issues due to increased emissions of criteria air contaminants

Potential health effects, survival, and reproduction issues from increased emissions of CACs are restricted to active remediation. Air dispersion modelling predicted that maximum emissions for NO_2, SO_2, and CO were below YAAQS. $PM_{2.5}$ and PM_{10} were above the standards for 24-hour and annual emissions, but the spatial extent of these exceedances was limited to a 750 m wide area near the Rose Creek diversion and waste rock dump areas.[620] Mitigations are in place to reduce the effects of air emissions, including a no-idling policy during non-winter period, minimizing hauling distances, etc.

[618] YOR 2019-0149-7410
[619] YOR 2019-0149-9964
[620] YOR 2019-0149-7410

15.7.3.1 Significance Determination

The EC determines that the Project will not result in significant adverse effects to general wildlife from increased emissions of CACs. The Project is likely to result in effects to the health, survival, and reproduction of all wildlife species, resulting from increased emissions of CACs. Potential health effects from increased emissions of CACs are adverse and restricted to active remediation. Measures to lessen the impact of air emissions will be implemented, such as enforcing a no-idling policy outside of winter months and minimizing the distance materials are transported. According to air dispersion modeling, the highest emissions of NO_2, SO_2, and CO remain below the YAAQS thresholds. $PM_{2.5}$ and PM_{10} levels exceeded standards for both daily and yearly emissions. However, these exceedances are confined to a relatively small area, approximately 750 m wide, primarily around the Rose Creek diversion and waste rock dump sites.[621] These are areas of high disturbance during active remediation and will likely be avoided by most wildlife. Therefore, effects from increased emissions of CACs are not significant.

15.7.4 Project Effect: Health, survival, and reproduction issues due to exposure to chemical hazards resulting from spills

Different project activities involving the use of heavy equipment may result in spill or malfunction. The contamination of soil and vegetation and nearby receiving surface watercourses may eventually cause health, survival, or reproduction issues for the wildlife inhabiting the contaminated area. To reduce potential risks associated with exposure to chemical spills, the Proponent committed to implement the mitigations listed in section 15.

15.7.4.1 Significance Determination

The EC determines that the Project will not result in significant adverse effects to general wildlife from exposure to chemical hazards resulting from spills. The Project is likely to result in exposure to chemical hazards resulting from spills due to the use of heavy equipment on-site. Effects from chemical hazards are adverse. However, effects to health, survival, and reproduction issues from exposure to chemical spills are not significant due to mitigations in place by the Proponent, including an Emergency Response Plan to react in a timely and adequate manner in case of spill.

[621] YOR 2019-0149-7410

16 MOOSE

16.1 Overview

The EC determines that the Project is likely to result in significant adverse effects to moose as a result of habitat loss, fragmentation, and degradation from earthworks and increased hunting pressure. As such, additional terms and conditions are recommended.

16.1.1 Reason for Inclusion

Moose are an important species ecologically, culturally, and socio-economically in the Yukon and Canada. Moose are the most widely hunted game species by both First Nation and non-First Nation hunters.[622] The Traditional Use Study provided by SFN identifies that Selkirk peoples harvest a broad spectrum of fish and wildlife species. For SFN citizens living in the community of Pelly Crossing, moose is the wildlife species most heavily relied upon for meeting household food needs. Perceived and actual contamination, resulting from the historic Faro Mine operations, has resulted in a belief by affected First Nations that the food chain is poisoned, including moose.[623] The Town of Faro and RRDC community members have long been concerned about high hunting pressure on moose in the Faro area.[624] Wildlife, and particularly moose, are very important to RRDC members as indicated through their comments.[625]

16.2 First Nation and Community Input

RRDC, LFN, and SFN provided broad comments throughout the assessment process pertaining to wildlife and wildlife habitat concerns, including moose. RRDC has concern pertaining to wildlife accessing and getting into tailings and waste rock piles as mentioned above, in section 15.

LFN raised concerns in their comments on the DSR about the term and condition recommended by the EC being too vague and high level to mitigation adverse effects from moose habitat loss. LFN requested rewording this term and condition within the FSR, and to do so in collaboration with affected Kaska Nations

> […]to provide assurances that the approach to management and stewardship of moose and moose habitat within the Project area during the proposed remediation work will appropriately consider Kaska rights, including ensuring Kaska Nations have full decision-making authority in the development and implementation of the management plan.[626]

[622] Clarke, Drummond, and Westover, *Moose Survey Faro Early Winter 2011*, 2012, https://open.yukon.ca/sites/default/files/Faro_Early_Winter_Moose_Survey_2011.pdf.
[623] YOR 2019-0149-0555
[624] Clarke, Drummond, and Westover, *Moose Survey Faro Early Winter 2011*.
[625] YOR 2019-0149-0555
[626] YOR 2019-0149-5873, p.11

LFN also requested the addition of a second term and condition:

- The Proponent, in collaboration with affected First Nations and the Government of Yukon, shall provide more robust monitoring and mitigation measures for moose, including, among others, seasonal road measures, timing of high disturbance activities, alternate borrow pit locations, and habitat offsetting.[627]

16.3 Existing Conditions

16.3.1 Population Status

There are approximately 70 000 moose in the Yukon.[628] Moose density is very high in the Faro area because of the abundance of high-quality moose habitat in the region. The estimated population in the studied area, including 10 game management subzones (GMSs) (seven of which overlapped with the RAA) was 364 moose per 1 000 km^2 in 2011.[629] The 2011 Early Winter Regional Moose Survey conducted by the Government of Yukon department of Environment that spanned 10 GMS, including the Town of Faro and the Faro Mine site, mentions the observation of 866 moose. That same survey showed between 80 to 570 moose/1 000 km^2 depending on the area.[630] Moose is the second most frequent species in the LAA, according to the Faro Mine's Incidental Wildlife Log[631], which recorded 842 observations from 2009 to 2013.[632] An Incidental Wildlife Log has been maintained by a consultant at the Faro Mine since 2009. This data demonstrates the importance of the area to the moose population despite the current disturbance.

Moose are the third most common large mammal wildlife species hit by motor vehicles on Yukon highways, comprising 23 % of wildlife vehicle collisions between 2003 and 2014. The majority (73 %) of these collisions have occurred on the Alaska Highway, although five collisions have occurred on the Robert Campbell Highway near Watson Lake.[633]

16.3.2 Moose Management Units/Game Management Subzones

YG has 61 moose management units (MMU) across the territory; these units are groups of GMSs that encompass biologically distinct moose populations. The Project falls within game management zone 4, which historically has the highest levels of moose harvest of any game

[627] YOR 2019-0149-5873, pp.11-12
[628] Environmental Dynamics Inc. (EDI), *Large Mammal-Vehicle Collisions: Overview of Mitigations and Analysis of Collisions in Yukon*, 2015, https://open.yukon.ca/sites/default/files/MRC-15-02WildlifeCollisionsReport.pdf.
[629] YOR 2019-0149-7410
[630] Clarke, Drummond, and Westover, *Moose Survey Faro Early Winter 2011*.
[631] CH2M Hill, *Preliminary Final Design Basis Report North Fork Rose Creek Project*, 2016, https://emrlibrary.gov.yk.ca/aam/preliminary-final-design-basis-report-north-fork-rose-creek-project-2016/final-report.pdf.
[632] YOR 2019-0149-4148
[633] Environmental Dynamics Inc. (EDI), *Large Mammal-Vehicle Collisions: Overview of Mitigations and Analysis of Collisions in Yukon*, 2015, https://open.yukon.ca/sites/default/files/MRC-15-02WildlifeCollisionsReport.pdf.

management zone in the territory.[634] Nine GMSs overlap the RAA: 4-41 to 4-47, 4-51, and 8-19. Four of these (4-44 to 4-47) overlap the LAA as shown in Figure 10: Game Management Subzones. GMS 4-51 is closed to all big game hunting.[635]

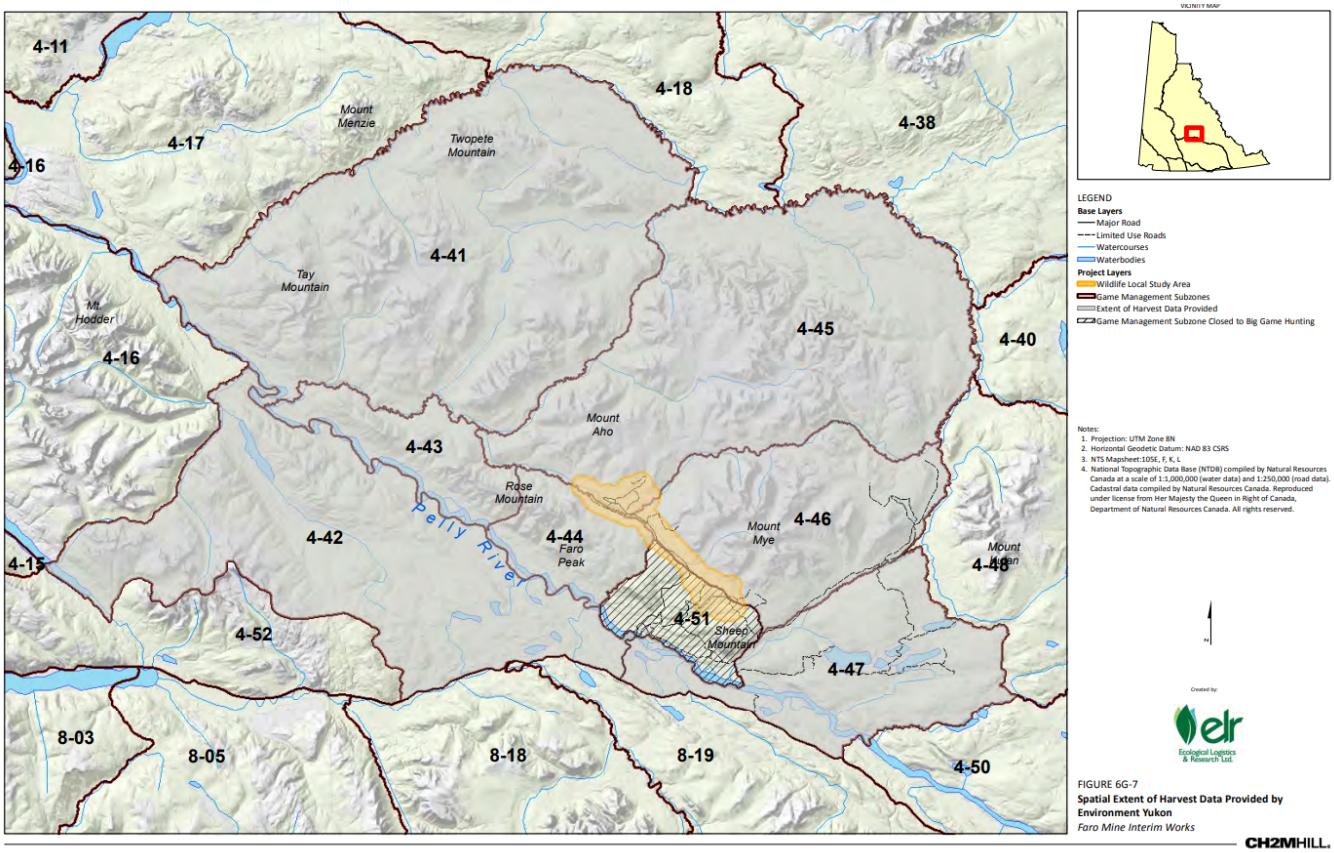

Figure 10: Game Management Subzones[636]

16.3.3 Harvest

Generally, in surveyed MMUs where the number of adult bulls is known, the recommended harvest rate is 10 % of the adult bull population. In MMUs where no survey information is available, recommended harvest rates are based on estimated population density.[637] In their comments on the DSR, the Government of Yukon department of Environment indicated specifically for the project area that "Licenced moose harvest is managed through a mandatory threshold hunt in GMS's 4-44, 4-45, 4-46, and licenced harvest is limited to a maximum of 15 bull moose. This threshold was implemented in 2016 for the fall hunting season. Licenced moose hunting is closed in GMS 4-51."[638] In GMS 4-45, the moose population declined by 28 %

[634] Government of Yukon, *Licensed Harvest Trends In Yukon 1980-2014*, 2018, https://yukon.ca/sites/yukon.ca/files/env/env-licensed-harvest-trends-yukon.pdf.
[635] YOR 2019-0149-7410
[636] YOR 2019-0149-4148
[637] Government of Yukon, *Science-Based Guidelines for Management of Moose in Yukon*, 2016, https://open.yukon.ca/sites/default/files/moose-guidelines-2016_2.pdf.
[638] YOR 2029-0149-6169, p.18

from 1997 to 2011, probably due to overhunting during that time.[639] GMS 4-45, which can be accessed using the Faro Mine access road, has a high moose harvest rate.[640]

Moose harvest data provided by the Government of Yukon department of Environment from 2012 to 2022 show that 307 moose were harvested for GMS 4-41 to 4-47. The general trendline during this period shows that harvest levels are stable.[641] Harvest management settings in the Faro area include:

- All cow harvest should be avoided;
- When the allowable harvest for an area is reached, subzones that are part of a moose threshold hunt will be closed to moose hunting for the remainder of the season; and
- GMS 4-44, 4-45, and 4-46 have a threshold of 15 moose. The hunt is open from August 1-October 31 or until threshold limit is reached.[642]

16.3.4 Habitat

Moose are found in a variety of habitat types that provide abundant deciduous browse and dense shrub habitats, including riparian areas, floodplains and deltas, subalpine willow communities, and recently disturbed areas such as burned or logged forest. They require mineral licks to procure essential minerals for dietary and health reasons and have specific requirements for calving, summer, and winter habitat.[643]

There are three early winter (October to January) ranges WKAs overlapping the northern and eastern edges of the RAA. One of these ranges also overlaps the northern edge of the LAA. High-quality habitat for moose is present throughout the RAA as shown below in Figure 11. Habitat suitability was determined by the Proponent based on the assumptions that moose prefer wetland, riparian, and shrubby habitats in summer and mature forests at low elevations in winter.[644]

- LAA habitat suitability: 67.0 % high, 13.1 % moderate, 0.9 % low, and 19.0 % unsuitable
- RAA habitat suitability: 63.3 % high, 13.0 % moderate, < 0.1 % low, and 23.6 % unsuitable[645]

[639] YOR 2019-0149-7410
[640] YOR 2019-0149-4148
[641] YOR 2019-0149-6111
[642] Government of Yukon, *Yukon Hunting Regulations Summary 2023-2024*, 2023, https://yukon.ca/sites/yukon.ca/files/env/env-yukon-hunting-regulations-summary_0_0.pdf.
[643] Government of Yukon, *Science-Based Guidelines for Management of Moose in Yukon.*
[644] YOR 2019-0149-9779
[645] YOR 2019-0149-7410

High-quality habitat is available throughout the LAA and RAA. Unsuitable habitat is concentrated in and near the Faro Mine site, the Town of Faro and associated anthropogenic disturbances.[646]

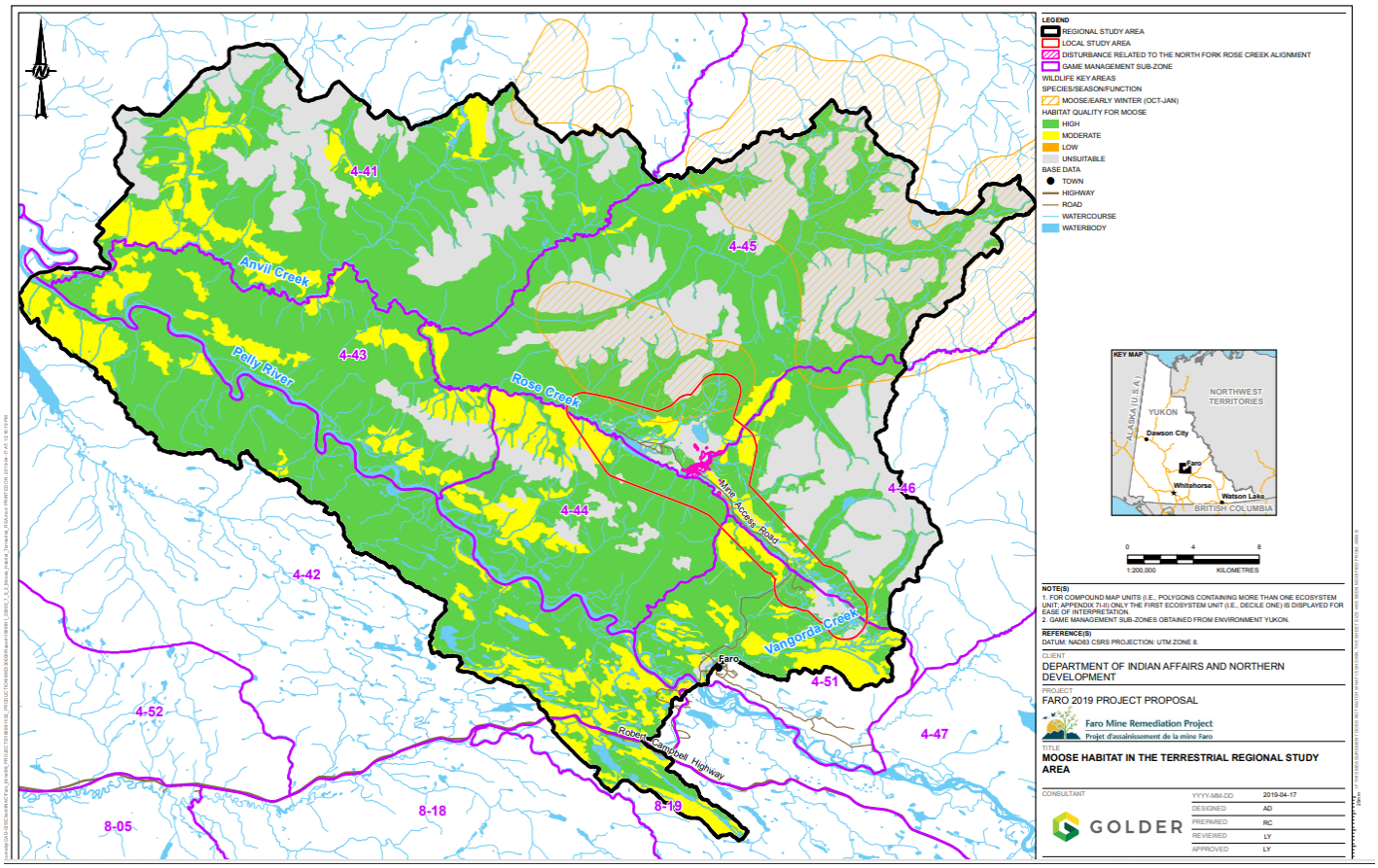

Figure 11: Moose Habitat Suitability within the RAA[647]

16.4 Project Effects Characterization

16.4.1 Project Effect: Disturbance or displacement of moose due to sensory disturbances

Moose have been observed at the Faro Mine site and reported between 2004 and 2017. They are especially present at the site from May to September.[648] The area does not represent a WKA for this period as mentioned above, but moose still use the area year-round because of the presence of high-quality habitat (Figure 1111). Although current disturbances do not stop moose from visiting the project location, additional disturbance from project activities could potentially alter the movement and behaviour of moose that are effectively using the area, as has been reported in the past.

[646] YOR 2019-0149-7410
[647] YOR 2019-0149-7410
[648] YOR 2019-0149-7410

Sensory disturbances to moose include noise generated from the use of heavy equipment, blasting, and construction/demolition activities, as well as activities related to the presence of workers (the camp is to house up to 304 people), including travel to the site and within the site of and by workers. The large scale of operations of the Project can lead to sensory disturbance of high magnitude at a period when moose are common in the area and over the multiple years that the Project will occur. Sensory disturbance from project activities (noise from heavy equipment, workers, blasting, etc.) could potentially result in habitat avoidance and/or lead to health effects or physiological stress of the animals.

Noise disturbance is expected intermittently. Noise is predicted to reach a maximum of 122 dBA (A-weighted decibels) within the LAA, which is a 77 to 87 dBA increase in noise levels from existing conditions. Sound levels above 90 dBA are likely to be harmful to mammals.[649] Sensory disturbance coupled with habitat loss due the borrow areas may result in decreased habitat connectivity for moose, who may avoid roads by up to 3 km.[650]

The Proponent has committed to maintain the greatest distance possible from wildlife when using aircrafts, implement a no-harassing, feeding, or approaching wildlife policy, and limit light pollution to reduce sensory disturbances. The Proponent also proposed mitigations specifically for blasting, which could result in sensory disturbance but could also lead to injury or death of wildlife:

- Implement and follow to blasting guidelines (e.g., *Yukon Occupational Health and Safety Act and Regulations* Part 14, Occupational Health and Safety Plan, unless otherwise authorized).
- Survey the blast pattern for large mammals prior to blasting. Do not blast if large mammals are within the blast pattern. Deter wildlife from the blast pattern, if required.[651]

The Government of Yukon department of Environment proposed that “Explosives shall not be detonated when moose, bears, caribou, sheep or other large animals are observed to be within 500 m of a blast site.”[652] The Proponent has indicated that no blasting will occur if large mammals are observed in the area prior to blasting, which is deemed sufficient to reduce effects from sensory disturbance.

16.4.1.1 Significance Determination

The EC determines that the Project is not likely to result in significant adverse environmental effects to moose from sensory disturbances. Alteration to moose movement and behaviour due to sensory disturbances is likely due to the presence of moose in the project area, coupled with various project activities (the presence of humans, the use of heavy equipment for earthworks, and blasting). Effects to movement and behaviour from sensory disturbances are adverse.

[649] YOR 2019-0149-7410
[650] YOR 2019-0149-7410
[651] YOR 2019-0149-7410, p.324
[652] YOR 2019-0149-3285, p.42

However, the EC determines that effects are not significant due to the mitigation measures proposed. Sensory disturbance will be temporary; moose may avoid the project location for the duration of the Project but will come back into the area once heavy equipment and workers have left and reclamation is completed. As such, no additional terms and conditions are recommended.

16.4.2 Project Effect: Moose habitat loss, fragmentation, and degradation from earthworks

Project activities could result in loss, fragmentation, or degradation of habitat. Overall, it is predicted that earthwork activities during the active remediation phase (i.e., development of new borrow areas and associated access roads, extending the toe of waste rock dump slopes) will result in the loss of approximately 12.2 % of suitable habitat in the LAA, with a majority of the loss representing highly suitable habitat, and 1.1 % of suitable habitat in the RAA.[653] The majority of the loss of suitable habitat will occur within the LAA, which is already an area of high disturbance due to the mine-site history. The EC notes that moose have been observed throughout LAA based on data collected between 2009 and 2017, especially during the summer months (May to September).[654]

Some habitat loss will be permanent, and some will be temporary, as some sites will be reclaimed. Any existing access points and roads not used during the Project will be reclaimed. Accesses and roads already in the process of natural reclamation will be left to naturally revegetate. However, even with reclamation, habitat will likely be permanently altered and potentially degraded in some areas, meaning the area might not be reclaimed to pre-mine conditions. As mentioned above, LFN identified the need for the Terrestrial Effects Monitoring Plan to monitor the abundance and condition of terrestrial wildlife and habitat. Recording of incidental observations for general wildlife will continue within the project site, informing about the abundance of wildlife in the area. Recording the location of all wildlife observations after reclamation activities are completed will also inform on the condition of their habitat. It is unclear, though, what efforts will be put in place in the future if habitat suitability is deemed low or restoration ineffective.

After the active remediation phase is over (15-year period), suitable habitat for moose should increase by 590.6 ha relative to existing conditions (i.e. current conditions).[655] This represents the greatest net increase in suitable habitat amongst the species assessed. The EC reiterates that “existing conditions” referred to are current disturbed conditions, recognizing that habitat will not be restored to pre-mine conditions. Suitable habitat does not mean pre-mine conditions, but rather conditions that will promote presence and prosperity of the species. Mitigation measures proposed to reduce effects from habitat loss and degradation due to earthworks and other construction activities are listed in Section 15.6. Mitigation measures include the implementation of the revegetation plan. The objective of the proponent’s revegetation plan is to return the mine

[653] YOR 2019-0149-7410
[654] *Ibid.*
[655] *Ibid.*

site “to an acceptable state of use that reflects pre-mining land use where practicable”,[656] including re-establishment of wildlife habitat for a range of species. To do so, the Plan focuses on re-establishing locally common forest and shrubland ecosystems and associated common plant species. Seeding, planting, and natural regeneration will be utilized to meet this objective, and “planting of both woody and herbaceous seedlings will likely be used to re-establish a diversity of native plant species.”[657] The EC recognizes the Proponent’s commitment towards reclamation and revegetation of the site, but is of the opinion that specific methods and objectives for revegetation of moose habitat are necessary because of the important proportion of highly suitable habitat that will be affected during the active remediation phase.

16.4.2.1 Significance Determination

Habitat loss, fragmentation, and degradation are likely due to project activities, such as earthworks during the active remediation phase. However, it is recognized that conditions after the active remediation phase is over will not be pre-mine conditions. Effects are adverse and significant because of the importance of the species ecologically, culturally, and socio-economically in the Yukon and Canada, such that further mitigation is proposed. The EC determines that further efforts are needed following active remediation in progressive revegetation, habitat diversification, and management to bring the site towards a more diverse and suitable habitat for wildlife, including moose, in the context of a heavily disturbed site. The habitat plan will support the development of suitable habitat that can maintain the moose population in the long-term.

The EC determines that the Project is likely to result in significant adverse effects to moose habitat resulting from project activities. The following mitigation is recommended to reduce, control, or eliminate significant adverse effects:

10. The Proponent, in collaboration with affected First Nations, the Government of Yukon and the Yukon Fish and Wildlife Management Board, shall develop a habitat plan specific to moose for the Faro Mine site maximum disturbance footprint. The habitat plan shall include, at minimum:

    a. The creation of effective browse for moose.
    b. Increases to percent cover and vigor of live seedlings.
    c. Consideration of vegetation community composition and how vegetation density objectives can be met to support continued efforts to diversify, manage, and support effective ecosystem restoration and the restoration of land use which supports First Nation values in relation to moose in the project area.

[656] YOR 2019-0149-8836, p.13
[657] YOR 2019-0149-8836, p.14

16.4.3 Project Effect: Increase in injury or mortality for moose

16.4.3.1 Increase in injury or mortality for moose due increased predation, collisions, and hunting pressure from linear development

There are currently concerns of overhunting for moose in some GMS within the project, especially GMS 4-45, and hunting pressure could increase due to construction of new access roads. It is unclear whether the Proponent can limit access on new access roads, but it has committed to maintaining public access on roads in the project area that are currently used by the public. The Proponent also committed to reclaim access roads once construction activities are complete and when roads are no longer required for ongoing operations and maintenance. Furthermore, all personal firearms will be banned from the project site for employees and contractors, and staff will be prohibited from hunting or fishing during work hours, while on work rotation, and/or while living in camp. However, hunting pressure from non-employees during the remediation phase is not addressed through mitigation. Historically, GMS 4-45 has experienced significant hunting pressure and high harvest rates[658], but licensed harvest within GMS 4-45 is now limited to 15 bull moose.[659] The Project is likely to result in increased harvest mortality for moose due to increased access, high harvest numbers for the past decade, concerns about overhunting in the project area, and lack of clarity around a commitment from the Proponent to limit access on newly constructed roads. However, effects are not significant because hunting in the area is regulated.

Vehicle mortality could potentially occur from linear development, although it is anticipated to be reduced or limited by way of proposed mitigations, such as implementing the Roads and Traffic Management Plan, speed limits on roads controlled by the Proponent, providing wildlife with the right of way, signage, and identifying and reporting where wildlife is frequently observed (see Table 24 above). LFN requested in their comment submission on the DSR that the following components be included in an updated Roads and Traffic Management Plan developed in collaboration with First Nations:

- Further details on the key components of the roads and traffic management plan (e.g. location of new access roads, full wildlife protection measures)
- Development of distance thresholds for modified vehicle speed or traffic stoppage when wildlife are adjacent to the road
- Development of adjusted road speeds and wildlife road monitoring during sensitive periods for wildlife (e.g. thinhorn sheep migration)[660]

A Roads and Traffic Management Plan is already in place and the details of its content can be discussed by the Proponent with the affected First Nations. The Government of Yukon department of Environment recommended that “Speed limits shall be posted at the beginning of

[658] YOR 2019-0149-4148
[659] YOR 2019-0149-6169
[660] YOR 2019-0149-5873, p.17

the access road and at frequent intervals, to be determined by site conditions thereafter."[661] Indication of speed limits is included in the Proponent's commitments.

Linear development can also result in increased predation, because wildlife sighting by predators is eased by those linear disturbance. The Government of Yukon department of Environment also recommended the following mitigation to reduce impact from increased predation due to linear development that is not included in the Proponent's commitments:

- New linear disturbance shall incorporate techniques that reduce line of sight from existing roads (e.g., rollback, doglegs, tree-falling)
- Line of sight for new linear disturbance shall be limited to 200 metres[662]

The Government of Yukon department of Environment mentions that "Reducing line of sight and reclaiming linear features may help reduce predation effects on moose."[663] However, the Project occurs in a pre-disturbed area that has already been cleared. The new linear disturbance proposed is not located in dense forest where clearing would impact sighting of preys (moose and other mammals). For that reason, it was determined that increased predation is not likely to occur as a result of project activities.

16.4.3.2 Increased injury or mortality for moose due to entrapment

Injury or mortality from entrapment in permanent site infrastructure could occur because of project activities. The Project includes the remediation and monitoring of the Faro pit but not the fencing of the area, which could represent a risk for moose and other wildlife to become trapped. The active remediation phase also includes the stabilization, landforming, and cover of tailings and waste rock; borrow development; non-contact and contact water management (sedimentation ponds, clean water diversions); demolition, contaminated soils; and waste management and supporting activities. If permanent site infrastructures are not constructed and maintained in a way to prevent wildlife entrapment, the risk for injury or mortality exists. Proponent mitigations to prevent wildlife entrapment are listed in section 14.

Mitigations that are not included in the Proponent's commitments were proposed by the Government of Yukon department of Environment in comment submissions during the assessment process to prevent wildlife entrapment related to borrows and snowberms:

- Borrows shall be contoured to facilitate wildlife egress
- Snowberms along the mine access and haul roads shall be maintained at a level of less than 50cm above the roadbed. Where this is not feasible, 3-metre-wide breaks or greater shall be created every 250 m along the snowberm to allow for straight-line wildlife crossings[664]

[661] YOR 2019-0149-3285, p.40
[662] YOR 2019-0149-3285, p.40
[663] YOR 2019-0149-3285, p.40
[664] YOR 2019-0149-3285, p.40

The Proponent committed to maintain gaps in the banks to facilitate wildlife crossing and escape routes, such that no further mitigation is proposed.

16.4.3.3 Significance Determination

Effects from collisions are not likely to occur as the design of linear development allows for sufficient visibility on existing and new roads to prevent collisions. Effects from entrapment are likely to occur due to earthworks, however, the effects are significantly reduced as structures on-site are proposed to be constructed, maintained, and reclaimed in a condition that prevents wildlife entrapment. Effects from predation and increase in hunting success are likely given the linear development (roads and trails) proposed by the Proponent beyond the existing disturbance footprint of the Project. Effects from increased hunting are likely to be limited in magnitude. The EC determines that the Project is not likely to result in significant adverse effects to moose from increase in injury or mortality resulting from project activities.

17 WOODLAND CARIBOU

17.1 Overview

The EC determines that the Project is likely to result in significant adverse effects to caribou as a result of sensory disturbances and habitat loss, fragmentation, and degradation from earthworks. As such, additional terms and conditions are recommended.

17.1.1 Reason for Inclusion

Three different herds from the Northern Mountain population of woodland caribou (also known as northern mountain caribou or boreal caribou) are found in the project area: Tay River herd (TRH), Tatchun herd, and Pelly herds. It was noted in the Biophysical Environment Effects Assessment that "herds migrate seasonally and may overlap at different times of the year, such that woodland caribou in the LAA and RAA may also belong to the nearby Pelly Herds, Tatchun, Moose Lake, Finlayson, or Ethel Lake caribou herds."[665] All three herds identified in the project area are relevant to this project and will be referred to as woodland caribou in the subsequent text.

Woodland caribou is an important species ecologically, culturally, and socio-economically in the Yukon and Canada. Caribou are traditionally hunted for food and have a high local value for First Nations and non-First Nations Yukon residents.[666] Woodland caribou can serve as an indicator for boreal forest ecosystem health.[667] RRDC and other Indigenous Elders believe that caribou have been displaced as a result of the historic Faro Mine activities.[668] The Project overlaps with woodland caribou habitat of high, moderate, and low quality, with an ungulate mineral lick that is present in the northwest corner of the RAA, meaning that caribou encounters at the project location are likely to occur.

17.2 First Nation and Community Input

17.2.1 Ross River Dena Council

RRDC stated that the displacement of wildlife is not given adequate consideration in the Proponent's assessment:

> Prescribing a buffer will not necessarily mitigate the impact of displacement. Caribou, in particular, are sensitive to noise disturbance and may alter their movements patterns, irrespective of a 500 m buffer. Deflection from these areas may significantly alter

[665] YOR 2019-0149-7410, p. 260
[666] Government of Yukon, *Woodland Caribou,* 2024, https://yukon.ca/en/outdoor-recreation-and-wildlife/yukon-wildlife/woodland-caribou.
[667] Government of Canada, *Caribou in Canada*, 2023, https://www.canada.ca/en/environment-climate-change/services/species-risk-education-centre/caribou.html.
[668] YOR 2019-0149-0555

> traditional movement patterns. The timing of the disturbance may be more important than a protected buffer, in some situations.[669]

17.2.2 Selkirk First Nation

In the Slater Environmental memo,[670] submitted as part of SFN's comments, SFN noted that severe effects on water quality would have important consequences on wildlife and fish species and, therefore, on SFN citizens way of life. Additionally, SFN raised concerns specifically about the potential for significantly high levels of dust deposition and the possible effects on wildlife, particularly caribou. SFN also flagged that all subsistence activities have already been disrupted by the historic Faro Mine activities.

17.2.3 Liard First Nation

Similarly to their comments on moose, LFN is concerned that the term and condition recommended by the EC in the DSR is too vague and high level. LFN requested to reword the term and condition in collaboration with affected Kaska Nations in the FSR:

> To provide assurances that the approach to management and stewardship of caribou habitat within the Project area during the proposed remediation work will appropriately consider Kaska rights, including ensuring Kaska Nations have full decision-making authority in the development and implementation of the management plan.[671]

LFN also requested additional term and condition to mitigate negative effects to caribou:

> The Proponent, in collaboration with affected First Nations and the Government of Yukon, shall provide more robust monitoring and mitigation measures for caribou, including, among others, seasonal road measures, timing of high disturbance activities, alternate borrow pit locations, and habitat offsetting.[672]

17.3 Existing Conditions

17.3.1 Biological Context

The population of caribou in the Yukon is estimated to be 41 000 individuals. Caribou reproduce slower and have larger zones of influence than other ungulates. They require specific habitat types, including ungulate mineral licks like the ones that can be found within the RAA. Caribou are specific about their food and need slow-growing lichen.[673] The Northern Mountain population of woodland caribou "make altitudinal migrations, moving from low-elevation forested areas in

[669] YOR 2019-0149-0555, p.45
[670] YOR 2019-0149-5339
[671] YOR 2019-0149-5873, p.10
[672] YOR 2019-0149-5873, p.11
[673] Government of Yukon, *Science-Based Guidelines for Management of Northern Mountain Caribou in Yukon*, 2016, https://open.yukon.ca/sites/default/files/northern-mountain-caribou-guidelines-2016_0.pdf.

winter to high elevation subalpine and alpine areas during calving, summer, and rut."[674] They are also very sensitive to anthropogenic disturbance, especially from industrial sites.[675] To this effect, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) described how the population is currently affected within the territory:

> Northern mountain population of woodland caribou in Yukon Territory, Northwest Territories, and British Columbia are beginning to be affected by forestry, roads, and other developments, through habitat modification and increased human access; most of the habitat is currently remote and has changed little; most of the population of over 3,500 adults appears stable but is particularly dependent on conservation actions, such as management plans. Two of 39 herds within this population are declining and may be at risk from changing predator-prey relationships and greater motor vehicle access.[676]

17.3.2 Population status

According to the NatureServe conservation status, woodland caribou in the Yukon are identified as a vulnerable (S3) species. This means that the species is "At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors."[677] Federally, SARA also identifies woodland caribou or northern mountain caribou as a species of special concern.[678]

Community or cultural knowledge shared by RRDC and available to the assessment identifies three different woodland caribou herds that use the alpine in the summer and fall months: Tay River, Tatchun and Pelly/Magundy herds. An additional herd that used to winter along the Tenas Creek disappeared after the Faro Mine discovery.

The population density of caribou for the project area (both LAA and RAA) is unknown. Between 2009 and 2013, 13 caribou observations were recorded in the Incidental Wildlife Log within the LAA.[679] The Government of Yukon department of Environment indicated in their comments on the DSR that "Work is ongoing to better understand the population dynamics of the herds and will further enhance understanding of trends in the region."[680] A 2017 estimate for the Tay River/

[674] YOR 2019-0149-6169, p.19
[675] Stewart, et al., "Boreal Caribou Can Coexist with Natural but Not Industrial Disturbances," *The Journal of Wildlife Management* 84 no. 8, (2020): 1435-1444, DOI: 10.1002/jwmg.21937.
[676] "Rangifer tarandus caribou, Woodland Caribou," NatureServe Explorer, last modified February 2, 2024, https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.105025/Rangifer_tarandus_caribou#:~:text=Northern %20mountain %20population %20of %20woodland %20caribou %20in %20Yukon,relationships %20and %20greater %20motor %20vehicle %20access %20 %28COSEWIC %202002 %29.
[677] "NatureServe Global Conservation Status Ranks," NatureServe Explorer, 2023, https://www.natureserve.org/nsexplorer/about-the-data/statuses/conservation-status-categories.
[678] Government of Canada, *Caribou (Rangifer tarandus), Northern Mountain population*, 2023, https://species-registry.canada.ca/index-en.html#/species/1294-946.
[679] YOR 2019-0149-4148
[680] YOR 2019-0149-6169, p.19

Moose Lake populations is available, estimating the population to 1 880 animals. According to YG, the population decline from the 1991 census in their main winter range could be explained by wildfire activity in the early 2000's that reduce the herd north-south movements and redistributed the herd in undefined herd or sub-group.[681] This in in line with the observation of an RRDC member who has noticed the disappearance of the TRH herd in areas that were once populated due to wildfires in the region more recently.[682] However, the potential displacement of the herd does not necessarily indicate a declining population. YG mentioned that the calf recruitment averaged 25 calves per 100 cows and the adult sex ratio was 41 bulls per 100 cows; data indicating a stable population growth.[683]

Caribou are the most frequently hit large mammal wildlife species hit by motor vehicles on Yukon highways, comprising 27 % of the total wildlife vehicle collisions in the Yukon between 2003 and 2014. The majority of these collisions (91 %) occurred on the Alaska Highway, although one occurred on the Robert Campbell highway near Watson Lake in 2013.[684]

17.3.3 Harvest

Caribou harvest is largely managed by herd. Licensed hunters are limited to one male only when hunting woodland caribou in the central and southern Yukon. Female caribou are protected from hunting. If one harvests a woodland caribou, then this person is not eligible to hunt the Fortymile or Nelchina caribou herds (barren-ground caribou).[685]

Herd size and stability are critical for estimating sustainable harvest rate. For stable herds, a bull-only harvest rate of 2 % is likely sustainable. For increasing herds, a bull-only harvest rate of between 3 % to 4 % is recommended. For decreasing herds and those of unknown status, a 1 % harvest rate is considered sustainable.[686]

The Government of Yukon department of Environment caribou harvest data from 2003 to 2012 for GMS 4-41 to 4-47 showed that 119 caribou were harvested, while no caribou were harvested from GMS 4-51. Caribou harvest was highest in GMS 4-45, at 83 animals (this harvest data does not include First Nations harvest).[687] Harvest data provided by the Government of Yukon department of Environment from 2012 to 2022 shows that 37 caribou were harvested from GMS 4-41 to 4-47. The general trendline during this period shows that harvest levels are stable.[688]

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[681] YOR 2019-0149-7895
[682] YOR 2019-0149-0555
[683] YOR 2019-0149-7895
[684] Environmental Dynamics Inc. (EDI), *Large Mammal-Vehicle Collisions: Overview of Mitigations and Analysis of Collisions in Yukon*, 2015, https://open.yukon.ca/sites/default/files/MRC-15-02WildlifeCollisionsReport.pdf.
[685] Government of Yukon, *Yukon Hunting Regulations Summary 2023-2024*.
[686] Government of Yukon, *Science-Based Guidelines for Management of Northern Mountain Caribou in Yukon, 2016*, https://open.yukon.ca/sites/default/files/northern-mountain-caribou-guidelines-2016_0.pdf.
[687] YOR 2019-0149-4148
[688] YOR 2019-0149-6111

17.3.4 Habitat

Habitat suitability maps were prepared by the Proponent. Habitat suitability was determined based on the assumption that woodland caribou have a strong preference for higher-elevation areas where they can forage easily in summer and a moderately strong preference for low-elevation mature to old-growth coniferous forest in winter.[689] Compared to moose, the LAA does not include a majority of highly suitable habitat for caribou. The RAA is much more suitable than the LAA for caribou, with 27.3 % of highly suitable habitat compared to 0.5 % of highly suitable habitat as shown in Figure 12. Other than the mineral lick in the northwest portion of the RAA that may be important to all ungulates, there is no other WKA for caribou within the LAA or RAA. Only the annual range of the TRH overlaps the project LAA and almost completely the project RAA. The Pelly herds and Tatchun herd annual ranges overlap minimally with the southern limit of the RAA (Figure 12). The focus of the assessment will be on the TRH due to the complete overlap of its annual range with the LAA and nearly complete overlap with the RAA.

The details for habitat suitability are provided below:

- LAA habitat suitability: 0.5 % high, 19.4 % moderate, 2.7 % low, and 77.5 % unsuitable
- RAA habitat suitability: 27.4 % high, 33.6 % moderate, 28.7 % low, and 10.3 % unsuitable[690]

Woodland caribou are very susceptible to anthropogenic disturbance, including habitat loss and noise, resulting in altered movements and physical avoidance.[691] Due to the existing conditions associated with historic and ongoing disturbances and caribou's nature to avoid anthropogenically disturbed areas, the majority of the LAA is likely not contributing to viable habitat or habitat connectivity for caribou. Suitable caribou habitat is well-distributed in the RAA, with high-quality alpine and subalpine habitat in the north of the RAA and patches of lowland along the Pelly River valley.[692]

[689] YOR 2019-0149-9779
[690] YOR 2019-0149-7410
[691] MacNearney, Nobert and Finnegan, "Woodland Caribou (Rangifer Tarandus) Avoid Wellsite Activity During Winter," *Global Ecology and Conservation* 29, (2021), doi: https://doi.org/10.1016/j.gecco.2021.e01737.
[692] YOR 2019-0149-7410

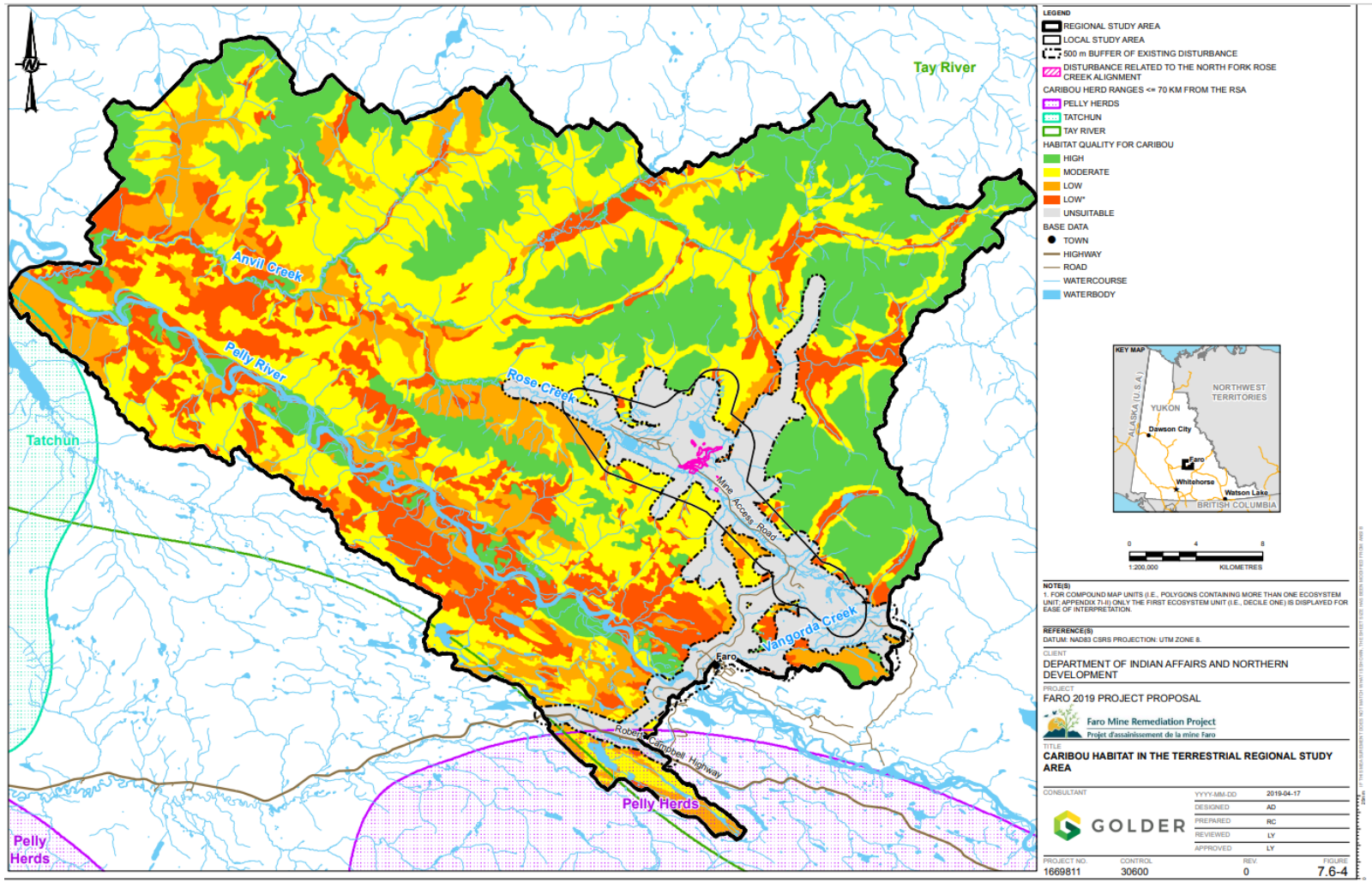

Figure 12: Caribou Habitat Suitability within the RAA[693]

[693] YOR 2019-0149-7410

17.4 Project Effects Characterization

17.4.1 Project Effect: Disturbance or displacement of caribou due to sensory disturbance

Project activities such as earthworks and general use of the area may result in the alteration of movement, behaviour, and physiological stress responses due to sensory disturbance. Anthropogenic activities during active remediation will likely result in 80.1 % of the LAA being functionally unavailable to woodland caribou due to avoidance.[694] This represents a very large proportion of the LAA and leaves very little room for caribou to fulfill their biological needs. The LAA already has limited viable habitat remaining and even more of it (nearly all) will be impacted during active remediation. The RAA is less impacted as it represents a larger area of undisturbed habitat.

Knowing that caribou are very susceptible to anthropogenic disturbance, including habitat loss and noise, disturbance from fixed-wing and rotary aircrafts should be reduced to the minimum. The Proponent already committed to avoid flying in known caribou calving areas and fly > 300 m above ground level at all times of the year and > 600 m during sensitive times of the year for ungulates, amongst other mitigations related to the use of fixed-wing and rotary aircrafts.[695] The EC acknowledges that it might not be always possible because of emergency or safety reasons but expects the Proponent to apply the proposed mitigations whenever possible. Lastly, disturbance from blasting and even collisions with fly rock from blasting have the potential to occur during remediation activities. Mitigation presented in section 15 addresses potential effects from blasting for all large animals, including caribou.

RRDC raised in their comments the disappearance of the Anvil and South Fork Range herd from the area surrounding the Faro Mine. The exact timing of its disappearance is unknown, but the group was said to be abundant prior to mine development.[696] This example shows that caribou are indeed sensitive to anthropogenic activities and may not return when anthropogenic disturbance decreases (i.e., following the end of mine operation in 1998). RRDC asserted that they should therefore be even more protected from any type of sensory disturbance and mentioned that “The timing of the disturbance may be more important than a protected buffer, in some situations”.[697] However, the EC is unable to propose mitigation related to a sensitive or critical period for caribou, because the project area represents an annual range for TRH.

Based on the information submitted by YG, the TRH may be self-sustaining, but population trends for the Pelly Herd is unknown. The EC understands that efforts are currently conducted to better characterize population status and to understand distribution, wildlife key areas and surface disturbances for the TRH. The data available is dated and the more recent preliminary data available does not provide firm conclusions. According to documentation submitted and provided by the Proponent, caribou populations in the Faro area may not be self-sustaining.[698]

[694] YOR 2019-0149-7410
[695] YOR 2019-0149-9964
[696] YOR 2019-0149-0555
[697] YOR 2019-0149-0555, p.45
[698] YOR 2019-0149-7410

The EC applies a precautionary approach in assessing project effects to caribou due to the overall status of Woodland caribou in the Yukon and in the context of limited data at the project location.

17.4.1.1 Significance Determination

The EC determines that the Project is likely to result in significant adverse effects to caribou as a result of sensory disturbances. Effects to caribou from sensory disturbance are likely because of the use of explosives, aircraft, and other heavy equipment on-site. As recent history has shown, effects from disturbance are adverse because they can lead to the disappearance of caribou in the area subject to disturbance. Effects are significant as they may not be reversible based on the status of the Northern Mountain population of woodland caribou in the Yukon, identified as vulnerable by the NatureServe conservation status and as a species of special concern in SARA. It is also well-known that the highly sensitive species is affected by anthropogenic activities. Further mitigation is proposed by the EC to ensure that appropriate measures are taken when caribou are observed on-site. The Proponent will avoid contact with wildlife, avoid flying over key areas during sensitive times of the year for ungulates, and survey the area before blasting. However, caribou will require additional management in case of interaction because of their high sensitivity.

The magnitude of effects to caribou from sensory disturbance is such that the following mitigation applicable year-round is proposed:

11. The Proponent, in collaboration with affected First Nations, the Government of Yukon and the Yukon Fish and Wildlife Management Board, shall develop a plan to address management of caribou. The plan shall include how operations on-site will be conducted when caribou are observed within the Faro Mine site maximum disturbance footprint (i.e. timing of high disturbance activities).

17.4.2 Project Effect: Caribou habitat loss, fragmentation, and degradation from earthworks

Project activities may result in habitat loss, fragmentation, and degradation by altering the final topography, soil condition, or plant species composition, or result in direct removal of soil or vegetation. These effects could alter the types of ecosystems that can be reclaimed on the landscape and could adversely affect wildlife habitat availability and distribution.

These activities include:

- Construction of clean water diversions
- Cover construction, landscaping, and revegetation activities
- Relocating waste rock and tailings
- Land-clearing and grubbing
- Construction of clean water diversions, site infrastructure, and facilities
- Development and use of borrow areas
- Upgrading and construction of new access roads and watercourse crossings
- Decommissioning and removal of mine infrastructure

- Operations and maintenance phase activities to ensure integrity of mine infrastructure

Habitat loss is expected to exacerbate impacts to caribou, who may experience a more dramatic reduction in their home range due to avoidance of disturbed areas and anthropogenic activities. This reduction in their home range may result in restricted movements and reduce access to required resources. They may also be forced into less suitable habitat and be more easily detected by predators. This loss and avoidance are expected to be most severe during active remediation, because caribou are more sensitive to anthropogenic activities than infrastructure.[699]

As mentioned above, only the annual range of the TRH overlaps the project LAA, with no other specific area characterized as WKA. Overall, the RAA represents suitable habitat (27.4 % high, 33.6 % moderate, 28.7 % low) for caribou, with three different caribou herds using the alpine in the summer and fall months. RRDC mentioned that an additional herd that used to winter along Tenas Creek disappeared after the Faro Mine discovery.[700]

- Overall loss of approximately 11.2 % of suitable habitat in the LAA (mostly moderate quality habitat) and 0.2 % of suitable habitat in the RAA will be due to earthworks activities during active remediation phase (i.e., development of new borrow areas and associated access roads, extending the toe of waste rock dump slopes).[701] Some habitat loss will be permanent and some will be temporary, as some sites will be reclaimed. However, even with reclamation, habitat will likely be permanently altered and potentially degraded (i.e., not back to pre-mine conditions). On the other hand, habitat availability for caribou during operations and maintenance is predicted to have a net increase of 101.4 ha, or 4.9 % of suitable habitat, relative to existing conditions in the LAA.[702]To limit habitat loss and render suitable habitat to caribou, and also to thinhorn sheep and grizzly bear, the Government of Yukon department of Environment recommended further mitigation related to remediation and reclamations efforts to ensure that “reclamation also focuses more closely on revegetation opportunities”[703]:Native seeding and planting shall be analogous and suitable to the adjacent vegetation and habitat type.
- Disturbed land shall be contoured to the pre-disturbance landform where possible.
- Coarse woody debris shall be used where possible and appropriate for adjacent habitat type.

While the use of native seeds and contouring is proposed by the Proponent, the use of coarse woody debris that “can assist with soil restoration by providing a nutrient source for soil development, and habitat for plants, animals and insects”[704] as indicated by the Government of

[699] MacNearney, Nobert and Finnegan, “Woodland Caribou (Rangifer Tarandus) Avoid Wellsite Activity During Winter.”, *Global Ecology and Conservation*, 29, 2021, e01737.
[700] YOR 2023-0149-0555
[701] YOR 2019-0149-7410
[702] Ibid.
[703] YOR 2019-0149-3285, p.41
[704] YOR 2019-0149-3285, p. 41

Yukon department of Environment, would further reduce potential effects to caribou from habitat loss.

Mitigations are in place to minimize impacts to terrain and soil, through the implementation of the revegetation plan, the Terrestrial Management and Effects Monitoring Plan, the Materials Management Plan, the Borrow Management Plan and the AMP; the use of previously disturbed areas to the extent practicable; sequencing remediation activities to limit the amount of new disturbance at any one time; designing roads to be the minimum possible width while accounting for safety regulations; reclaiming access roads once construction activities are complete and roads are no longer required; and spreading topsoil, grade, re-contour, and revegetate borrow areas with natural vegetation after use as soon as feasible. As previously discussed, the revegetation plan does not focus on specific species. The Biophysical Environment Effects Assessment mentions a net increase in suitable habitat for caribou during long-term operations and maintenance. However, the increase is due to the addition of low-quality caribou habitat and "unspecified area".[705] Reclamation will not generate highly suitable habitat during the long-term operations and maintenance phase. Due to the status of Northen Mountain Woodland caribou in the Yukon, the development of a habitat plan with objectives specific to caribou will help support the needs of the species in this uncertain context.

17.4.2.1 Significance Determination

The EC determines that the Project is likely to result in significant adverse effects to caribou as a result of habitat loss, fragmentation, and degradation from earthworks. Effects from habitat loss, fragmentation, and degradation from earthworks are likely and adverse. Even though habitat suitability in the project area will increase in the long-term, it is not said that suitable habitat represents pre-mine conditions and a diversified and effective ecosystem. Due to the status of woodland caribou in the Yukon, providing diverse suitable habitat in the long-term will be essential to avoid the disappearance of another caribou herd in the area after active remediation is over. The development of a habitat plan for caribou, as it has been recommended for moose in section 16, will support prosperity of caribou in the area. As such, the following mitigation is recommended:

12. The Proponent, in collaboration with affected First Nations, the Government of Yukon and the Yukon Fish and Wildlife Management Board, shall develop a habitat plan specific to caribou for the Faro Mine site maximum disturbance footprint. The habitat plan shall include:

    a. The creation of effective browse for moose
    b. Increases to percent cover and vigor of live seedlings
    c. Consideration of vegetation community composition and how vegetation density objectives can be met to support continued efforts to diversify, manage, and

[705] YOR 2019-0149-7410, p.346

support effective ecosystem restoration and the restoration of land use which supports First Nation values in relation to moose in the project area.

effective ecosystem restoration and the restoration of First Nation land use which supports First Nation values in relation to caribou in the project area.

17.4.3 Project Effect: Increase in injury or mortality for caribou

17.4.3.1 Increase in injury or mortality for caribou due to increased predation, collisions, and hunting pressure from linear development

Potential project effects include mortality/injury due to increased hunting pressure and predation or collisions from increased access with construction of new roads. Building and maintaining access roads to develop borrow sites for the Faro Creek diversion works, continued testing works, and maintenance are planned as part of the Project.

Collisions with vehicles and equipment travelling throughout the site, as well as to and from the site, may result in caribou mortality. Due to the nearly complete overlap between the TRH range and the RAA, injury or mortality from collisions may become more frequent with active remediation ramp-up, as more people are travelling in the area and equipment and vehicles on-site increases. However, mitigations are in place to reduce the risks of injury or mortality from collisions with vehicles, including:

- Advise staff, contractors, and visitors to take all reasonable precautions to avoid wildlife collisions
- Provide wildlife with the right of way
- Identify wildlife use areas and migration corridors/crossings along the road and provide appropriate signage in high wildlife use areas
- Maintain gaps in the banks to facilitate wildlife crossing and escape routes
- Stop and report/communicate when wildlife is observed on or adjacent to the road and allow animals to move away before continuing to drive
- Provide and maintain signage where wildlife encounters are most likely to occur
- Report any collisions observed along any access road immediately
- Adjust speed limit in accordance with conditions (e.g., wildlife use of road, road conditions, grade, weather, and loads on vehicle)[706]

Development of roads will only occur within the already disturbed site but will ease access to a larger area to the public and, potentially hunters, if the access is not controlled. However, changes to access from the Project are expected to be minor and local during the active remediation phase. No changes to access are expected during the operations and maintenance phase.

[706] YOR 2019-0149-7410, p.322

The EC predicts that predation by wolves related to the development of new roads will not increase because the area is pre-disturbed. Wolves may use linear development to move around more easily on the territory, but in the context of this heavily disturbed site, the addition of new roads is unlikely to change predation behaviour in the area.

17.4.3.1.1 Significance Determination

The EC determines that the Project is likely to result in significant adverse effects to caribou as a result of increased predation, collisions, and hunting pressure from linear development. Increase in injury or mortality is likely from development of new roads, or from entrapment (as previously discussed for moose in section 16). Effects are adverse because they can threaten caribou population in the project area. However, the mitigations proposed by the Proponent are sufficient to reduce, control, or eliminate significant adverse effects to caribou from linear development or entrapment.

18 THINHORN SHEEP

18.1 Overview

The EC determines that the Project is unlikely to result in significant adverse effects to thinhorn sheep. While effects are likely to occur, they are anticipated to be reversible in nature and to not affect the long-term viability of the species in the region.

18.1.1 Reason for Inclusion

Thinhorn sheep are an important species ecologically, culturally, and socio-economically in the Yukon and Canada. Thinhorn sheep are only found in northwestern Canada and Alaska, and the Yukon is where the most thinhorn sheep are found in Canada.[707] Thinhorn sheep were traditionally harvested by First Nations and are hunted by non-First Nations Yukon residents and non-residents.[708] Thinhorn sheep have a high cultural and economic value as a hunted species and for wildlife viewing, resulting in public demand for their conservation.[709] The Project overlaps with thinhorn sheep habitat of high, moderate, and low quality and an ungulate mineral lick is present in the northwest corner of the RAA. More than 50 thinhorn sheep WKAs overlap the project area, including winter ranges, lambing areas, and migration corridors.[710]

Fannin's sheep are a hybrid of Dall's and Stone's sheep and can be found in areas of the central Yukon, particularly in areas around the Town of Faro and the community of Ross River.[711] Fannin's sheep is a unique population of thinhorn sheep and will be referred to as thinhorn sheep in the subsequent text.

18.2 First Nations and Community Input

Comments specific to thinhorn sheep were submitted by LFN during the screening process. LFN requested the addition of the following term and condition because of the multiple WKAs in the project area and the presence of a unique population of thinhorn sheep:

> The Proponent shall provide more robust monitoring and mitigation measures for thinhorn sheep, including, among others, seasonal road measures, timing of high disturbance activities, alternate borrow pit locations (i.e. avoiding areas identified as Wildlife Key Areas based on western science and/or Kaska knowledge), and habitat offsetting.[712]

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[707] Government of Yukon, *Yukon Thinhorn Sheep Horn Growth, Genetics and Climate Change*, 2014, https://yukon.ca/sites/yukon.ca/files/env/env-yukon-thinhorn-sheep.pdf.
[708] Government of Yukon, *Thinhorn Sheep,* 2024, https://yukon.ca/en/outdoor-recreation-and-wildlife/yukon-wildlife/dalls-sheep.
[709] Government of Yukon, *Sheep Management Guidelines*, 1996, https://open.yukon.ca/sites/default/files/SheepManagementGuidelinesJuly1996.pdf.
[710] YOR 2019-0149-7410
[711] Government of Yukon, *Thinhorn Sheep.*
[712] YOR 2019-0149-5873, p.10

18.3 Existing Conditions

18.3.1 Biological Context

Thinhorn sheep show high levels of range fidelity and are more sensitive to range impacts than most other northern ungulates. Thinhorn sheep need rugged terrain for escape routes from predators and for secure spring lambing grounds. Mineral licks are critical for replenishing nutrients lost over winter.[713] They rely heavily on key habitats, typically on dry sides of specific mountain ranges.[714]

18.3.2 Population Status

The Yukon population of thinhorn sheep is estimated to be around 20 000 individuals. Their conservation status in the Yukon is 'Apparently Secure' (S4).[715] Between 2009 and 2013, 1 697 thinhorn sheep observations were recorded in the Incidental Wildlife Log within the LAA.[716] The project area density is unknown, but the density of thinhorn sheep in the Yukon is between two sheep/100 km^2 to 30 sheep/km^2.[717]

18.3.3 Harvest

Harvest management is specific to a GMS or group of GMSs (Figure 13). Harvest is managed by lottery and limited to one full-curl ram.[718] Male sheep with horns less than full curl and all female sheep are protected from hunting. A full-curl ram harvest rate of 4 % of the non-lamb population is considered sustainable for populations that have been surveyed. For populations with no or outdated survey information, recommendations on sustainable harvest rate are based on a number of indicators used to assess risk.[719] Harvest data provided by the Government of Yukon department of Environment from 2012 to 2022 shows that 59 sheep were harvested for GMS 4-41 to 4-47. The general trendline during this period shows that harvest levels are decreasing or stable.[720]

[713] Government of Yukon, *Science-Based Guidelines for Management of Thinhorn Sheep in Yukon*, 2019, https://yukon.ca/sites/yukon.ca/files/env/env-science-based-guidelines-management-thinhorn-sheep-yukon.pdf.
[714] YOR 2019-0149-7410
[715] Government of Yukon, *Thinhorn Sheep.*
[716] YOR 2019-0149-4148
[717] Government of Yukon, *Science-Based Guidelines for Management of Thinhorn Sheep in Yukon*.
[718] YOR 2019-0149-4148
[719] Government of Yukon, *Science-Based Guidelines for Management of Thinhorn Sheep in Yukon*.
[720] YOR 2019-0149-6111

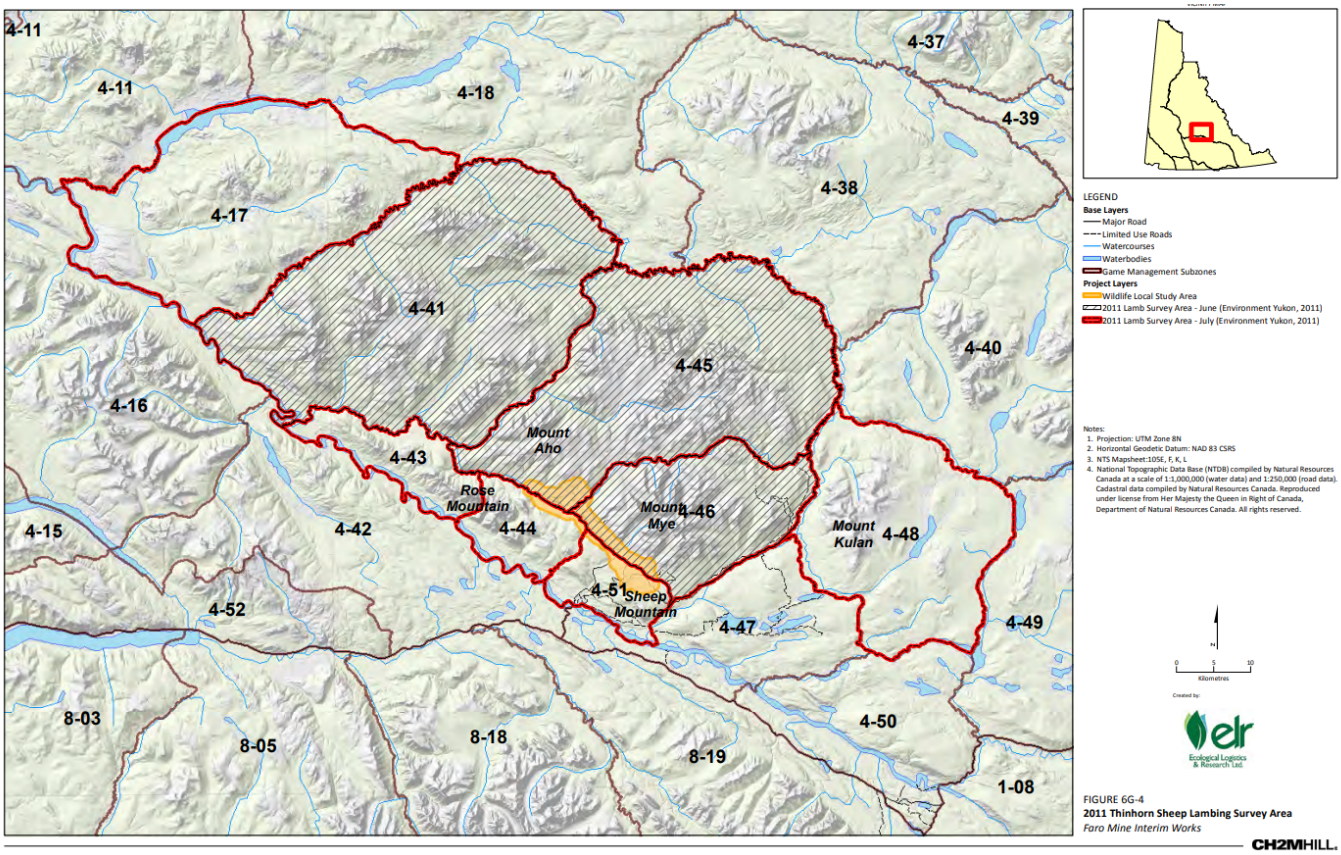

Figure 13: Lamb Survey Areas and Game Management Subzones[721]

18.3.4 Habitat

Habitat suitability maps were not prepared by the Proponent due to sheep reliance on key habitats that were not adequately reflected in LAA and RAA land cover mapping.[722] Thinhorn sheep rely heavily on key habitats, typically on dry sides of specific mountain ranges, and have high site fidelity. Assessment of habitat for thinhorn sheep focused on quantifying the approximate area of identified sheep WKAs in the LAA and RAA.[723]

[721] YOR 2019-0149-4148
[722] YOR 2019-0149-9779
[723] YOR 2019-0149-7410

WKAs within the LAA and RAA are visible in Figure 14. Migration corridor represents 9.4 % of the LAA, winter range represents 0.2 % of the LAA, and early winter breeding range, spring lambing range, and mineral lick range represent 0 % of the LAA. Migration corridor represents 1.3 % of the RAA, winter range represents 13.3 % of the RAA, early winter breeding range represents 2.7 % of the RAA, spring lambing range represents 3.7 % of the RAA, and mineral lick represents 4.8 % of the RAA. Thinhorn sheep WKAs are well-distributed within the RAA, while migration corridors and the southern tip of one winter range overlap the LAA in the Vangorda Plateau mine area.[724]

18.4 Project Effects Characterization

18.4.1 Project Effect: Thinhorn sheep habitat loss, degradation, or fragmentation from earthworks

Project activities (e.g., development of new borrow areas and associated access roads, extending the toe of waste rock dump slopes, relocating waste rock and tailings, land-clearing and grubbing, etc.) could result in loss, fragmentation, or degradation of habitat. Thinhorn sheep show high levels of range fidelity and are more sensitive than other northern ungulates to range impacts. They rely heavily on key habitats, typically on dry sides of specific mountain ranges,

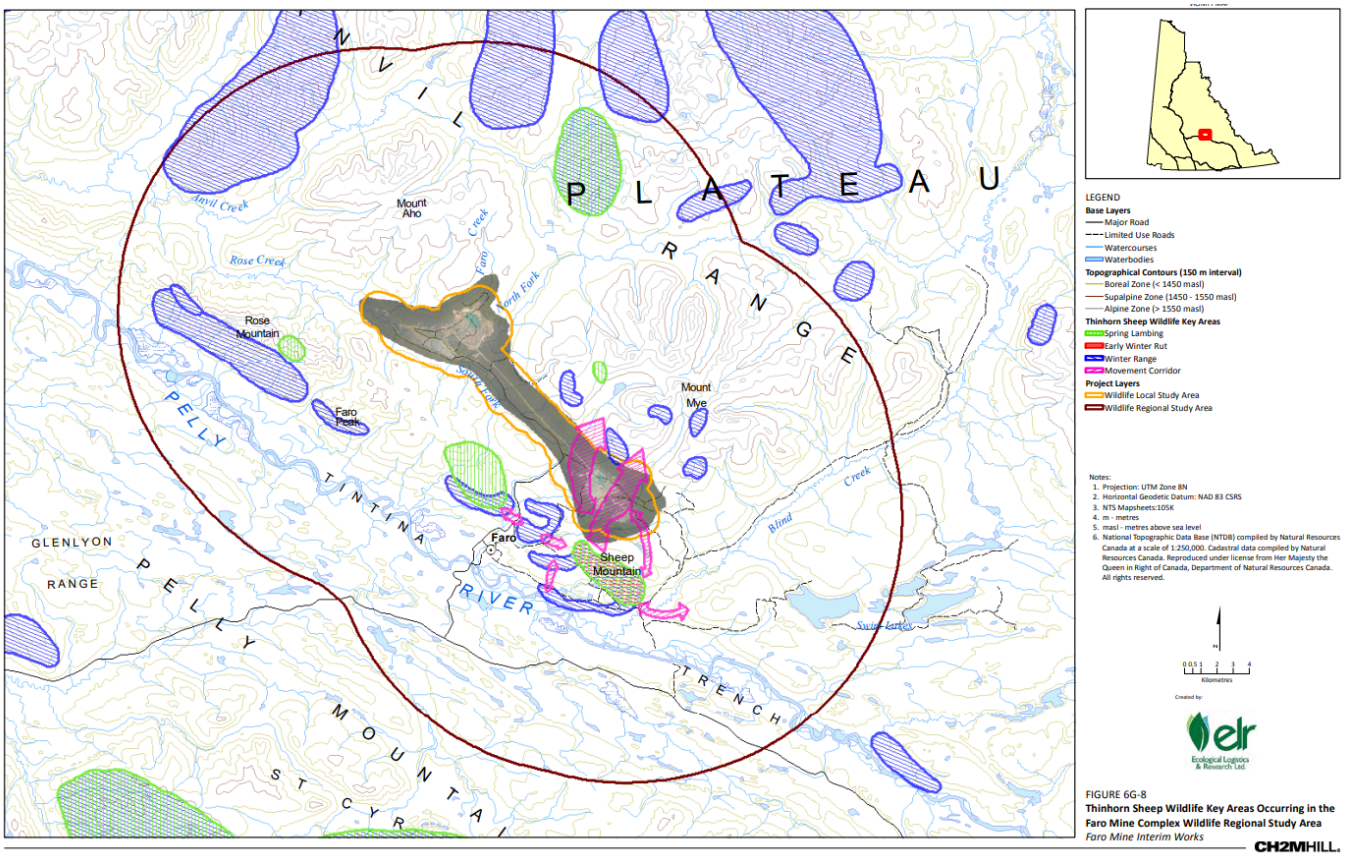

Figure 14: Thinhorn Sheep Wildlife Key Areas[725]

[724] YOR 2019-0149-7410
[725] YOR 2019-0149-7410

and need rugged terrain for escape routes from predators. Mineral licks are critical for replenishing nutrients lost over winter.[726]

Habitat loss of approximately 2.9 % of migration corridor in the LAA and 1.3 % of migration corridor in the RAA are expected due to earthworks activities during the active remediation phase (i.e., development of new borrow areas and associated access roads). None of the thinhorn sheep WKA will be affected during the active remediation phase other than the migration corridor due to disturbances in the Vangorda Plateau Mine area.[727] Unlike cervids assessed in Section 16 and Section 17, thinhorn sheep rely heavily on key habitats and have high site fidelity, making the characterization of suitable habitat throughout the RAA irrelevant for the species. Sheep are frequent in the area and have been observed and recorded but mostly on Mount Mye, Sheep Mountain and Rose Mountain[728] (visible on Figure 14), typical habitat characterized by dry sides of mountain ranges. The new borrow areas do not span the entire migration corridor, so sheep can continue to move between their winter and spring/summer ranges using the remaining portions of their migration corridors. Sheep have been observed in the Vangorda Plateau Mine area despite heavy disturbance from the mine and will likely continue to do so as the portion of their migration corridors that will be altered is minimal. No spring lambing ranges occur within 1.5 km of the MDF.[729]

18.4.1.1 Significance Determination

The EC determines that the Project is unlikely to result in significant adverse effects to thinhorn sheep from habitat loss. Thinhorn sheep populations and suitable habitat and WKAs are known within the RAA. Loss of suitable habitat may result in population decline or in sheep abandoning the area. However, effects from habitat loss are deemed limited due to the small geographic overlap with sheep migration and habitat. Project activities should not limit thinhorn sheep movement, or disturb or displace the population. As such, no additional mitigation is recommended.

18.4.2 Project effect: Thinhorn sheep injury, mortality, or health effects from increased collisions and hunting pressure from linear development

Although there is existing access to the area through the Faro Mine access road, new roads within the project area could increase the access to further hunting areas and increase hunting pressure. Hunting regulations restrict the harvest of sheep to a single full-curl ram and in most of the RAA. GMS harvest is managed by lottery. The general trendline during the 2012 to 2022 period shows that harvest levels are decreasing or stable.[730] Thinhorn sheep are not an endangered species in the Yukon and harvesting does not seem to threaten the population in the area.

[726] Government of Yukon, *Science-Based Guidelines for Management of Thinhorn Sheep in Yukon*.
[727] YOR 2019-0149-7410
[728] YOR 2019-0149-4148
[729] YOR 2019-0149-7410
[730] YOR 2019-0149-6111

Vehicle mortality has the potential to occur for all species, but thinhorn sheep are especially at risk because of their seasonal movement, which requires crossing the Faro Mine access road as mentioned by the Government of Yukon:

> Thinhorn sheep move to their rutting grounds on Sheep Mountain in the fall and remain there throughout the winter. In May, lambing also occurs in this area and in late spring, sheep depart Sheep Mountain and move to their summer range. Some of this movement occurs in an east-west direction from the front facing Anvil Range area (Rose Mountain), which requires crossing the Mine Access Road.[731]

The risk is anticipated to be reduced or controlled by way of proposed mitigations by the Proponent presented in section 15, including:

- Implement the Roads and Traffic Management Plan;
- Design above-ground pipeline water conveyance systems similar to existing pipelines (i.e., small to moderate diameter, directly along the ground, often through low points such as small ditches) such that the need for wildlife crossing structures will be limited;
- Maintain gaps in the banks to facilitate wildlife crossing and escape routes;
- Provide wildlife with the right of way;
- Identify wildlife use areas and migration corridors/crossings along the road and provide appropriate signage in high wildlife use areas;
- Stop and report/communicate when wildlife is observed on or adjacent to the road and allow animals to move away before continuing to drive;
- Provide and maintain signage where wildlife encounters are most likely to occur; and
- Implement speed limits of 50 km/h or less throughout the project footprint on roads controlled by the Proponent other than the haul road, which will have a speed limit of 70 km/h.

18.4.2.1 Significance Determination

The EC determines that the Project is unlikely to result in significant adverse effects to thinhorn sheep from increased collisions and hunting pressure from linear development. Thinhorn sheep populations and suitable habitat and WKAs are known within the RAA. Injury or mortality from linear development may result in population decline or in sheep abandoning the area. However, thinhorn sheep is not an endangered species in the Yukon or other jurisdictions, and the temporary effects to the species should not threaten the population in the long-term since sufficient mitigation is in place.

18.4.3 Project Effect: Disturbance or displacement of thinhorn sheep due to sensory disturbance

Thinhorn sheep have high site fidelity and are regularly observed in the area surrounding the Faro Mine. Sheep have been shown to become habituated and tolerant to industrial

[731] YOR 2019-0149-3285, p.40

disturbances.[732] Sheep are typically most sensitive to close, loud, or random disturbances and to those occurring above them or while they are resting. When sheep are disturbed, they may display agitated behaviour, such as stopping foraging, un-bedding, or fleeing. Sheep will typically respond to ground-based disturbances within 500 m. The Proponent will avoid flying directly toward, following, hovering over or circling wildlife, avoid flying in sheep country between 11 a.m. and 3 p.m. and avoid flying within 3.5 km of known sheep ranges.The Proponent will also maintain overflight altitudes of > 300 m above ground level at all times of the year and limit the number of flights and concentrate the flights into as short a time period as possible. [733] Sensory disturbance from aircraft is not expected to have significant effects if the distance and cruising altitude for project-related aircraft is sufficient.

18.4.3.1 Significance Determination

The EC determines that the Project is unlikely to result in significant adverse effects to thinhorn sheep from disturbance or displacement. Thinhorn sheep populations and suitable habitat and WKAs are known within the RAA. Increased disturbance may result in population decline or in sheep abandoning the area. However, sufficient mitigation is in place to reduce disturbance from flying in the project area.

[732] Government of Yukon, *Sheep Management Guidelines*, 1996, https://open.yukon.ca/sites/default/files/SheepManagementGuidelinesJuly1996.pdf.
[733] YOR 2019-0149-9964

19 GRIZZLY BEAR

19.1 Overview

The EC determines that the Project will not result in significant adverse effects to grizzly bear. Although impacts may occur to bears as a result of various project activities (outlined below), the effects are not significant based on the project design and proponent mitigations. As such, no additional terms or conditions are recommended.

19.1.1 Reason for Inclusion

Grizzly bears are an important species ecologically, culturally, and socio-economically in the Yukon and Canada. Grizzly bears are an umbrella species, whereby protecting grizzlies and their habitat results in all surrounding species receiving protection as well.[734] For this assessment, methods undertaken to avoid interactions with grizzly bears should also help avoid interactions with black bears. As such, a separate effects assessment for black bears was not undertaken.

Wildlife is important to RRDC members, and Elders have noticed significant changes in behaviour for several different species in the area since the Faro Mine began, including grizzly bears.[735] Grizzly bears are hunted throughout the Yukon for subsistence harvest, resident harvest, and non-resident harvest.[736] The Project overlaps with grizzly bear habitat of high, moderate, and low quality.

19.2 First Nation and Community Input

No specific comment on project effects to grizzly bears was submitted during the screening process.

19.3 Existing Conditions

19.3.1 Bear Management Units (BMU)

Four BMUs overlap the project RAA as shown in Figure 15: Anvil (6 % of the BMU is in the RAA), MacMillan (3 %), Glenlyon (2 %), and Pelly (1 %). The LAA is entirely within the MacMillan BMU, and the largest portion of the RAA is also in the MacMillan BMU with 47 %. The population and density estimated for the four BMUs are:[737]

- Anvil: 160 bears and 16.0 bears per 1 000 km^2

[734] Steenweg, et al., *Testing Umbrella Species and Food-web Properties of Large Carnivores in the Rocky Mountains,* 2023, https://www.sciencedirect.com/science/article/pii/S0006320722004414?via%3Dihub.
[735] YOR 2019-0149-0555
[736] Government of Yukon, *Review of Grizzly Bear Monitoring and Mortality Management in the Yukon*, n.d., https://yukon.ca/sites/yukon.ca/files/env/env-review-grizzly-bear-monitoring-mortality-management-yukon.pdf.
[737] Government of Yukon, *Review of Grizzly Bear Monitoring and Mortality Management in the Yukon*.

- MacMillan: 339 bears and 15.1 bears per 1 000 km^2
- Glenlyon: 162 bears and 16.0 bears per 1 000 km^2
- Pelly: 235 bears and 15.2 bears per 1 000 km^2

19.3.2 Population Status

The Yukon population of grizzly bears is estimated to be 6 000 to 7 000 individuals. The density within the Yukon Plateau-North ecoregion where the Faro Mine is located is estimated to 15.3 bears per 1 000 km^2.[738] Between 2009 and 2013, 60 grizzly bear observations were recorded in the project site Incidental Wildlife Log within the LAA. Updated information from 2014 to 2017 indicates an additional 87 grizzly bear sightings.[739]

Mortality includes resident and non-resident harvest, defense of life and property kills, special guided hunts, and other sources of mortality, such as vehicles and accidents. Between 1980 and 2016, 24 bears were confirmed killed due to vehicle collisions in the Yukon.[740]

The mortality rates of 2 % for females, 4 % for males, and 3 % of the total population are considered sustainable. Between 2012 and 2016, the five-year moving average[741] mortality for all bears was less than 4 % in 27 of 29 BMUs (Figure 15), including the four BMUs within the project area. During those same five years, average mortality has been 2 % or higher at least once for females in Glenlyon and Pelly BMUs, which is a cause for concern.[742] These BMUs only overlap the project RAA at 2 % and 1 %, respectively.[743] Mortality rate may be of concern, however the overlaps with the project are minimal.

Grizzly bears have a low reproduction rate. The species is sensitive to changes in the mortality of adult females because of that low reproduction rate. A population that is declining can be slow to recover. Grizzly bears are also sensitive to human disturbance and human-bear conflicts are more frequent in developed areas, which can lead to higher mortality risk.[744]

[738] Ibid.
[739] YOR 2019-0149-4148
[740] Government of Yukon, *Review of Grizzly Bear Monitoring and Mortality Management in the Yukon*.
[741] A moving average, is comparison to an average, is useful to forecast trends. “An average represents the middling value of a set of numbers. The moving average is exactly the same, but the average is calculated several times for several subsets of data.” (Moving Average: What it is and How to Calculate it - Statistics How To) A 5-year moving average uses 5-year subsets of data.
[742] Government of Yukon, *Review of Grizzly Bear Monitoring and Mortality Management in the Yukon*.
[743] YOR 2019-0149-7410
[744] Government of Yukon, *Review of Grizzly Bear Monitoring and Mortality Management in the Yukon*.

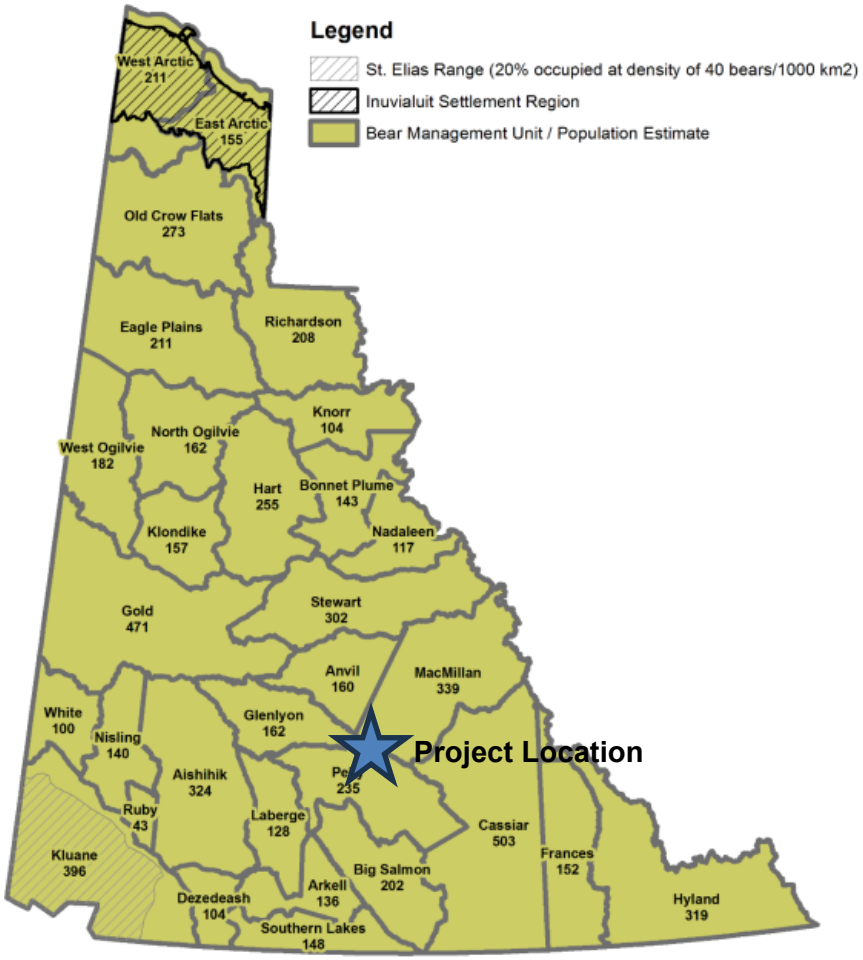

Figure 15: BMUs Overlapping the Project RAA[745]

19.3.3 Harvest

A hunting licence and seal are required to harvest grizzly bears. Subsistence harvest by First Nations hunters is thought to be low, although it is not mandatory to report.[746] Yukon residents are permitted to harvest one grizzly bear every three licence years and are encouraged (but not required) to only harvest males. All cubs and female grizzly bears with cubs are protected from hunting.[747]

Harvest data provided by the Government of Yukon department of Environment from 2012 to 2022 shows that 21 grizzlies were harvested for GMS 4-41 to 4-47. The general trendline during

[745] Government of Yukon, *Review of Grizzly Bear Monitoring and Mortality Management in the Yukon*.
[746] Ibid.
[747] Government of Yukon, *Yukon Hunting Regulations Summary 2023-2024*, 2023, 49, https://yukon.ca/sites/yukon.ca/files/env/env-yukon-hunting-regulations-summary_0_0.pdf; Government of Yukon, Review of Grizzly Bear Monitoring and Mortality Management in the Yukon, 25-28.

this period shows that harvest levels are stable.[748] The wildlife baseline report for the project proposal included bear harvest data from 2003 to 2012 for the GMS in the project area:

- 13 grizzly bears were harvested across GMS 4-41 to 4-47 and 4-51 during this time frame
- No grizzly bears were harvested in GMS 4-43 or 4-46
- GMS 4-45 had the highest number of grizzly bear harvests (n=4) during this time frame[749]

19.3.4 Habitat

Habitat suitability maps were prepared by the Proponent. Habitat suitability was determined based on the fact that grizzly bears prefer riparian and shrubby habitats and avoid wetlands and most anthropogenic land cover types.[750]

- LAA habitat suitability: high 12.3 %, moderate 67.0 %, low 0.8 %, and unsuitable 20.0%
- RAA habitat suitability: high 49.6 %, moderate 42.1 %, low 4.0 %, and unsuitable 4.3%[751]

Habitat is well-distributed throughout the LAA and RAA (Figure 16). In the summer and fall, when grizzly bears feed on salmon, they are mostly found in riparian areas near the Pelly River in the RAA and Blind Creek and Tay River near the RAA. Most of the RAA is well-connected with low linear disturbance in and near the Faro Mine site and Town of Faro despite existing disturbances.[752]

[748] YOR 2019-0149-6111
[749] YOR 2019-0149-4148
[750] YOR 2019-0149-9779, p.15
[751] YOR 2019-0149-7410
[752] YOR 2019-0149-7410

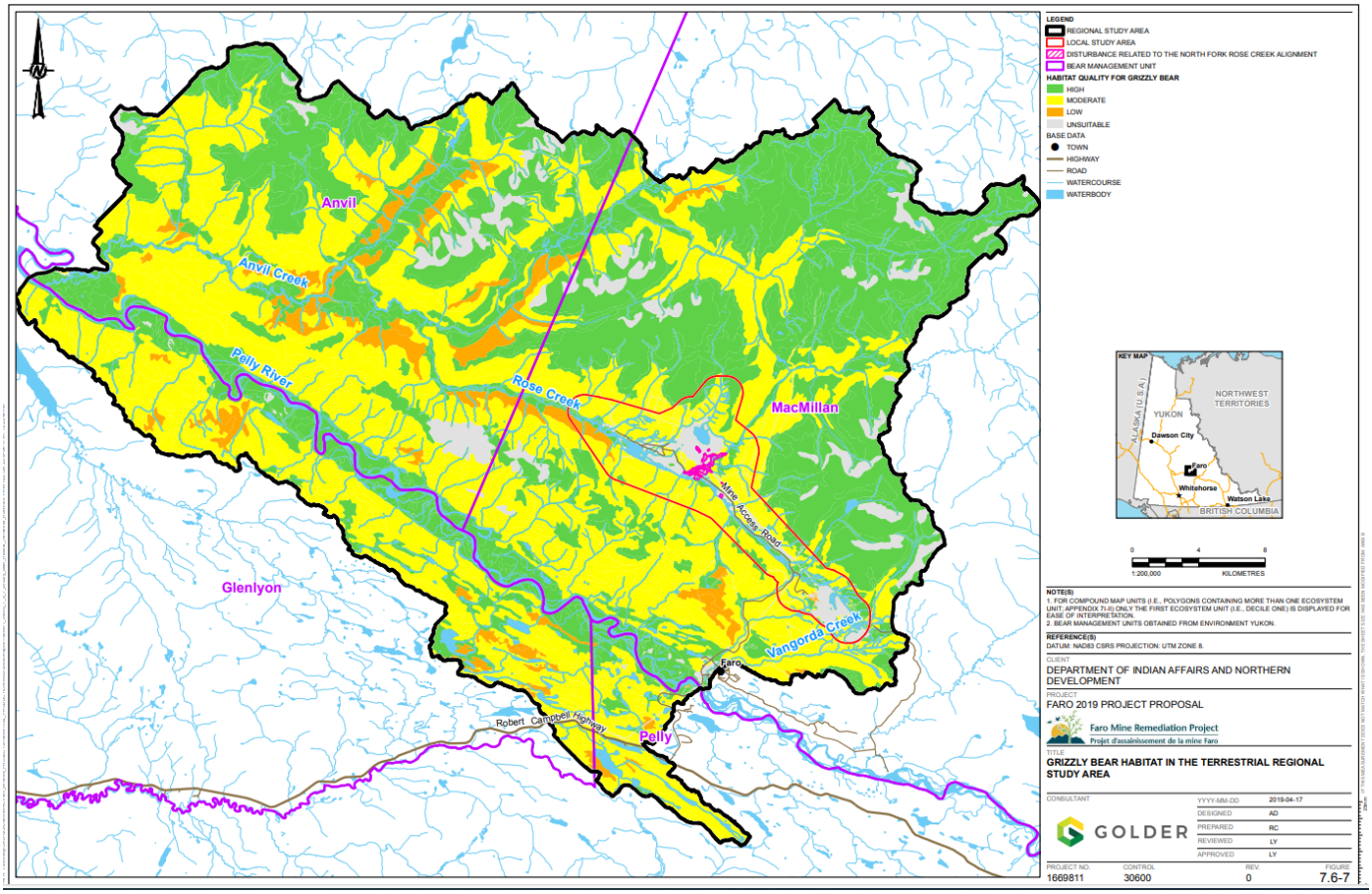

Figure 16: Habitat Suitability for Grizzly Bear within the LAA[753]

19.4 Project Effects Characterization

19.4.1 Project Effect: Grizzly bears' injury or mortality from increased human-bear conflicts

The Project will have stored food waste on-site, as well as grey water storage and petroleum products. The Proponent has identified, as mentioned above, a suite of standard mitigations and practices to be implemented to deter bears. Bears can be attracted to improperly processed or stored food waste, grey water, and petroleum products such as oils, fuels, and lubricants.[754] The presence of bears can lead to defense of life or property kills. Each year in the Yukon, between 30 and 40 black bears and 10 and 15 grizzly bears are killed through human-bear conflict, with an estimated 70% of incidents caused by poor management practices for waste and attractants.[755] In relation to the Project, concerns centre on bears (including grizzly and black

[753] YOR 2019-0149-7410
[754] Government of Yukon, *Proponent's Guide: Assessing and Mitigating the Risk of Human-Bear Encounters*, 2012, https://yukon.ca/sites/yukon.ca/files/env/env-proponents-guide-human-bear-encounters.pdf.
[755] Government of Yukon, *Guidelines for Industrial Activity in Bear Country*, 2008, https://www.bearsmart.com/docs/Guidelines_for_Industrial_Activity_in_Bear_Country.pdf.

bears) becoming attracted to waste or habituated to infrastructure and activities. This would increase the risk for human-bear conflict and bear mortality.

The Proponent's mitigation measures to limit injury or mortality of grizzly bears due to human-wildlife conflict from attractants on-site include safe storing and handling of waste (inside buildings), no-littering policy, and no harassing, feeding, or approaching wildlife.[756] These measures are sufficient to reduce significant adverse effects to bears from increased human-bear conflicts.

19.4.1.1 Significance Determination

The EC determines that the Project will not result in significant adverse effects to grizzly bears from increased human-bear conflicts. Bear mortality is adverse, as both species are valued within the cultural, ecological, and economic contexts of the Yukon. Mortality is particularly serious for grizzly bears given their listing as a species of special concern and the associated conservation imperative. Additionally, the presence of grizzly bears and humans on-site increases the risk of human-bear conflict. Factors that can contribute to mortality risks, such as attractants and human behaviour, are well-mitigated. Increased bear mortality (once proposed mitigations are implemented) is unlikely to occur at rates that threaten regional population stability. As such, no additional mitigations are recommended.

19.4.2 Project Effect: Increase in grizzly bear habitat loss, fragmentation, and degradation from earthworks

Operational activities such as drilling, blasting, and operating vehicles, including air traffic, may result in grizzly bear habitat loss, fragmentation, and degradation.

The above identified activities create a suite of sensory disturbances and may cause animals to avoid adjacent areas, resulting in functional habitat loss. Disturbance that results in den abandonment is harmful for sows and cubs, resulting in an increased risk of cub mortality. Particularly during the active remediation phase, human presence and disturbance may alter bears' natural movement patterns. Displacement can lead bears to occupy sub-optimal habitat and may compromise their over-wintering success.

Habitat loss during the active remediation phase will include low (65.6 %), moderate (11.2 %), and highly suitable habitat (14.5 %), for a total of 91.3 % within the LAA and significantly lower percentages within the RAA (1.8 %). Habitat loss will occur in proximity to unsuitable habitat as

[756] YOR 2019-0149-7410

shown in Figure 17, while highly suitable habitat will be available within the RAA during and after the active remediation phase.[757]

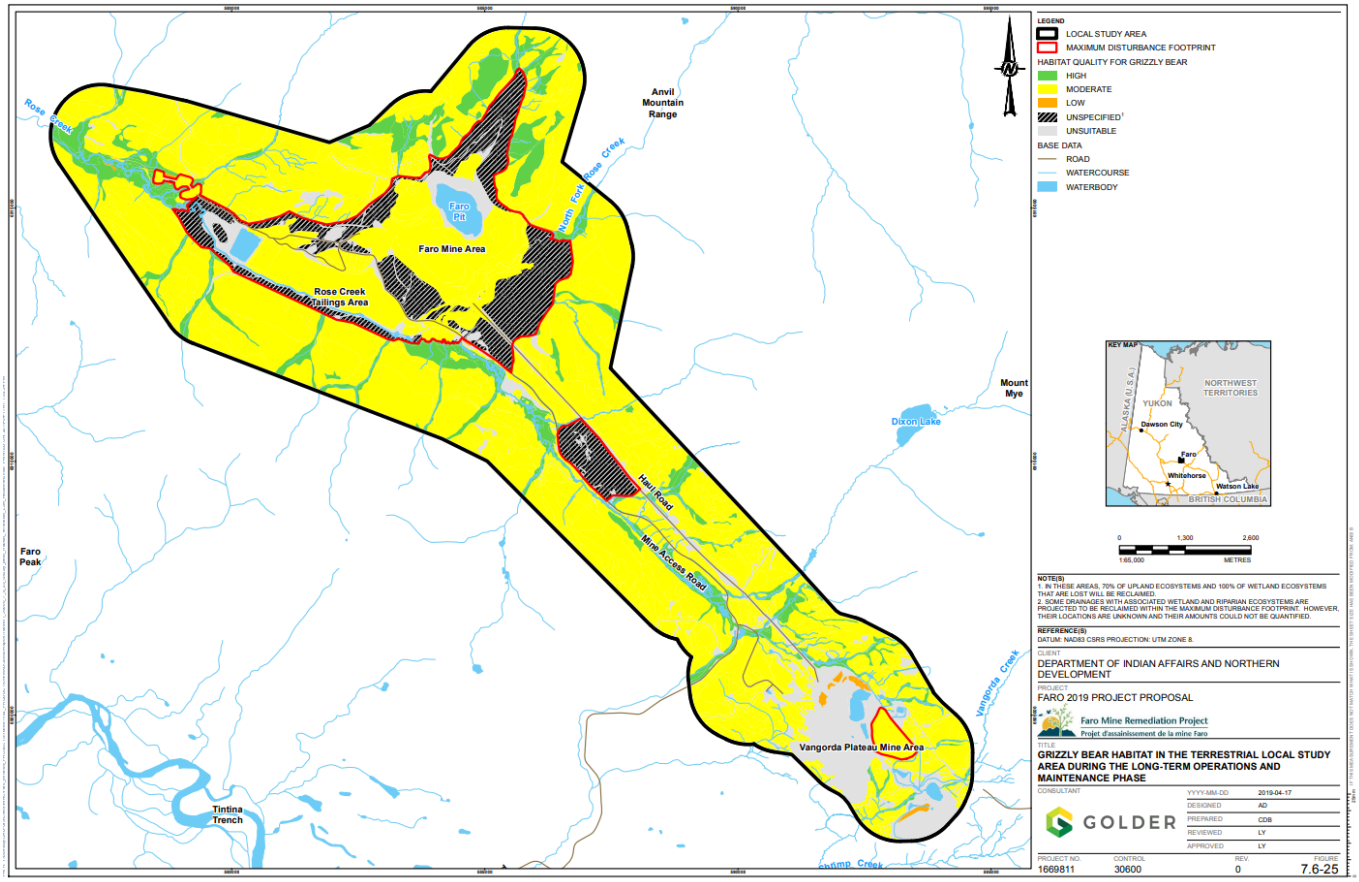

Figure 17: Measurable Change to Grizzly Bear Habitat within LAA[758]

19.4.2.1 Significance Determination

The EC determines that the Project will not result in significant adverse effects to grizzly bears from habitat loss, fragmentation, and degradation from earthworks. Effects are likely because habitat loss is expected to be more extensive during remediation activities. Functional habitat loss and potential alteration of movement between high-quality habitat areas are expected until completion of the remediation phase. Direct and functional habitat loss is adverse for bears because they require large home ranges. The direct effects of habitat loss and disturbance on individual animals include stress, reduced overwintering success, and potential higher mortality rates.[759] Effects are not significant, because the majority of habitat loss will occur in areas that are already disturbed by the Faro Mine and of low suitability for grizzly bears. As such, no additional mitigation is recommended.

[757] YOR 2019-0149-7410
[758] YOR 2019-0149-7410
[759] Government of Yukon, *Guidelines for Industrial Activity in Bear Country*, 2008, https://www.bearsmart.com/docs/Guidelines_for_Industrial_Activity_in_Bear_Country.pdf.

20 SMALL MAMMALS

20.1 Overview

The EC determines that the Project will not result in significant adverse effects to small mammals. Although impacts may occur to small mammals as result of habitat loss, harvest/predation, entrapment, or contamination, the effects are not significant based on the project design and proponent mitigations. As such, no additional terms or conditions are recommended.

20.1.1 Reason for Inclusion

Small mammals observed at the project site and in surrounding areas included red-backed vole, common shrew, heather vole, deer mouse, Siberian lemming, least chipmunk, American marten, Arctic ground squirrel, wolverine, ermine, weasel, mink, fisher, snowshoe hare, porcupine, grey wolf, coyote, red fox, lynx, and red squirrel.[760] It is not possible to assess every species separately. American marten and Arctic ground squirrel were identified as representative indicators for other small mammals, predators (e.g., lynx, wolverine, grizzly bear), raptors, or furbearers. Effects to semi-aquatic species like muskrat and beaver downstream of project location are encompassed in water and aquatic resources VESEC. Compared to other small mammals, the presence of American marten has been recorded in the LAA. Both American marten and Arctic ground squirrel have historically been a very important for First Nations who trap marten for their fur and squirrel for their meat.[761] Assessing these two small mammals was deemed sufficient to assess effects to other small mammals within the RAA.

American marten, also known as marten or pine marten, is an important species ecologically, culturally, and socio-economically in the Yukon and Canada. American marten is a representative indicator for the little brown bat, which rests in similar trees, as well as an umbrella-monitoring species for several other small mammals.[762] American marten skins were used to make fur robes in several different Indigenous communities[763] and are very important socio-economically to trappers and have valuable pelts.[764] The Project overlaps with American marten habitat of high, moderate, and low quality.

Arctic ground squirrel is an important species ecologically and culturally in the Yukon and Canada. Arctic ground squirrel is an indicator species as prey for raptors, furbearers, and other top predators such as lynx.[765] Arctic ground squirrel being prey is indicative of the presence of

[760] YOR 2019-0149-4148
[761] YOR 2019-0149-7410
[762] YOR 2019-0149-0822; University of Maine, *Understanding the American marten could aid conservation, but habitat loss threatens its existence*.
[763] Government of Yukon*, American Marten*, 2024, https://yukon.ca/en/outdoor-recreation-and-wildlife/yukon-wildlife/american-marten.
[764] Government of Yukon, *American Marten.*
[765] YOR 2019-0149-0822

predators and, therefore, of the ecosystem health. Arctic ground squirrels were traditionally harvested by First Nations communities for their pelts and meat.[766] The Project overlaps with Arctic ground squirrel habitat of moderate and low quality.

20.2 First Nation and Community Input

20.2.1 Liard First Nation

LFN recommended that the assessment of impacts to furbearers goes beyond marten and squirrel. LFN wants to see a high degree of clarity related to the extent to which the Project seeks to re-establish intact ecosystems necessary to support the Kaska exercise of Aboriginal rights.[767]In their comment submission on the DSR, LFN requested the addition of the following term and condition to mitigate the loss of high-quality habitat for small mammals: “The Proponent, in collaboration with affected First Nations and the Government of Yukon, will develop an offsetting plan for the removal of 530 ha of mature/old-growth forest.”[768]

20.3 Existing Conditions

20.3.1 American Marten

The Yukon population of American marten is unknown. Between 2009 and 2013, five marten observations were recorded within the LAA in the Incidental Wildlife Log. They were the most detected mustelid (a family of carnivorous mammals, including weasels, badgers, otters, and wolverines) in the 2012 winter tracking survey, with 60 observations. The overall track density is of 0.77 tracks/kilometre/day (TKD) within the LAA.[769]

Harvest data on American marten is not available. The Project is in one registered trapping concession, # 405. This concession is collectively managed by RRDC and is known as “Ross River group trap line.” Together with the smaller concession # 415, the concessions cover the area of 35 380 km². This trapline is of great cultural importance to RRDC. The Project is also located in outfitting concession 9 and is adjacent to concessions 8, 14, and 15.[770]

American marten is strongly associated with coniferous forests with high structural complexity, abundant woody coarse debris, and a well-developed understory.[771] A habitat suitability map for American marten was prepared by the Proponent and is visible in Figure 18. Habitat suitability characterization assumes that American marten prefer late seral coniferous or mixed forests,

[766] Government of Yukon, *Arctic Ground Squirrel*. 2024, https://yukon.ca/en/outdoor-recreation-and-wildlife/yukon-wildlife/arctic-ground-squirrel.
[767] YOR 2019-0149-7999
[768] YOR 2019-0149-8575
[769] YOR 2019-0149-4148
[770] YOR 2019-0149-5821
[771] Payer and Harrison, “Influence of Forest Structure on Habitat Use by American Marten in an Industrial Forest,” *Forest Ecology and Management* 179 no 1-3 (July 2003): 145-156.

and that they avoid wetlands and anthropogenic land cover types.[772] Habitat suitability is characterized as follows:

- LAA habitat suitability: 45.8% high, 0% moderate, 30.3% low, and 23.9% unsuitable
- RAA habitat suitability: 33.2% high, 0.2% moderate, 59.9% low, and 6.7% unsuitable[773]

Low- and high-quality habitat is well-distributed and interspersed throughout the RAA. Existing disturbance in the RAA may be affecting connectivity in and near the Project and the Town of Faro, because marten appear to avoid roads and abundance has been shown to decline as road density increases. High-quality habitat is well-distributed throughout the LAA.[774]

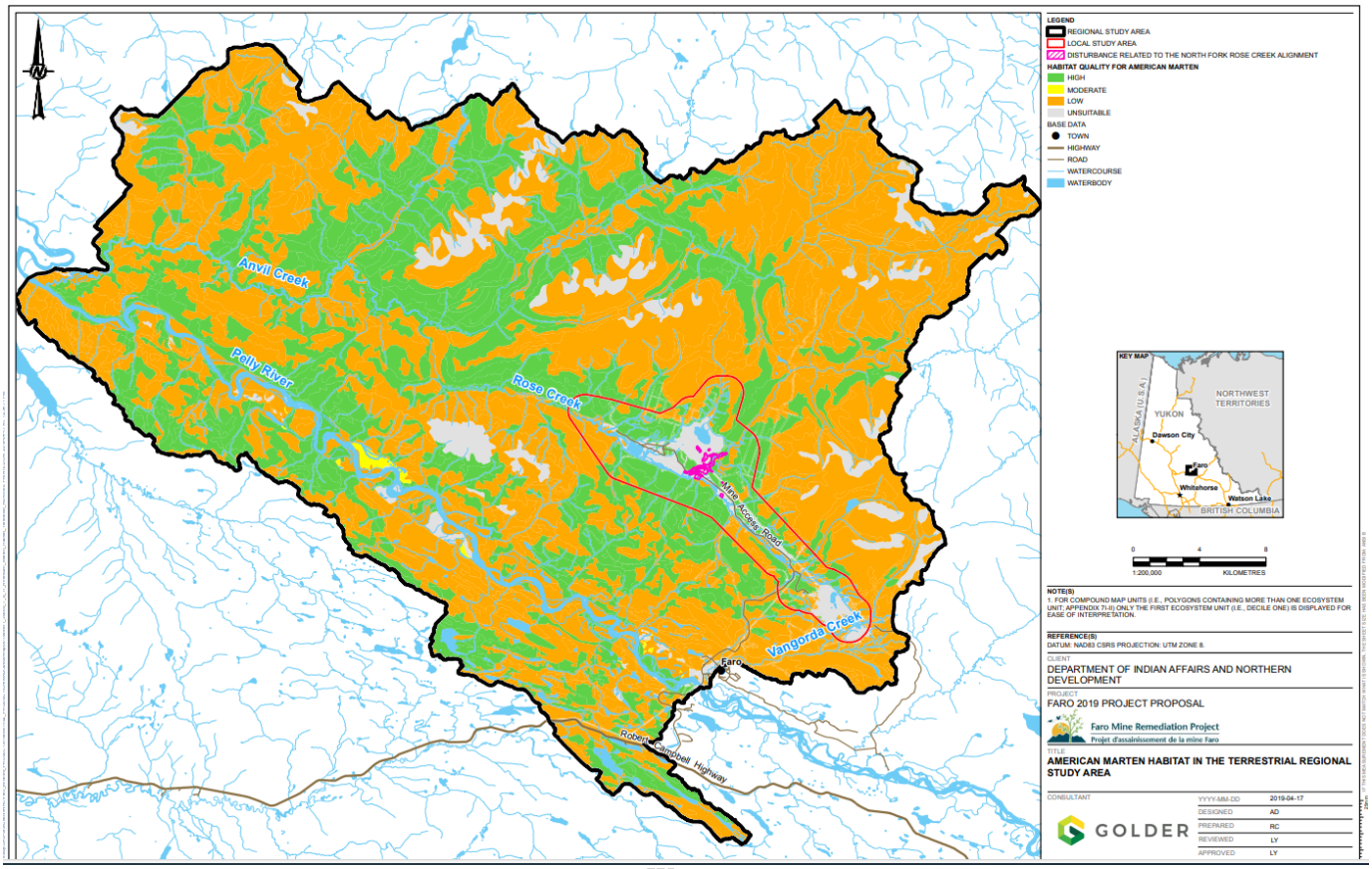

Figure 18: Habitat Suitability for American Marten[775]

[772] YOR 2019-0149-9779
[773] YOR 2019-0149-7410
[774] YOR 2019-0149-7410
[775] YOR 2019-0149-7410

20.3.2 Arctic Ground Squirrel

Arctic ground squirrel typically constructs burrows in meadows and other open habitats, although they are known to use boreal forests. Burrows are used for escaping from predators, as a den for expecting mothers, and as a winter refuge.[776]

Data on Arctic ground squirrels is limited. The Yukon population is unknown. There were no LAA observations made in Incidental Wildlife Logs between 2009 and 2017 as squirrels are not typically reported or tracked. However, in the summer of 2018, Arctic ground squirrels were observed within the LAA.[777] The density of the population in the project area is unknown. Data on harvest of Arctic ground squirrels is not available. As mentioned above, the project location overlaps with trapping concession # 405.

A habitat suitability map for Arctic ground squirrel was prepared by the Proponent. Habitat suitability was based on the assumption that squirrels prefer open, grassy habitats (structural stage 2) and drier habitats (upland ecosystems) and avoid wetlands.[778] The details on habitat suitability are visible in Figure 19 and are quantified as follows:

- LAA habitat suitability: < 0.1 % high, 0.3 % moderate, 53.5 % low, and 46.3 % unsuitable
- RAA habitat suitability: 0 % high, 17.9 % moderate, 53.3 % low, and 28.8 % unsuitable[779]

Low-quality habitat dominates in both the LAA and RAA. Existing disturbance in the RAA may be contributing to connectivity for Arctic ground squirrels, because they burrow in loosened ground and have indeed been observed near the haul road.[780]

[776] Donker and Krebs, “Habitat-specific Distribution and Abundance of Arctic Ground Squirrels (Urocitellus Parryii Plesius) in Southwest Yukon,” *Canadian Journal of Zoology* 89, (2011): 571.
[777] YOR 2019-0149-7410
[778] YOR 2019-0149-9779
[779] YOR 2019-0149-7410
[780] YOR 2019-0149-7410

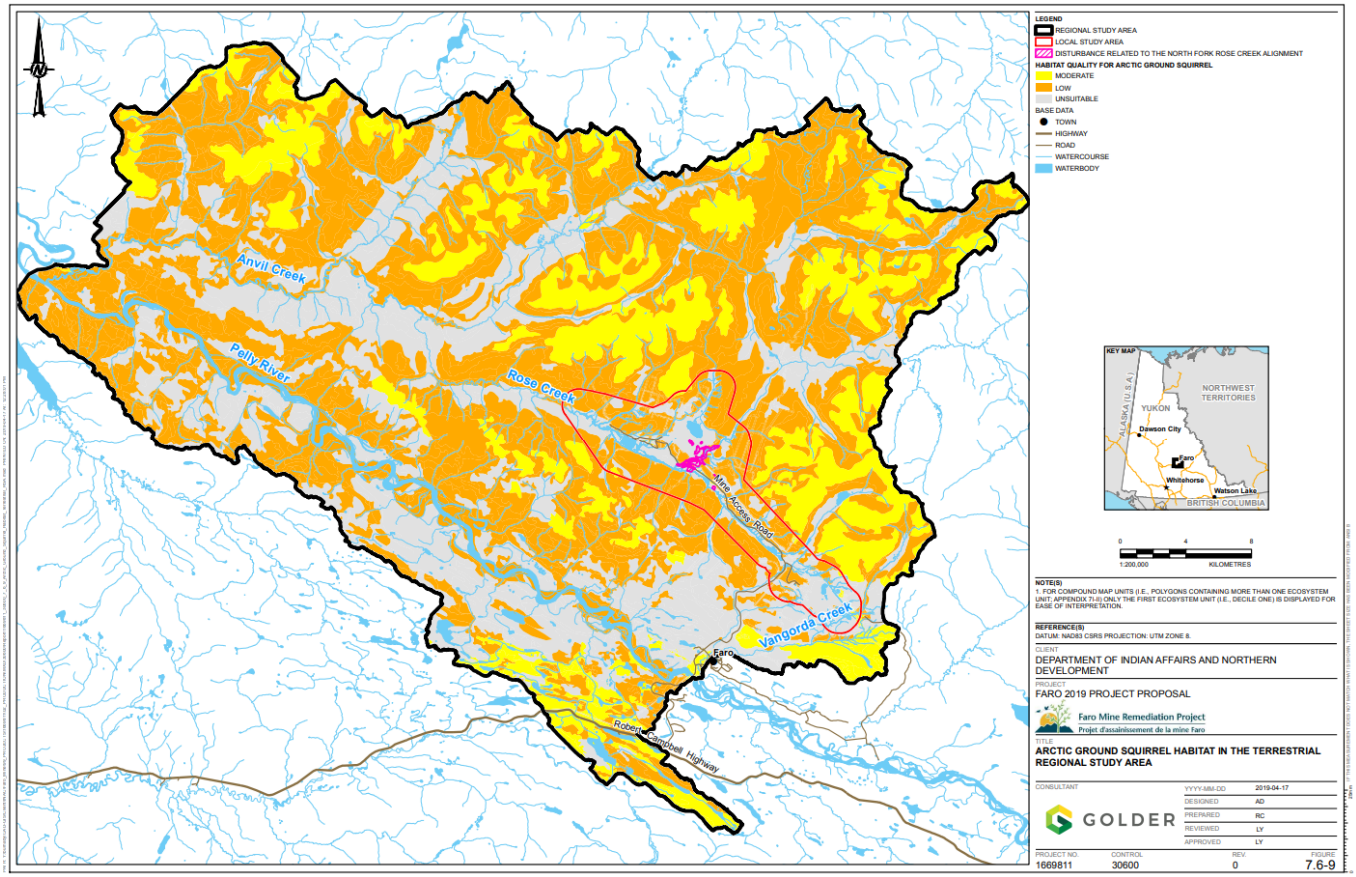

Figure 19*: Habitat Suitability for Arctic Ground Squirrel*[781]

20.4 Project Effects Characterization

20.4.1 Project Effect: American marten and Arctic ground squirrel habitat loss, fragmentation, or degradation.

20.4.1.1 American Marten

RRDC noted that habitat destruction and displacement of animals, combined with excessive harvest, resulted in the declines of most fish and wildlife species in the area. According to Elders, groundhogs (marmots), gophers, marten, fox, lynx, wolf, and wolverine populations have declined.[782]

An overall loss of approximately 22.2 % of suitable habitat in the LAA and 1.4 % of suitable habitat in the RAA due to earthworks activities during the active remediation phase (i.e., development of new borrow areas and associated access roads, extending the toe of waste

[781] YOR 2019-0149-7410
[782] Weinstein, *The Ross River Dena: A Yukon Aboriginal Economy*, 30-31; YOR 2019-0149-0555 p. 15-21; Weinstein*, Just Like People Get Lost: A Retrospective Assessment of the Impacts of the Faro Mining Development on the Land Use of the Ross River Indian People*, 71-76.

rock dump slopes) is predicted.[783] Some habitat loss will be permanent and some will be temporary, as some sites will be reclaimed.

Habitat availability for marten during operations and maintenance is predicted to have a net increase of 41.8 % in low-quality suitable habitat relative to existing conditions. An area of 530 ha of mature and old-growth forest of high-quality habitat will be removed and cannot be replaced for 100 years or longer. When compared to Figure 18 above, Figure 20 shows that the net increase in low-quality habitat is located in the Faro Mine and Rose Creek tailings areas.

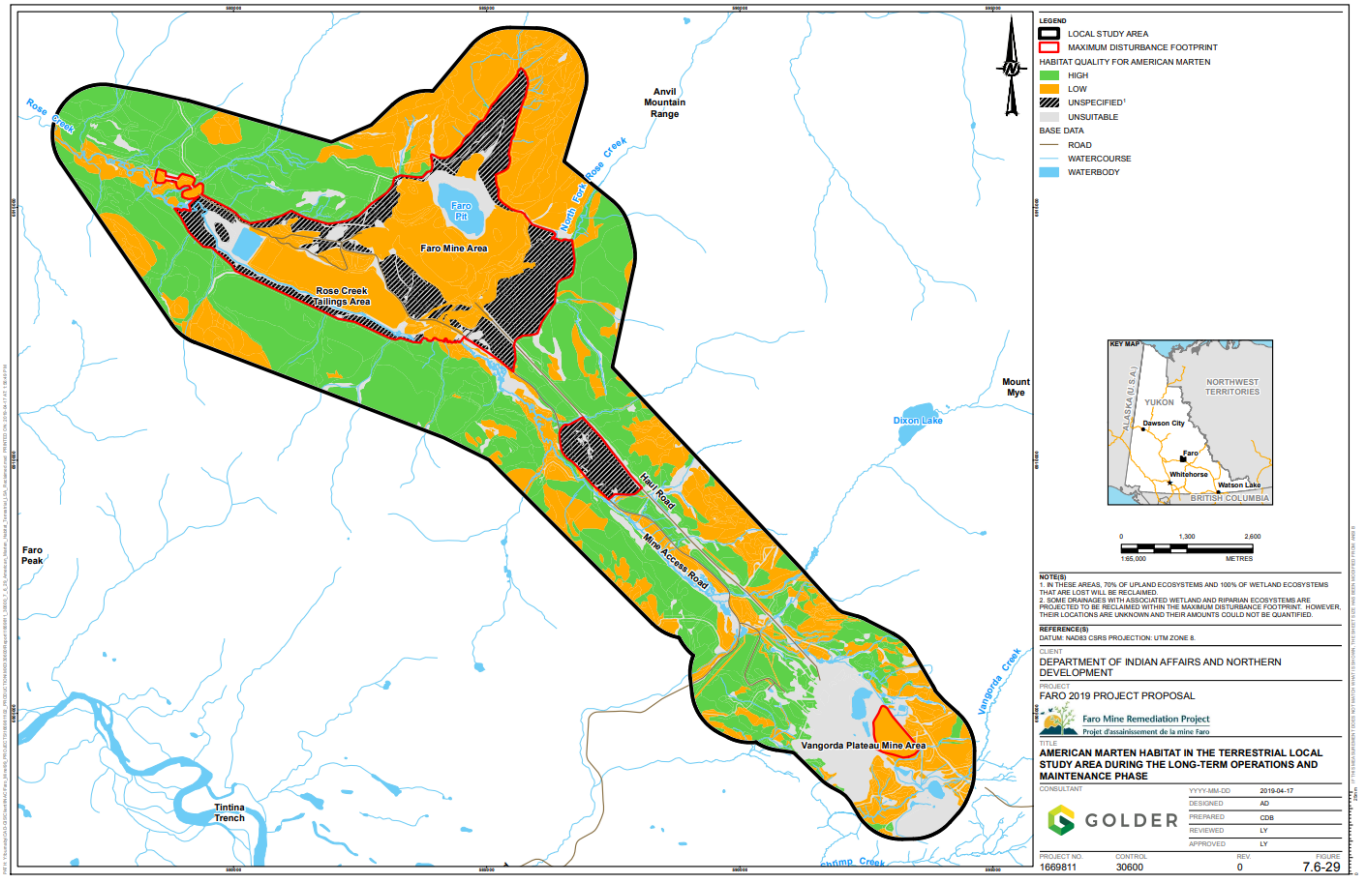

Figure 20: Habitat Quality for American Marten During the Operations and Maintenance Phase[784]

20.4.1.2 Arctic Ground Squirrel

An overall loss of approximately 11.5 % of suitable habitat in the LAA and 0.9 % of suitable habitat in the RAA due to earthworks activities during the active remediation phase (i.e., development of new borrow areas and associated access roads, extending the toe of waste rock dump slopes) is predicted. Some habitat loss will be permanent and some will be temporary, as some sites will be reclaimed. However, even with reclamation, habitat will likely be permanently altered and degraded.

[783] YOR 2019-0149-7410
[784] YOR 2019-0149-7410

There is no high-quality suitable habitat present for Arctic ground squirrels in the RAA. Only 0.2 ha of high-quality habitat for squirrels is present in the LAA, and it will not be directly affected by earthworks during active remediation. Suitable habitat for Arctic ground squirrels after active remediation is expected to have a net increase in the LAA of 44.8 %.[785] Similar to suitable habitat for American marten, the net increase in suitable habitat for Arctic ground squirrel is located in the Faro Mine and Rose Creek tailings areas, as shown in Figure 21.

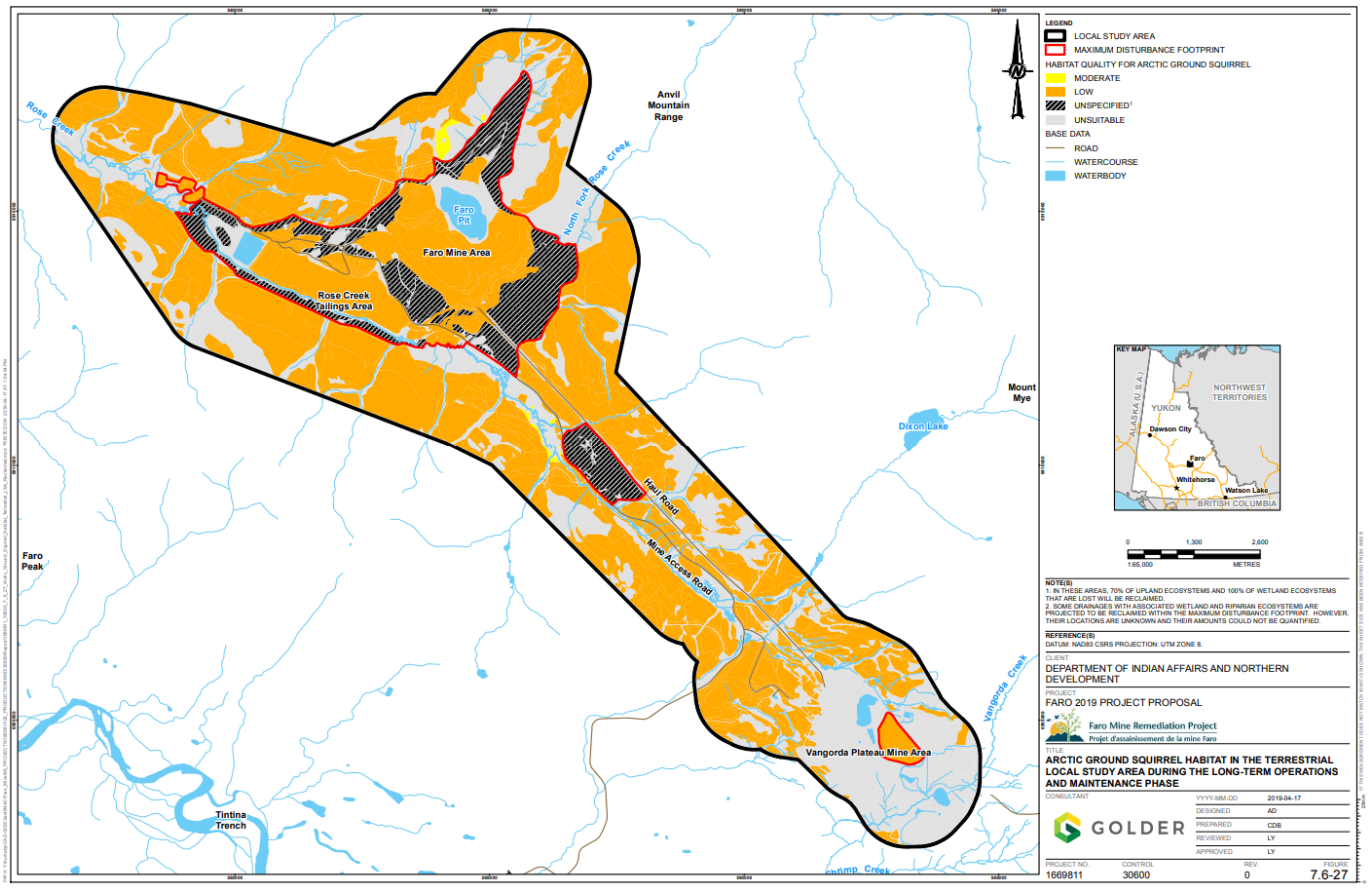

Figure 21: Habitat Quality for Arctic Ground Squirrel During the Operations and Maintenance Phase[786]

Reclamation efforts are expected to result in a net increase of suitable habitat after active remediation phase for moose and woodland caribou, as discussed in the previous sections, as well as for American marten and Arctic ground squirrel. American marten and Arctic ground squirrel will experience a net gain in available suitable habitat by the end of the 25-year assessment period. Mitigations also include reclaiming access roads once construction activities are complete and roads are no longer required for ongoing maintenance, coupled with revegetation using native or non-persistent non-native species. General progressive

[785] YOR 2019-0149-7410
[786] YOR 2019-0149-7410

revegetation across the site also helps to reduce the amount of impacted habitat at one time and therefore to allow for successional growth and suitable habitat establishment over a faster period of time.

20.4.1.3 Significance Determination

The EC determines that the Project will not result in significant adverse effects to small mammals from habitat loss. Increase in habitat loss, fragmentation, and degradation from earthworks is likely, because project activities will result in further habitat loss during the active remediation phase. However, at the end of the 25-year period, a net gain in available suitable habitat for both American marten and Arctic ground squirrel will be observed. Effects are adverse, especially for Arctic ground squirrel, because suitable habitat available is mostly of low quality within the RAA (< 0.1 % high, 0.3 % moderate, 53.5 % low) and the remediation phase will result in further loss of suitable habitat. However, effects are not significant because they are temporary and limited to the remediation phase, after which a net gain in available suitable habitat will be observed. A small portion of the site, specifically the Faro Mine and Rose Creek tailings areas, will be perpetually altered due to the permanence of that infrastructure. However, those structures occupy a relatively small area.

20.4.2 Project Effect: Increase in health effects, injury, or mortality for American marten and Arctic ground squirrel

Increase in health effects, injury, or mortality could occur during land-clearing due to low motility during denning, being trapped on roadways by snowbanks or above-ground pipelines, increasing risk of vehicle collisions and affecting habitat connectivity, or interaction or collision with, or entrapment in, permanent site infrastructure.

20.4.2.1 Increase in health effects from sensory disturbance

Alterations to movement, behaviour, and potential physiological stress response due to sensory disturbance from active remediation activities may occur. Sensory disturbance, coupled with habitat loss due to construction, may result in decreased habitat connectivity for American marten, who have been shown to avoid roads.[787]

Arctic ground squirrels seem relatively tolerant to noise and other anthropogenic disturbances, as they have been shown to occupy road verges and airport runway margins.[788] The Proponent has not committed but will try to “Avoid clearing mature forests and hollow wildlife trees from 11 March to 31 July to avoid destruction of active American marten natal and maternal dens.”[789]

[787] Robitaille and Aubry, “Occurrence and Activity of American Martens (Martes Americana) in Relation to Roads and Other Routes,” *Acta Theriologica* 45 no. 1 (2000) doi: 10.4098/AT.arch.00-15
[788] Werner, et al., “Arctic Ground Squirrel Population Collapse in the Boreal Forests of the Southern Yukon,” *Wildlife Research* 42 no. 2 (2015):176, doi: 10.1071/WR14240.
[789] YOR 2019-0149-7410, p.316

20.4.2.2 Increase in injury or mortality from increased harvest pressure

Mortality due to increased harvest pressures, resulting from the construction of new access roads, could potentially occur. Data on population or harvest is limited for both American marten and Arctic ground squirrel. However, based on the information available, it appears that the American marten population has been affected by habitat loss in the past rather than harvesting (trapping).[790] The Project is not likely to result in increased harvest or predation mortality for American marten or Arctic ground squirrel due to current wildlife regulations for their trapping. Except for First Nations members or citizens, trapping in the Yukon requires a valid concession, along with a valid annual trapping licence.[791] No information on active trapping from RRDC members in the group trapping concession # 405 is available. However, the concession will still be managed by RRDC and, thus, no changes in trapping are anticipated.

20.4.2.3 Increase in injury or mortality from entrapment

Entrapment in permanent site infrastructure is likely to occur. However, mitigations are in place to maintain habitat connectivity, such as gaps in banks at known and high-potential wildlife movement areas. During the operations and maintenance phase, most roads will likely only be maintained in the spring, summer, and fall months, while others are proposed to be decommissioned/left to naturally revegetate. Arctic ground squirrels, however, are not likely to experience entrapment from snowbanks on roadways due to hibernation during winter. The proponent mitigations to reduce potential injury or mortality due to interaction or collision with, or entrapment in, permanent site infrastructure are listed in section 15.

The Faro pit area will be monitored to assess and reduce risk from entrapment in the Faro pit for wildlife. Other mitigations proposed by the Proponent reduce the risk of injury or mortality due to interaction with, or entrapment in, water conveyance and storage systems as mentioned in section 15.

20.4.2.4 Increase in health effects due to contact with contaminated waste rock and tailings

Health, survival, and reproduction issues could increase due to the risk of coming into contact with contaminated waste rock and tailings via burrows, which can reach up to a maximum observed depth of 2 m.[792] Arctic ground squirrels may come into contact with contaminated waste rock and tailings where covers do not reach 2 m in depth. The HHERA performed by the Proponent included calculations for soil exposure concentrations at 1 m and 2 m depth, which used depth-weighted averages. The assessment found that risks for squirrels were low to negligible at all depths.[793]

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[790] Government of Yukon, *American Marten*.
[791] Government of Yukon*, Yukon Trapping Regulations Summary 2023-2024*.
[792] Van Vuren and Ordeñana, "Factors Influencing Burrow Length and Depth of Ground-dwelling Squirrels," *Journal of Mammalogy* 93 no. 5 (2012): 1240 -1246, doi: https://doi.org/10.1644/12-MAMM-A-049.1.
[793] YOR 2019-0149-7760

20.4.2.5 Significance Determination

The EC determines that the Project will not result in significant adverse effects to small mammals. Effects to health, injury, or mortality are likely to occur from disturbance, harvest, entrapment, and contact with contaminated waste rock and tailings. Effects are adverse because American marten and Arctic grounds squirrel are important species ecologically, culturally, and socio-economically in the Yukon and Canada. However, it was determined that effects from increased disturbance, harvest, or entrapment are not significant for either American marten or Arctic ground squirrel. Similarly, effects to health, survival, and reproduction issues from contaminants in nearby vegetation or soils are not significant due to mitigations in place by the Proponent, as well as calculated low to negligible risk from the HHERA for all species, including Arctic ground squirrel contact with waste rock and tailings due to burrows.

21 AVIAN WILDLIFE

21.1 Overview

The EC determines that the Project is likely to result in significant adverse effects to avian wildlife. Impacts may occur to avian wildlife as result of habitat loss, fragmentation, and degradation from earthworks, clearing during nesting, or ingestion of contaminants from surface water. The effects of ingestion of contaminants from surface water are significant, such that further mitigation is proposed.

21.1.1 Reason for Inclusion

Three different avian species were chosen for assessment due to their ecological importance in the Yukon and Canada: bank swallow, horned grebe, and olive-sided flycatcher.

Bank swallows are a representative indicator for aerial insectivores and wildlife that use riparian habitat.[794] The Project overlaps with avian habitat of high, moderate, and low quality; this includes habitat suitable for nesting for bank swallows. Suitable habitat for bank swallow nesting is distributed throughout the LAA and RAA.

Horned grebe is a representative indicator for waterfowl and other wildlife that use aquatic and wetland habitats. It is also representative of effects on beavers and muskrats.[795]

Olive-sided flycatchers are a representative indicator for aerial insectivores and songbirds that use coniferous forests, snags, forest edges, and openings near meadows and ponds.[796]

The Project is within Bird Conservation Region (BCR) 4, which is home to 211 regularly occurring species, 170 of which are protected by the MBCA.[797]

21.2 First Nation and Community Input

LFN mentioned in their comments on the PSOA the desire for waterfowl to be identified as a sub-component of the wildlife VESEC, stating that waterfowl are an important part of the traditional Kaska diet. LFN is seeking “a high degree of clarity about the extent to which the

[794] COSEWIC, *COSEWIC Assessment and Status Report on the Bank Swallow Riparia*, 2013, iv., https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/cosewic/sr_hirondelle_rivage_bank_swallow_1213_e.pdf.
[795] COSEWIC, *COSEWIC Assessment and Status Report on the Horned Grebe Podiceps Auritus Western Population Magdalen Islands Population in Canada*, 2009, iv-v, https://www.sararegistry.gc.ca/virtual_sara/files/cosewic/sr_horned_grebe_0809_e.pdf.
[796] Government of Canada, *Recovery Strategy for the Olive-sided Flycatcher (Contopus Cooperi) in Canada*, 2016, 2-7, https://www.sararegistry.gc.ca/virtual_sara/files/plans/rs_olive-sided%20flycatcher_e_final.pdf.
[797] Government of Canada, *Migratory Birds Regulations*, 2023, https://laws-lois.justice.gc.ca/eng/regulations/SOR-2022-105/index.html.

Project seeks to re-establish the intact ecosystems necessary to support Kaska exercises of Aboriginal rights."[798]

As mentioned above, the horned grebe that was chosen for assessment is a representative indicator for waterfowl and, therefore, fulfills LFN's request to integrate waterfowl as a sub-component of the wildlife VESEC.

In their comments on the DSR, LFN requested the involvement of Kaska Guardians in the determination of contaminant levels and potential effects to avian species.[799]

21.3 Existing Conditions

21.3.1 Bank swallow

21.3.1.1 Population status

Bank swallows are one of the most numerous birds encountered by river travelers. In Canada, its population has had a severe long-term decline of 98 % over the last 40 years.[800] Of all the species included in this assessment, bank swallow is the only one listed on Schedule I of *SARA* as threatened.[801]

21.3.1.2 Habitat

Habitat suitability maps were not prepared by the Proponent for bank swallow. Bank swallows require fine-scale habitat that is not captured in the mapping layer developed by the Proponent either for the LAA or RAA; instead "watercourse length and a qualitative approach were used to evaluate habitat suitability.[802]

Bank swallows migrate outside Canada over the winter. This is why habitat evaluation focused on nesting habitat within its breeding range. In natural habitats, most nesting colonies are found in meandering waterways with slow current and eroding streamside banks, or in artificial habitats such as sand and gravel quarries and road cuts. Bank swallows avoid dense forests because they do not represent suitable nesting sites.[803]

Within the RAA, low elevation in riparian areas, edges of large water bodies, and exposed soil in upland areas represent suitable nesting habitat. Within the LAA, cut banks are most likely to support nesting habitat and represent 5.2 ha (< 0.1 % of the LAA). According to the Proponent, water bodies within the LAA, such as ponds, are unlikely to provide suitable nesting habitat.[804]

[798] YOR 2019-0149-7999, p.3
[799] YOR 2019-0149-8575
[800] Government of Canada and Government of Yukon, *Yukon Species at Risk 2018*, 2018, 62, https://yukon.ca/sites/yukon.ca/files/env/env-yukon-species-risk.pdf.
[801] Government of Canada, *Species at Risk Act (S.C. 2002, c. 29),* 2002, https://laws.justice.gc.ca/eng/acts/s-15.3/
[802] YOR 2019-0149-9779, p.27
[803] YOR 2019-0149-9779
[804] YOR 2019-0149-7410

21.3.2 Horned grebe

21.3.2.1 Population Status

There is limited trend data for the Yukon, but horned grebes are relatively common to see on small lakes and wetlands in southern Yukon. They have suffered a 30 % decline across Canada between 1986 and 2006.[805]

21.3.2.2 Habitat

Habitat suitability maps were prepared by the Proponent. Habitat suitability focused on breeding habitat suitability since horned grebes migrate south for winter. Horned grebes usually choose semi-permanent and permanent freshwater ponds and shallow bays or open-water marshes for breeding habitat.[806] LAA vegetation associations were assigned habitat suitability categories, with “Pond” being high, “Wetland fen” being moderate, and all remaining vegetation associations and human disturbance areas classified as unsuitable. RAA vegetation associations were as follows: non-vegetated water as high, non-vegetated exposed land as moderate, vegetated and forested as moderate, vegetated non-forested in the wetland broad ecosystem group as moderate, and all remaining land cover types as unsuitable.[807]

- LAA habitat suitability: < 0.1 % high, 3.7 % moderate, 0 % low, and 96.2 % unsuitable
- RAA habitat suitability: 1.4 % high, 0.5 % moderate, 0 % low, and 98.1 % unsuitable[808]

In the existing conditions, suitable habitat for horned grebe is limited to discrete patches throughout the LAA and RAA. Within the RAA, suitable habitat is found near the Pelly River. Within the LAA, suitable habitat is limited to patches along South Fork Rose Creek and along smaller tributaries, as well as southeast of the Faro pit. Given the high mobility and naturally patchy distribution of the species, it is unlikely that existing disturbances represent movement barriers for horned grebes.[809]

Figure 22 shows the locations where waterfowl have been observed in the Faro Mine area and Vangorda/Grum area. Based on these observations, it is apparent that waterfowl have been using the Faro, Vangorda, and Grum pits, sheep pad pond, and the tailings area.

[805] Government of Canada and Government of Yukon, *Yukon Species at Risk 2018*, 76.
[806] YOR 2019-0149-9779
[807] YOR 2019-0149-9779
[808] YOR 2019-0149-7410
[809] YOR 2019-0149-7410

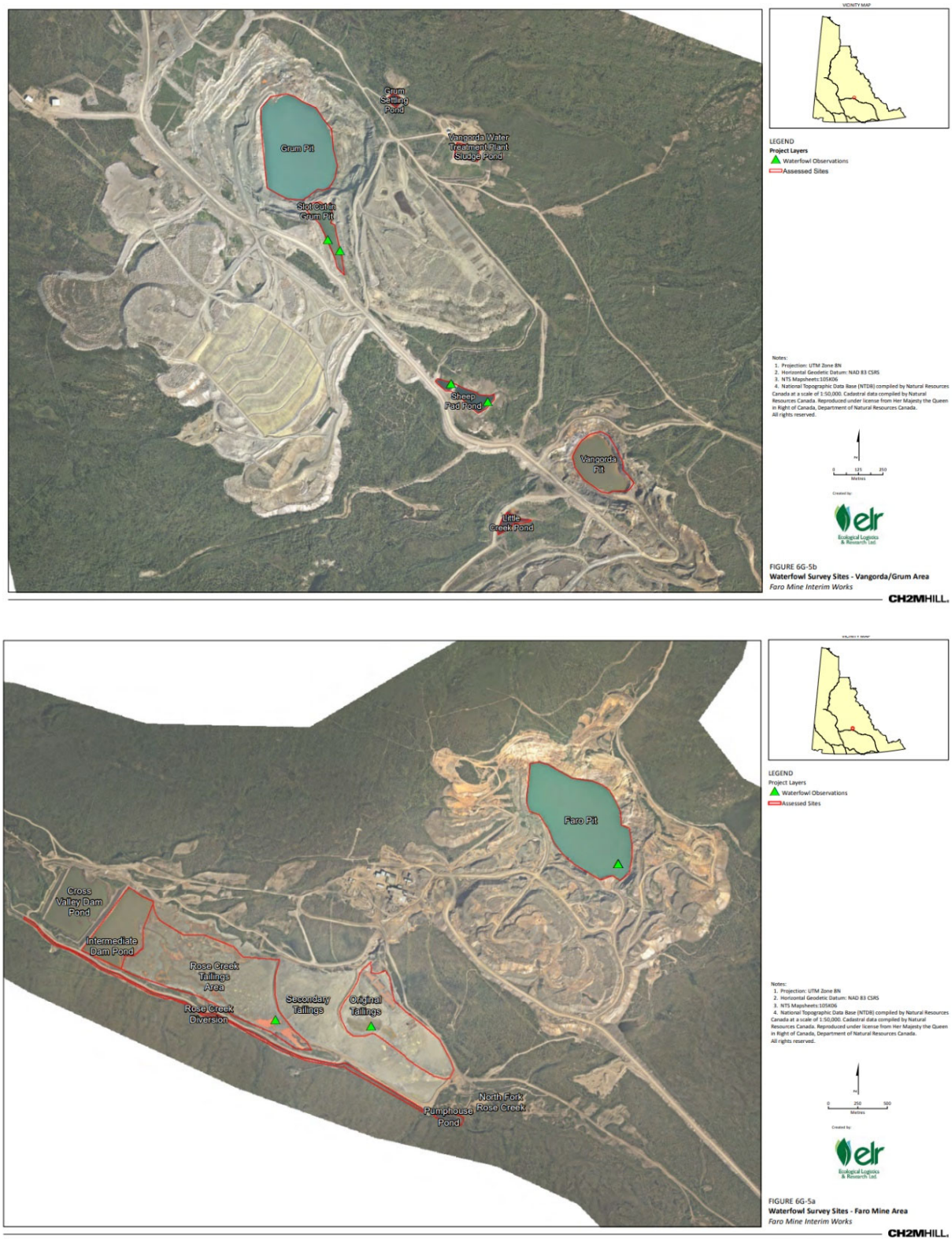

Figure 22*: Waterfowl Observations in the Faro Pit Mine Area and Vangorda/Grum Area*[810]

21.3.3 Olive-Sided Flycatcher

21.3.3.1 Population Status

There is limited trend data for the Yukon, but olive-sided flycatcher has suffered a 79 % decline across Canada between 1968 and 2006.[811]

21.3.3.2 Habitat

Habitat suitability maps were prepared by the Proponent. Olive-sided flycatchers migrate outside Canada over the winter, so habitat mapping identified breeding habitat suitability. Suitability of the habitat within the LAA depended on the structural stage of the forest, because this species prefers the frontier between open and closed habitats. For the RAA, a combination of broad ecosystem group, cover type, and subtype/leading species helped in the assignment on habitat suitability.[812]

- LAA habitat suitability: 54.8 % high, < 0.1 % moderate, 10.9 % low, and 34.2 % unsuitable
- RAA habitat suitability: 34.5 % high, 10.7 % moderate, 1.7 % low, and 53.1 % unsuitable[813]

Suitable habitat is well-distributed and connected throughout the LAA and RAA. Within the RAA, suitable habitat is most common in the southern half and in areas surrounding Anvil Creek. The majority of the LAA has habitat of high suitability despite isolated disturbances. Because the high mobility and naturally patchy distribution of the species, it is unlikely that isolated disturbances would represent movement barriers.[814]

21.4 Project Effects Characterization

21.4.1 Project Effect: Avian wildlife habitat loss, fragmentation, and degradation from earthworks

The Project includes significant earthworks that may result in the fragmentation, degradation, or loss of habitat for avian wildlife. The loss of suitable habitat for avian wildlife will be mostly temporary, as some sites throughout the project area will be reclaimed. There are adaptative components to the revegetation plan as proposed "to adjust revegetation treatments as necessary as the closure project progresses, based on monitoring results."[815] However, even with reclamation, habitat will likely be permanently altered and degraded, especially for bank swallows that have been observed on-site.

[810] YOR 2019-0149-4148
[811] Government of Canada and Government of Yukon, *Yukon Species at Risk* 2018, 78.
[812] YOR 2019-0149-9779
[813] YOR 2019-0149-7410
[814] YOR 2019-0149-7410
[815] YOR 2019-0149-8836, p.24

21.4.1.1 Bank Swallow

An overall loss of approximately 35 % of suitable nesting habitat for bank swallow within the LAA is predicted due to earthworks activities during active remediation phase (i.e., development of new borrow areas and associated access roads, extending the toe of waste rock dump slopes). Available suitable nesting habitat within the RAA is expected to remain largely unchanged, as suitable nesting habitat loss within the LAA is expected to be permanent. A colony of nesting bank swallows was observed along an exposed road cut on the access road to the Cross Valley dam water pump station in 2013. The dam will be altered to the point that it will no longer provide suitable nesting habitat for bank swallows.[816] The Proponent proposes specific mitigations that apply specifically to bank swallow:

- Mitigate potential effects to bank swallow nesting habitat in vertical banks created by erosion: do not disturb active bank swallow colonies while bank swallows are present; limit opportunities for bank swallows to nest in active work areas as per ECCC, where appropriate; if a bank swallow nesting site is removed after the birds leave in fall, consult with ECCC in advance regarding compensation requirements.[817]

21.4.1.2 Horned Grebe

Waterfowl, as represented by the horned grebe, are adaptable species with generalist habitat requirements; however, habitat loss will occur during the remediation phase of the Project and likely be permanent. The availability of suitable habitat available elsewhere within the Project's vicinity is limited.

An overall loss of approximately 18.3 % of suitable habitat for horned grebe within the LAA is predicted due to earthworks activities during active remediation phase (i.e., development of new borrow areas and associated access roads, extending the toe of waste rock dump slopes), while no change is predicted for the RAA.[818]

21.4.1.3 Olive-Sided Flycatcher

An overall loss of approximately 39.2 % of suitable habitat for olive-sided flycatcher within the LAA and 1.1 % of suitable habitat within the RAA is planned due to earthworks activities during active remediation phase (i.e., development of new borrow areas and associated access roads, extending the toe of waste rock dump slopes).[819]

21.4.1.4 Significance Determination

The EC determines that the Project is not likely to result in significant adverse effects to avian wildlife from habitat loss, fragmentation, and degradation from earthworks. Effects from habitat loss, fragmentation, and degradation from earthworks are likely, as overall habitat loss is

[816] YOR 2019-0149-7410
[817] YOR 2019-0149-7410, p.319
[818] YOR 2019-0149-7410
[819] YOR 2019-0149-7410

predicted for the three species assessed. Between 18.3 % and 39.2 % of suitable habitat (low to high suitability) loss is predicted during the remediation phase. Effects are adverse because habitat loss from fragmentation can impact nesting success or feeding, resulting in population decline or mortality of avian wildlife. Unlike moose, woodland caribou, American marten, and Arctic ground squirrel previously assessed, the reclamation efforts will not result in a net increase of suitable habitat for avian wildlife.

Effects are adverse because the population of all three species is currently declining across Canada (data is unknown for the Yukon). The bank swallow is identified as threatened under *SARA*, and its suitable habitat will decrease permanently following the remediation phase. However, mitigations currently proposed by the Proponent address habitat loss for bank swallows by compensating any nesting site that is removed as a result of project activities. Horned grebe and olive-sided flycatcher are highly mobile species, and minimal/no change is predicted for the RAA, meaning that suitable habitat will still be available. As such, the EC determines that the Project is not likely to result in significant adverse effects to avian wildlife from habitat loss, fragmentation, and degradation from earthworks.

21.4.2 Project Effect: Avian wildlife injury, mortality, and reduced health

21.4.2.1 Increase injury or mortality due to clearing or demolition during nesting

Clearing and stripping of vegetation overlaps with typical nesting season and may result in injury to bird populations as well as the inadvertent destruction (incidental take) of their nests or eggs. Nest sites are often cryptic or camouflaged, making them difficult to locate. Migratory birds may nest in trees, in tree cavities, in shrubs, on the ground, on cliffs, in burrows, in stockpiles of overburden from mines, in quarry banks, within wetlands, and on human-made structures, such as bridges and ledges. Demolition of site buildings that do not have a continuing function is planned as part of the Project. Demolition of buildings where birds may have nested could also lead to avian wildlife injury or mortality. Due to the difficulty of locating bird nests, the inadvertent destruction of the nests and eggs (i.e., incidental take) may result from project activities.

Specifically for demolition activities, ECCC recommends:

- The Proponent avoid demolition, maintenance or other work on existing infrastructure during the nesting period.
- If maintenance or demolition activities must take place during the nesting period, that the Proponent temporarily install netting and/or other appropriate deterrence systems prior to the arrival of birds in the spring to prevent nesting on man-made infrastructure.[820]

The Proponent indicated that “In some cases, pre-clearance nest searches can be conducted for conspicuous nests (e.g., bank swallow colonies) or nests in simple habitat (e.g., previously cleared construction areas, soil stockpiles, buildings).”[821] The Proponent also committed to

[820] YOR 2019-0149-0293
[821] YOR 2019-0149-9964, p.13

conduct clearing activities outside of the migratory bird nesting period (May 4 to August 22). If vegetation clearing is required between May 4 and August 22, the Proponent will:

- Use non-intrusive passive methods or pre-clearance nest searches to determine presence of bird nests, then protect bird nests with an appropriate setback;
- Commence clearing activities outside nest buffer zones no more than 24 hours following the completion of the final survey to determine no new nests are initiated after that time.[822]

Furthermore, existing legislation in the *Wildlife Act*, *SARA*, and MBCA protects individual birds and nests from direct mortality and nest and egg destruction. Mitigations and existing legislation are sufficient to prevent significant adverse effects to avian wildlife.

21.4.2.2 Health effects due to ingestion of contaminants from surface water

The HHERA showed negligible to low risks for COPCs were estimated for wildlife receptors that use other water bodies, ponds, or open wetlands, including moose, with the exception of horned grebe, which has been observed to use the Faro pit. The HHERA identified aluminum and iron as a moderate risk mostly due to eating aquatic invertebrates and ingesting sediment.[823] Effects to health, survival, and reproduction from ingestion of contaminants in the surface water in the Faro pit is a potential for all species, but especially for horned grebe, which has been observed accessing the Faro pit. The Proponent proposed additional mitigations to reduce effects due to contaminants from surface water specific to avian wildlife, including the deployment of deterrents and monitoring their effectiveness as listed above (see section 15).

Monitoring includes the Aviafauna Monitoring Program intented to assess the presence of waterfowl at the site and the success of mitigation measures in place. Surveys are conducted annually and data including size of group, age class and behaviour is collected. Wildlife patrols during key waterbird migratory periods (i.e., from ice-out to 15 June, and 1 August to 30 September) represent additional monitoring of avian wildlife on-site.[824]

21.4.2.3 Significance Determination

The Project is not likely to result in significant adverse effects to avian wildlife from clearing activities due to mitigations in place by the Proponent. Effects to health, survival, and reproduction due to ingestion of contaminants from access to surface water in the Faro pit are likely for all species, as discussed in section 15, but especially horned grebe. For that reason, the Proponent included further mitigations to the project proposal, including bird deterrents and monitoring for avian wildlife.

The EC determines that the Project is likely to result in significant adverse effects to health, survival, and reproduction issues from exposure contaminated water (e.g., the Faro pit) to avian

[822] YOR 2019-0149-7410
[823] YOR 2019-0149-7410
[824] YOR 2019-0149-9964

wildlife. Effects are adverse because of the ecological importance of avian species identified, especially to First Nations, as was raised by LFN. The Proponent committed to monitor the Faro pit, but it seems that monitoring is related to interaction or collision with, or entrapment in, permanent site infrastructure, and not for potential use of the Faro pit as a drinking water source or habitat for avian wildlife. Although avian wildlife might not be as frequent during the active remediation phase, effects to health, survival, and reproduction from contamination of surface water in the Faro pit would be of high magnitude given that sulphate levels in the Faro pit are predicted to be above livestock drinking guidelines. The Proponent's mitigations are insufficient and, therefore, further mitigation is proposed to address potential issues, trends, or problems areas related to contaminants in surface water:

13. The Proponent shall develop adaptive management in collaboration with affected First Nations and their representatives (e.g. Kaska Game Guardians) to address issues, trends, or problems areas related to the use of contaminated water storage facilities on the Faro Mine site for specific avian species identified by monitoring.

22 COMMUNITY INFRASTRUCTURE AND SERVICES OVERVIEW

22.1 Overview

Community infrastructure and services are complex systems of facilities, programs, social networks, and infrastructure services that improve quality of life. Community infrastructure plays a role in a neighbourhood's and a community's health, sociality, and wellness.

Foundational pieces relating to the broad spectrum of infrastructure and services include educational, health, public utilities, recreational, and other similar services. These are valuable to help establish a well-functioning, thriving community and economy. Changes to, strains on, or a lack of availability of these services can alter individuals day-to-day or overall community functionality.

The assessment considers the VESECs and associated effects, that make up community infrastructure and services, listed in Table 15.

Table 15: List of VESECs and Project Effects Assessed[825]

VESECs	Project Effects
Housing	Increased project activities during active remediation increasing housing pressures
Public Infrastructure	Increased pressures on public infrastructure services, including waste management service
Community Services	Increasing demands for community services in the Town of Faro
Health and Emergency Services	Affects to community health and social worker services during active remediation
Mental Health and Substance Use Services	Affects to community health and substance use services during active remediation

These VESECs examine the project effects to multiple aspects of day-to-day community life and living. Availability and quality of services and infrastructure in communities is critical to quality of life, well-being, and community cohesion, which comprise these community infrastructure and services VESECs.

Following the project proposal submission through IR No. 2, the Proponent submitted an updated Appendix 8A – Socio-Economic Existing Conditions.[826] This information, along with

[825] The EC acknowledges that there is repetition in project effects assessment for the different species considered. However, it was deemed appropriate to assess the project effects separately as the habitat and context are different for each species.
[826] YOR 2019-0149-7010, p. 347- 496

other IR responses and comments throughout the assessment from the Proponent and the project proposal, collectively inform these VESECs. Additional data and research further supplement the understanding of these VESECs.

This general community infrastructure and services section is intended to provide overarching information, relating to spatial boundaries, First Nations and community input, and existing conditions which inform each of the housing, public infrastructure, community services, health and emergency services, and mental health and substance use VESECs that follow.

22.2 Spatial Boundaries

The spatial boundaries for the housing, public infrastructure, community services, health and emergency services, and mental health and substance use VESECs are presented using the LAA and RAA. The LAA and RAA, defined below, include the identified communities and First Nations. The EC accepts the Proponent's detailed rationale pertaining to the determinations for the LAA and RAA, as outlined in the project proposal.[827]

- The LAA encompasses RRDC, in whose Traditional Territory the Project falls, and the community of Ross River. This also includes the Town of Faro, a community that lies in close proximity to the Project, and whose inception was a result of the Faro Mine. Lastly, this also includes SFN, whose Traditional Territory lies downstream of the Project, as well as the community of Pelly Crossing.
- The RAA encompasses LFN, and the Town of Watson Lake. The Town of Carmacks and the Little Salmon Carmacks First Nation (LSCFN) lie along the transportation route from the Town of Faro to the City of Whitehorse and beyond. The Proponent further notes that LSCFN are "socially and culturally linked to both the Ross River Dena and Selkirk First Nation, members or citizens historically participated in the Faro Mine Complex operations."[828] The City of Whitehorse serves as a main supply and transportation hub for workers and the project and, therefore, is included in the RAA.

22.3 First Nations and Community Input

RRDC, LFN and SFN provided comments pertaining to First Nations' way of life and community well-being, which helped to inform the following VESECs. Specific comments pertaining to infrastructure and services were limited, however these elements underpin healthy, vibrant, safe communities. Community well-being and First Nations' way of life rely on a multitude of factors, of which strong, reliable, and accessible community infrastructure and services are one.

LFN identified in their comments during participation in a SATAC session that "we would like to bring health out of the view that it is something that can be measured through a lens of chemical contaminants. We are trying to broaden the view of health. Resilient health and wellbeing was

[827] YOR 2019-0149-2609, Table 8A.2.1
[828] YOR 2019-0149-2609, p.5

supported by strong family and community systems."[829] LFN further emphasized the long-standing challenges currently faced by LFN members:

> poverty and dependence on social assistance is prevalent, as is a lack of success in education, lack of appropriate training and employment opportunities that don't focus on what people are interested in, chronic and acute physical and mental health problems and traumas, violence and involvement in the criminal justice system…[830]

The many challenges outlined by LFN require, amongst other things, a suite of available community services and infrastructure to provide supports and address health and wellness issues in a safe and familial environment. RRDC echoed LFN's sentiments, indicating that their "presentation on the health, social, and economic problems, paints a good picture of Ross River."[831] SFN further spoke to these interrelationships: "there is a direct effects pathway from salmon to SFN fishery and tied to that Traditional Land Use (TLU) and the health of the culture and community in the community of Pelly Crossing. All of those are linked."[832] It is imperative to understand and recognize these linkages. Traditional ways of life, a healthy culture, and a healthy and safe community are supported by foundational infrastructure, including housing, health and social services, and infrastructure, which bring a sense of safety and security and allow for day-to-day life to operate.

Similar themes were raised during SATAC II, where LFN identified the need for a broad lens on health, well-being, and way of life: "the four elements of health (physical, mental, emotional, spiritual)."[833] SFN echoed these sentiments in their comments.

Through SATAC III, LFN identified community and social well-being by speaking to the issue of housing: "That's how you create social cohesion at a structural level. If you have some people living in fancy houses and others in shacks, it affects social cohesion, no matter how many community events you have."[834] This basic need for available and accessible housing is a vital piece to well-being and social cohesion. SATAC III also saw discussion regarding the need to meet basic needs, such as food, water, and housing, as imperative to quality of life and well-being, followed by programming and supports, notably physical and mental health and social services contributing to an individual's, family's, and community's health. These basic needs, again, tie to the requirement for available and accessible services within a community, as examined in the following VESECs.

SFN, during SATAC IV, raised specific housing capacity issues that their community of Pelly Crossing, along with others, struggle with: "We really do have capacity issues. Also housing issues. We do not have staff housing. We can't bring in outside hires. We are similar to RRDC.

[829] YOR 2019-0149-9158, p.8
[830] YOR 2019-0149-9158, p.47
[831] YOR 2019-0149-9158, p.57
[832] YOR 2019-0149-9158, p.6
[833] YOR 2019-0419-3563, p. 35
[834] YOR 2019-0419-9549, p.30

We are unincorporated and a majority First Nation community."[835] Meanwhile, in SATAC IV, LFN revisited the theme of mental health and community well-being: "One of the areas was mental health, in the concern about mental health, both in the occupational setting and in the community setting. And part of what we, as First Nations, are trying to do is get to all aspects of health. So, mind, body, spirit, heart, and also to take it into an Indigenous determinants of health perspective…"[836]

Comments from SFN, RRDC, and LFN through the assessment demonstrated the interconnectivity of community well-being, First Nations' way of life, and individual health. Examining the multi-pronged topic of community infrastructure and services inherently ties to these other VESECs and can speak to individual and community resiliency and the capacity to navigate changes over time.

22.4 Existing Conditions

The existing conditions listed below for the various diverse LAA and RAA communities apply to the housing, public infrastructure, community services, health and emergency services, and mental health and substance use services VESECs.

22.4.1 Community of Ross River

The community of Ross River is located in central Yukon and comprised of approximately 355 people.[837] It is located 90 km by road, or approximately 60 km "as the crow flies," from the project site. It is comprised predominantly of RRDC (86 % of the population identifies as Indigenous[838]), which is a Kaska Nation. The Project is located in its Traditional Territory, which stretches west to the Northwest Territories and south into northern British Columbia.

2016 Statistics Canada data for Ross River shows a population decline of 9 %,[839] while the 2016 Census Aboriginal Community Portrait for the Council of Kaska Chiefs, show a population change of 1 %.[840] Much of the community of Ross River's population is between the ages of 15 to 64 (255 individuals, or 72 %)[841] and, of this, 160 people are in the labour force. The employment rate is 45.8 %.[842]

Services in the community include police (RCMP detachment), K-12 school, library (as of February 2024, the community of Ross River library is open Wednesday, Thursday, and

[835] YOR 2019-0149-2584, p.2
[836] YOR 2019-0149-2584, p.49
[837] Government of Canada*, Census profile, 2021 Census of Population, Ross River, Settlement*. 2021.
[838] Government of Yukon, *Census profile, 2021 Census of Population, Ross River, Settlement.* 2021.
[839] Government of Canada, *Aboriginal Community Data Initiative Portrait, 2016 Census – Ross River (First Nation/Indian Band or Tribal Council Area*
[840] Government of Canada, *Aboriginal Community Data Initiative Portrait, 2016 Census – Council of Kaska Chiefs (First Nation/Indian Band or Tribal Council Area*
[841] Government of Canada, *Census profile, 2021 Census of Population, Ross River, Settlement.* 2021.
[842] Government of Yukon, *Labour Census 2021*. 2021.

Sunday[843]), daycare, Yukon University campus, recreation centre, general store, gas station, local businesses and territorial government services. Services include substance use education and prevention programs, legal information and support services, women's safe house, child and family services, and other social assistance programs. Health services in the community of Ross River include a nursing station open 24 hours/day and on-call access to registered nurses through Yukon HealthLine. Medevac and fire services are also available, while ambulance services are provided by the Town of Faro to the community of Ross River.[844]

The community of Ross River is an unincorporated community, where YG provides municipal services, including water and wastewater services, landfill operations, and road maintenance.[845] Many of the social programs and services, including housing, cultural, language, and heritage supports, are offered by RRDC.

22.4.2 Town of Faro

The Town of Faro is located approximately 15 km from the project site.It was purpose-built for the Faro Mine in 1968 and, by 1970, it had a population of approximately 800 people.[846] As of the 2021 census, the population of the Town of Faro is approximately 440, with 25 % of the population identifying as Indigenous.[847] The Town of Faro is in the Traditional Territory of RRDC. There are a total of 210 private dwellings in the Town of Faro, of which only 33 % are rentals. The median total income in 2020 was $ 44,800, and the median household income was $ 78,500.[848]

The Town of Faro OCP (2013)[849] discusses the difficulty in making accurate predictions regarding future populations, however noted that "enrolment at [the school]…has continued to steadily decline over the last several years." And further notes, "if school enrolment data is used as an indicator of future population, then this would suggest a trend toward overall population decline in Faro."

The Town of Faro is home to a Yukon University campus, K-12 school, library, daycare, youth group, gas station, grocery and hardware store, liquor store, craft and art gallery/store, temporary lodging (hotel, motel, bed and breakfasts, guest houses), visitor and interpretive centre, RCMP detachment, nine-hole golf course, and health centre.

Community infrastructure and services are provided by the Town of Faro and YG. A new community services and firehall building was recently built in the Town of Faro, housing

[843] Government of Yukon, *Ross River Community Library,* 2024 https://yukon.ca/en/places/ross-river-community-library.
[844] YOR 2019-0149-0756
[845] YOR 2019-0149-0756
[846] Town of Faro, *History of Faro*, 2023, https://faro.ca/p/history-of-faro.
[847] Government of Canada, *Census Profile, 2021 Census of Population, Faro, Town*. 2021.
[848] Government of Canada, *Census Profile, 2021 Census of Population, Faro, Town*. 2021.
[849] Town of Faro, *Forever Faro Volume 1: Integrated Community Sustainability Plan 2013*, 2013, https://www.whistlercentre.ca/wp-content/uploads/2014/09/Forever-Faro-ICSP-FINAL.pdf.

community and emergency services.[850] Water, sewer, and road upgrades to the Town of Faro were recently carried out through funding from YG and GC.[851] Yukon Energy Corporation operates a diesel generation facility out of the Town of Faro to supply additional grid power, while also consisting of emergency diesel power to be operated in the event of an emergency. YG provides health and social services, in conjunction with the municipality, to citizens of the Town of Faro.

22.4.3 Community of Pelly Crossing

The community of Pelly Crossing is home to SFN and is located in SFN's Traditional Territory. The total population of the community of Pelly Crossing is 316, as of 2021, with 205 between the ages of 15 and 64.[852] Two hundred and forty-five (245) identify as Indigenous (77 %). Statistics Canada, 2016 Census Aboriginal Community Portrait for Selkirk First Nation,[853] identifies a population change of 20 %, while the Aboriginal Community Portrait for Pelly Crossing shows a 22 % population change.[854]

The community of Pelly Crossing is located approximately 300 km by road from the project site, however, it is approximately 170 km "as the crow flies." There are 140 private dwellings in the community of Pelly Crossing, with 95 dwellings provided by the First Nation. The median individual annual income is $ 35,200, while the median household income for 2020 is $ 63,200.[855]Services in the community of Pelly Crossing consist of a Yukon University campus, library, RCMP detachment, K-12 school, health centre, volunteer fire department (recently reinstated after over a decade's absence),[856] daycare, museum and tourist information centre, gas station and general store, recreation centre, and new pool facility.[857] The community of Pelly Crossing is an unincorporated community, where YG provides municipal services including water and wastewater services, landfill operations, and road maintenance.[858]

SFN government, along with the territorial government, provide services to community members, including youth services, educational supports, mental health, and substance use services, business planning and supports, child and family supports, and culture, language, and

[850] Government of Yukon, *New Community Services Building opens in Faro.*
[851] Government of Yukon*, Residents of Faro to benefit from improved roads, water and wastewater infrastructure, Government of Yukon,* 2019, https://yukon.ca/en/news/residents-faro-benefit-improved-roads-water-and-wastewater-infrastructure.
[852] Government of Canada, *Census Profile, 2021 Census of Population, Faro, Town*. 2021.
[853] Government of Canada, "Aboriginal Community Data Initiative Portrait, 2016 Census – Selkirk First Nation (First Nation/Indian Band or Tribal Council Area)."
[854] Government of Canada, "Aboriginal Community Data Initiative Portrait, 2016 Census – Pelly Crossing (Census Subdivision)."
[855] Government of Canada*, Census Profile, 2021 Census of Population, Faro, Town*. 2021
[856] MacIntyre, "Fire services have returned to Pelly Crossing, Yukon, after a decade without," *CBC News*, July 3, 2023, https://www.cbc.ca/news/canada/north/fire-service-returned-pelly-crossing-yukon-1.6893540#:~:text=It's %20been %20at %20least %2010,Devin %20Bailey %2C %20Yukon's %20fire %20marshal.
[857] Government of Yukon, *Celebrating a great first season at the Pelly Crossing pool*, 2023, https://yukon.ca/en/news/celebrating-great-first-season-pelly-crossing-pool.
[858] YOR 2019-0149-0756

heritage support services. In recent years, through federal and territorial funding, improvements to local infrastructure and services have been made, including the new pool and recreational facility, early childhood development centre, and upgrades to the water treatment facility and water mains to service a local subdivision. The Selkirk First Nation/Pelly Crossing Integrated Community Sustainability Plan (2007),[859] while published nearly 20 years ago, identifies challenges pertaining to housing, employment and other "social, health and cultural services that the community feels are lacking or need to be upgraded."

Additional relevant statistics and information are available for SFN as a result of the *Minto Mine Socio-Economic Monitoring Program 2016-2018 Annual Report,* a study supported by SFN, the now defunct Minto Explorations Ltd., and YG.[860] The report outlined that violent and non-violent criminal incidents had decreased from 2012 to 2015,[861] remained the same through 2017, and decreased further in 2018.[862] The report also identified that housing conditions continue to be a challenge in the community of Pelly Crossing, with rates of housing needing major repairs sitting between 12 % and 14 %.

A household survey carried out in 2015 found that two-thirds of respondents felt that the community of Pelly Crossing was as safe as five years prior. Concerning health, 90 % of respondents considered their mental health to be excellent, very good, or good, while 75 % reported their physical health as being excellent, very good, or good.[863] Based on survey data, the conditions of housing within the community of Pelly Crossing appear to be poor. According to the SFN household survey, 61 % of respondents expressed that they were neutral, dissatisfied, or very dissatisfied with their housing in the community of Pelly Crossing.[864] On another note, SFN citizens generally feel a high level of satisfaction with family and relationships, with 87 % of SFN citizens in the community of Pelly Crossing indicating that they are satisfied or very satisfied. However, this number dropped when asked about satisfaction with the community, with 62 % of respondents indicating that they were very satisfied or satisfied with the community of Pelly Crossing.[865]

[859] Selkirk Fist Nation, "SFN-Pelly Crossing Integrated Community Sustainability Plan 2007."
[860] Selkirk First Nation, Government of Yukon, and Minto Explorations Ltd.*, Minto Mine Socio-Economic Monitoring Program. Annual Report 2016-2018, 2021*, https://emr-ftp.gov.yk.ca/emrweb/COMM/major-mines/minto/mml-minto-socio-economic-annual-report-2016-2018.pdf.
[861] Selkirk First Nation, Government of Yukon, and Minto Explorations Ltd., *Minto Mine: Socio-Economic Monitoring Program Annual Report 2015, 2018,* http://www.selkirkfn.com/index.php?cID=445
[862] Selkirk First Nation, Government of Yukon, and Minto Explorations Ltd., *Minto Mine Socio-Economic Monitoring Program Annual Report 2016-2018, 2021,* https://emr-ftp.gov.yk.ca/emrweb/COMM/major-mines/minto/mml-minto-socio-economic-annual-report-2016-2018.pdf.
[863] Selkirk First Nation, Government of Yukon and Minto Explorations Ltd., Minto Mine: Socio-Economic Monitoring Program Annual Report 2015.
[864] Ibid, 22
[865] Ibid, 24

22.4.4 Village of Carmacks

The Village of Carmacks is located on the way to the Town of Faro, via the North Klondike Highway, and serves as the last community hub prior to turning onto the Robert Campell Highway towards the Town of Faro, the community of Ross River, and the project site.

The Village of Carmacks is home to the Little Salmon/Carmacks First Nation. The population of the Village of Carmacks is 588, of which 70 % identify as Indigenous.[866] Of the total population, 65 % are between the ages of 15 to 64, with approximately 300 people in the labour force and a 54 % employment rate.[867] The Village of Carmacks OCP[868] identifies a 2040 low-growth population forecast, specifically predicting that "over the next 20 years, the population will increase by 179 residents. Based on the fact that 70 % of the population is First Nation, it can be assumed that…[growth] will be met by Little Salmon Carmacks First Nation."[869] Statistics Canada census data[870] (2016) shows a population change of 3 % for Carmacks

There are approximately 265 private dwellings in the Village of Carmacks. These include both privately owned and rental units, 65 units of which are provided by the First Nation or local government. Of the private dwellings (owner and rental-based), 170 are identified as "acceptable," meaning they don't require major repairs and/or their inhabitants are not spending 30 % or more of income on shelter costs alone (i.e., affordability).[871]

There is an RCMP detachment in the Village of Carmacks, along with a school, health centre, post office, grocery store, recreation, new arena[872] and community centre, library, K-12 school, restaurants, temporary lodgings (i.e., hotel, motel and bed and breakfast), visitor and interpretive centre, and Yukon University campus. Asset management planning funding has supported the Village of Carmacks in assessing and determining life cycle needs of infrastructure in the community.[873]

LSCFN, along with YG, offer a variety of social and community wellness programs and services, including mental health and substance use programming, daycare, and educational programming and resources, as well as infrastructure services, including water and sanitary infrastructure, road maintenance, and citizen housing.

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[866] Government of Canada, *Census Profile, 2021 Census of Population, Carmacks, Village.* 2021.
[867] Government of Yukon, *Labour Census 2021*. 2021.
[868] Village of Carmacks. *Imagine Carmacks 2030 Official Community Plan Bylaw #272-21*. 2021.
[869] Village of Carmacks. *Imagine Carmacks 2030 Official Community Plan Bylaw #272-21*. 2021.
[870] Government of Canada, "Aboriginal Community Data Initiative Portrait, 2016 Census – Carmacks (Census Subdivision)."
[871] Government of Canada, *Census Profile, 2021 Census of Population, Carmacks, Village*. 2021.
[872] Ann, "Carmacks, Yukon, celebrates grand opening of long-awaited arena," *CBC News,* March 13, 2023, https://www.cbc.ca/news/canada/north/carmacks-arena-grand-opening-1.6775399.
[873] Waddell, "Federal funding coming to Carmacks," *Yukon News,* June 12, 2021, https://www.yukon-news.com/news/federal-funding-coming-to-carmacks-7001158.

22.4.5 Town of Watson Lake

As of the 2021 census, the population of the Town of Watson Lake is 1 133, with 61 % of the population between the ages of 15 to 64.[874] The Town of Watson Lake is located within the LFN Traditional Territory. LFN members reside in and around the Town of Watson Lake in several settlement locations (e.g., Two Mile, Upper Liard, and Albert Creek, to name a few), with the Town of Watson Lake serving as home to the largest proportion of LFN members. Forty percent (40 %) of the Town of Watson Lake residents identify as Indigenous.

The Town of Watson Lake's Official Community Plan[875] identifies that, much like other small rural Canadian communities, population dynamics are influenced by a large population of baby boomers and out-migration from younger age groups. The OCP identifies, based on YG Bureau of Statistics, that "these two influences combined are likely to reinforce the established downward trend in Watson Lake with drops in population numbers for 5 % to 10 % from census-to-census." Based on these statistics, the projected population for 2040 could decrease to as low as 1 100, with a preferred scenario holding somewhat steady at 1 400 individuals and the less likely high-growth scenario of an increasing population of 1 900. LFN's comments on the DSR[876] identify a high birthrate for Kaska society, however recent (2016) Statistics Canada data for Liard First Nation shows a population decline of 6 %,[877] while the 2016 Census Aboriginal Community Portrait for the Council of Kaska Chiefs, show a population change of 1 %.[878]

The median income for 2020 for the Town of Watson Lake residents is $ 44,800, with a median household income of $ 78,500.[879] There are 500 private dwellings located in the Town of Watson Lake, nearly evenly divided between rental and privately owned homes, with 335 of these homes identified as "acceptable," meaning they don't require major repairs and/or their inhabitants don't spend 30 % or more of income on shelter costs alone (i.e., affordability).[880]

Many community services are shared by the Town of Watson Lake and LFN. LFN provides water treatment and delivery to its members and the local RCMP detachment. LFN also provides community wellness programs, social development and assistance programs, family support programs, and other types of social assistance. Further, LFN provides mental health and substance use services to its members. LFN, in their comments on the DSR,[881] highlight the oversight that the services described exclude services directly provided by First Nation governments. LFN provides a suite of services through eight different departments which help LFN members in their day-to-day lives, including, but not limited to, water, sewer, garbage, fire

[874] Government of Canada, *Census Profile, 2021 Census of Population, Watson Lake, Town.* 2021.
[875] Town of Watson Lake. *Official Community Plan*. 2021.
[876] YOR 2019-0149-8575
[877] Government of Canada, "Aboriginal Community Data Initiative Portrait, 2016 Census – Liard First Nation (First Nation/Indian Band or Tribal Council Area)."
[878] Government of Canada, "Aboriginal Community Data Initiative Portrait, 2016 Census – Council of Kaska Chiefs (First Nation/Indian Band or Tribal Council Area)."
[879] Government of Canada*, Census Profile, 2021 Census of Population, Carmacks, Village*. 2021.
[880] Government of Canada, *Census Profile, 2021 Census of Population, Carmacks, Village*. 2021.
[881] YOR 2019-0149-8575

protection, legal support, education, housing, health and social services and more. There is also the Liard Aboriginal Women's Society, which serves as an active community association, carries out women and youth advocacy, and supports healing, wellness, dignity, and justice, as well as cultural continuity (through language, healing and archival work).[882]

The Town of Watson Lake provides road maintenance, snow removal and volunteer fire services. Territorial or federal services include the Town of Watson Lake Hospital, library, K-12 school, community centre, theatre, visitor information centre and interpretive facility, Yukon University campus, library, automobile repair, grocery stores, restaurants, employment office, and temporary lodgings (i.e., hotels, motels, and bed and breakfasts), as well as social services, such as prenatal nutrition programming, mental wellness, and substance use services,[883] child, youth, and family services, and psychiatric outreach programming. Federal and territorial funding has supported recent water, sewer, and road upgrades in the Town of Watson Lake.[884]

22.4.6 City of Whitehorse

The City of Whitehorse is the capital of the Yukon Territory, located in the southern portion of the territory and serving as a central hub for services and other communities. The area has a population of 31 913 residents; 16 % percent identify as Indigenous.[885] The City of Whitehorse has a diverse First Nations population, many of whom have moved to the city from other communities. The City of Whitehorse is located within the Traditional Territories of the Kwanlin Dün First Nation and the Ta'an Kwäch'än Council.

For the City of Whitehorse, the median total household income in 2020 was $ 109,000.[886] Total median individual income for people 15 and older in 2020 was $ 58,400. In terms of housing, there are approximately 13 000 occupied private dwellings in the City of Whitehorse, with little housing provided by local government or First Nations. Approximately 71 % of the housing stock has been identified as "acceptable housing," where no more than 30 % of inhabitants' income is spent on shelter cost and/or major repairs are not required.[887]

As the largest Yukon community, the City of Whitehorse has a greater diversity of services and infrastructure. The city has a larger police presence, with more resources available than smaller Yukon communities. Numerous multi-language elementary and secondary schools; the main campus of Yukon University; daycares; literacy, child development, and early years programming; and the main branch of Yukon Public Libraries, the Whitehorse Public Library, are

[882] "Liard Aboriginal Women's Society," Liard Aboriginal Women's Society, n.d., https://www.liardaboriginalwomen.ca/.
[883] Government of Yukon, "First Mental Wellness and Substance Use Services hub officially opened," March 23, 2018, https://yukon.ca/en/news/first-mental-wellness-and-substance-use-services-hub-officially-opened.
[884] Infrastructure Canada, "Canada, Yukon Fund Watson Lake Water, Sewer, Road Upgrades," Mirage News, September 30, 2023, https://www.miragenews.com/canada-yukon-fund-watson-lake-water-sewer-road-1095044/.
[885] Government of Canada, *Census Profile, 2021 Census of Population, Whitehorse,* 2021.
[886] Government of Canada, *Census Profile, 2021 Census of Population, Whitehorse,* 2021.
[887] Government of Canada, *Census Profile, 2021 Census of Population, Whitehorse,* 2021.

all located in the city. There are also many recreational facilities and opportunities in the City of Whitehorse, including the Canada Games Centre (recreation centre), cross-country ski club, shooting range and biathlon facilities, curling rink, multiple hockey arenas, rock climbing, and gymnastics. There are public transit options and affordable flights to destinations outside the Yukon. Furthermore, Whitehorse has many social services, such as Victoria Faulkner Women's Centre,[888] the Whitehorse Emergency Shelter,[889] women's transition home (second-stage housing at Betty's Haven),[890] Kaushee's Place emergency shelter,[891] Skookum Jim Friendship Centre,[892] and Yukon Legal Services Society,[893] as well as access to mental health and counselling services. Additionally, many Yukon First Nations offer specific services for their members or citizens living in the City of Whitehorse, be they social, educational, or community services.

The City of Whitehorse, and the rest of the territory, are served by Whitehorse General Hospital, as well as local doctors' offices, dentists, and the Whitehorse Health Centre, offering maternal and newborn care and public health services, such as immunizations. Recently, a much-anticipated walk-in clinic was opened to serve Yukon residents without a family doctor or who require more immediate non-emergency services.[894] Police and emergency services (fire and ambulance) are extensive throughout the City of Whitehorse. There are also youth and adult correctional facilities located in the City of Whitehorse. In the last 10 years, additional housing resources have been built[895] or funding established to meet housing needs, particularly affordable housing options, in Whitehorse.[896] Much of this has been joint funding efforts by YG

[888] "The Victoria Faulkner Women's Centre." Victoria Faulkner Women's Centre, https://vfwomenscentre.com/.
[889] "Whitehorse Emergency Centre," Connective, 2024, https://connective.ca/services/whitehorse-emergency-shelter/.
[890] "Second Stage Apartments," Women's Transition Home, n.d., https://www.womenstransitionhome.ca/bettys-haven#:~:text=Betty's %20Haven %20is %20a %2010,1 %20to %203 %20bedroom %20apartments.
[891] "Emergency Shelter," Women's Transition Home, n.d., https://www.womenstransitionhome.ca/kaushees-place.
[892] "Skookum Jim Friendship Centre", Skookum Jim Friendship Centre, n.d., https://skookumjim.com/.
[893] "Yukon Legal Services Society", Yukon Legal Services Society, n.d., https://www.yukonlegalaid.ca/.
[894] Pilkington, "Long-anticipated Whitehorse walk-in clinic opening on Monday," *CBC News*, December 17, 2023, https://www.cbc.ca/news/canada/north/whitehorse-yukon-walk-in-clinic-opening-date-1.7061897.
[895] Canada Mortgage and Housing Corporation, "47 new affordable homes coming to Whitehorse," January 18, 2023, https://www.cmhc-schl.gc.ca/media-newsroom/news-releases/2023/47-new-affordable-homes-coming-whitehorse; Waddell, "New Yukon Housing building opens in downtown Whitehorse," *Yukon News*, January 21, 2023, https://www.yukon-news.com/news/new-yukon-housing-building-opens-in-downtown-whitehorse-7004094; Rudyk, "New Whitehorse mixed-use building with affordable rental units opens," *CBC News,* July 21, 2022, https://www.cbc.ca/news/canada/north/new-whitehorse-building-includes-45-affordable-rental-units-1.6527997.
[896] Government of Yukon, "Twelve new affordable homes built in Whitehorse," Government of Yukon, August 23, 2022, https://yukon.ca/en/news/twelve-new-affordable-homes-built-whitehorse; Government of Canada, "Governments of Canada and Yukon Invest Over $8 Million for Affordable Housing in Whitehorse." Government of Canada, August 30, 2023, https://www.newswire.ca/news-releases/governments-of-canada-and-yukon-invest-over-8-million-for-affordable-housing-in-whitehorse-829906215.html.

and GC. Additionally, funds have been allocated towards renovations for Kaushee's Place, the shelter for women, non-binary people, and children who have experienced violence and abuse.[897]

At the same time, the City of Whitehorse has a large population of vulnerable people, who are more likely to be targets of violence. For example, the city has the largest homeless population in the territory and a documented sex work industry. A recent study suggests that homelessness is on the rise in the City of Whitehorse, up 30 % in two years.[898] Additional challenges have also been experienced at the Whitehorse Emergency Shelter in recent years, where an increase in clients who have, complex needs has led to increasing challenges and concerns associated with safety and quality of life in the city core. This has led to additional funding and services by various levels of government to address these issues.

[897] Hatherly, "Governments pledge to add at least 9 homes in Whitehorse, renovate shelter amid housing crisis," *Yukon News*, September 2, 2023, https://www.yukon-news.com/local-news/governments-pledge-to-add-at-least-9-homes-in-whitehorse-renovate-shelter-amid-housing-crisis-7005126.

[898] Windeyer, "As housing crisis worsens, Whitehorse city council looks for answers," *CBC News*, September 19, 2023, https://www.cbc.ca/news/canada/north/whitehorse-homelessness-city-council-housing-1.6971523.

23 HOUSING

23.1 Overview

Housing refers to potential changes to housing infrastructure in relation to the availability, quality, and affordability of rental and market housing from project development, as well as services related to housing, such as shelters, emergency accommodations, and supported housing. The EC determines that the Project is likely to result in significant adverse effects to housing, specifically in the Town of Faro, due to increased pressures during active remediation.

23.1.1 Reason for Inclusion

Housing in the Yukon is an ongoing concern and the subject of federal, territorial, and community planning.[899] In recent years, in particular, community and non-profit organizations have been raising the alarm surrounding housing availability and affordability throughout the Yukon. Housing availability contributes to community cohesion and population sustainability. Conversely, a lack of housing is associated with decreases in affordability, out-migration, and fracturing of social networks.

Low availability or a lack of affordable housing disproportionately affects vulnerable groups, excluding them through costs or discrimination. Their exclusion may lead to experiences of housing insecurity and/or housing unsuitability. This, in turn, can have subsequent secondary effects, including poorer physical and mental health outcomes and increased risk of violence and exploitation. The housing continuum considers that a full spectrum of housing options is required in a community, from emergency shelter to private ownership. This continuum is not meant as a linear progression; it acknowledges that housing needs vary from person to person and will change throughout a person's life for various reasons, including age, income, household size, or mobility level.[900]

23.2 Existing Conditions

Economic in-migration is a larger driver of population growth than birth and deaths. Small communities throughout the Yukon remain sensitive to additional demands in housing availability and affordability. Similar housing pressures are equally felt in the City of Whitehorse.

Over the past decade (2012 to 2022), the City of Whitehorse population has increased by 22.2 % and the Yukon Bureau of Statistics expects this growth trend to continue.[901] Whitehorse rental vacancy rates remain low, at 2.0 %.[902] In 2014, rental vacancy was the highest in many

[899] City of Whitehorse, Whitehorse 2040: Official Community Plan, 2023, https://www.engagewhitehorse.ca/ocp
[900] City of Whitehorse*, Whitehorse 2040: Official Community Plan*.
[901] Government of Yukon, *Population Report: Fourth Quarter*, 2022, 2022, https://yukon.ca/sites/yukon.ca/files/ybs/fin-population-report-q4-2022.pdf.
[902] Government of Yukon, *Yukon Rent Survey: April 2023*, 2023, https://yukon.ca/sites/yukon.ca/files/ybs/fin-yukon-rent-survey-april-2023.pdf.

years, at 4.7 %, and lowest at 0.8 % in 2022, but it has otherwise been closer to 2 % over the last 15 years.[903,904] The median rent in Whitehorse is currently approximately $ 1,350.[905] Availability and affordability have proven to be growing issues throughout not only the City of Whitehorse but the Yukon communities as well. In April 2023, of the available 54 vacant rental units in the Yukon, 47 were in the City of Whitehorse. It has been reported that "one in six Yukoners, or just over 15 percent, are spending more than 30 percent of their income on housing."[906] As housing availability remains constricted and affordability is on the decline, there is a rise in under-housing or homelessness in the City of Whitehorse.[907] The wait list for community housing in the Yukon has increased by 320 % from 2015 to 2021,[908] and it's taking longer to address housing needs for those on the waitlist, with people waiting nearly a year and half.

Communities continue to feel additional pressures and challenges. With limits to land availability and affordability, reduced trades, increased supply and material costs, these communities continue to experience housing challenges. In June 2023, municipalities across the Yukon (and the country) passed resolutions urging the federal government to provide long-term funding for local governments to combat homelessness.[909] As identified in the above community profiles, "acceptable" housing, particularly in rural communities, remains an issue and ongoing challenge. Housing shortages are resulting in impacts to other services and staffing shortages, with no available housing and, therefore, the inability to live and work in that community.[910]

In response to these conditions, the City of Whitehorse adopted a Housing Development Incentives Policy in February 2021 to promote housing density and development of rental and supportive housing projects. YG has undertaken a number of initiatives and measures to address the issue of affordability, including affordable housing in the Village of Carmacks[911] and Town of Mayo; rapid housing initiatives in communities, including a housing-first complex in the

[903] Government of Yukon, *Yukon Rent Survey: April 2023*.
[904] Government of Yukon, *Yukon Rent Survey 2022*. 2022, https://yukon.ca/sites/yukon.ca/files/fin/fin-yukon-rent-survey-april-2022.pdf.
[905] Government of Yukon, *Yukon Rent Survey: April 2023*.
[906] Desmarais, "Affordability one major theme of Yukon's latest housing report," *CBC News*, January 13, 2023, https://www.cbc.ca/news/canada/north/yukon-housing-report-data-affordability-1.6713880#:~:text=The %20report %20says %20one %20in,homeowners %20(47.8 %20per %20cent).
[907] Windeyer, "As housing crisis worsens, Whitehorse city council looks for answers."
[908] Proulx, "Startling' lack of progress made on Yukon housing and homelessness, says auditor general report," *CBC News*, May 25, 2022, https://www.cbc.ca/news/canada/north/startling-lack-of-progress-yukon-housing-auditor-general-report-2022-1.6464485.
[909] Webb, "Yukon communities join municipal leaders across country to push feds for support in several areas," *CBC News*, June 29, 2023, https://www.yukon-news.com/local-news/yukon-communities-join-municipal-leaders-across-country-to-push-feds-for-support-in-several-areas-7004514.
[910] Hupé, "Housing shortage is impacting teachers' availability," *Whitehorse Star*, October 10, 2023, https://www.whitehorsestar.com/News/housing-shortage-is-impacting-teachers-availability.
[911] Government of Yukon, "Statement from Premier Pillai on new accessible duplexes open in Mayo and Carmacks," *Government of Yukon*, September 9, 2023, https://yukon.ca/en/news/statement-premier-pillai-new-accessible-duplexes-open-mayo-and-carmacks.

Town of Watson Lake;[912] home ownership loan programs; and the building of energy-efficient homes across the territory.[913] Additionally, some First Nations governments are working to address housing issues in their communities, such as LFN implementing a 15-home build project on the outskirts of the Town of Watson Lake, providing not only housing but also employment to nearly 50 people.[914] A former City of Whitehorse hotel is being converted into 20 temporary housing units that will support individuals in the City of Whitehorse and alleviate some of the challenges currently experienced.[915]

Additional land will become available in the next number of years as the government releases more lots for land lotteries, and both the City of Whitehorse and YG continue to identify parcels of land for sale and development in and around the City of Whitehorse. Meanwhile, the ongoing development of housing units continues in the City of Whitehorse's Whistle Bend subdivision, which is expected to have nearly 4 000 units when completed. New housing stock that serves vulnerable demographics has also been added in the City of Whitehorse in particular.

23.3 Proponent Mitigation Measures

The Proponent indicates that the large camp size will help to offset much of the housing needs and pressures in LAA communities, with the ability to house slightly more than 300 workers.

- Additionally, through a Workforce Management Plan, alternative housing options for staff will be identified and occupancy and availability levels tracked to ensure temporary and long-term housing options for active remediation. Moreover, where workers are located in the Town of Faro and Ross River, the proponent will design and implement transportation services for project workers located in the Town of Faro and, where applicable, the community of Ross River. The Proponent has further identified the need to engage with the Town of Faro and YG to establish dialogue and collaborate on solutions related to housing.

[912] Government of Yukon, "Housing First complex under construction in Watson Lake," *Government of Yukon*, August 25, 2023, https://yukon.ca/en/news/housing-first-complex-under-construction-watson-lake.
[913] Government of Yukon, "Government of Yukon making life more affordable across the territory," *Government of Yukon*, August 29, 2023, https://yukon.ca/en/news/government-yukon-making-life-more-affordable-across-territory.
[914] Todd, "A paradigm shift': Liard First Nation tackles housing crisis with timber home kits, new production plant," CBC News, October 7, 2023, https://www.cbc.ca/news/canada/north/liard-first-nation-lego-timber-homes-1.6986397.
[915] Hatherly, "Former Whitehorse hotel will convert into temporary housing mid-February," Yukon News, February 1, 2023, https://www.yukon-news.com/news/former-whitehorse-hotel-will-convert-into-temporary-housing-mid-february-7004138.

23.4 Project Effects Characterization

23.4.1 Project Effect: Increased project activity during active remediation will likely result in increased housing pressures in the Town of Faro

It is projected that residents returning to the area to work may contribute to housing demand and increased shortages. The Proponent has identified a camp for up to 304 workers and intends to house the majority of its workers on-site in the camp, leading to limited needs off-site during peak workforce and activity at the project site.

The Town of Faro is expected to serve as a home to six foremen and six superintendents (and their families).[916] This would see an increase in the Town of Faro population by, at minimum, 12 people, but this could be upwards of 30 people. The Proponent identified in the project proposal that the Town of Faro has "available housing supply and related infrastructure for people to relocate to the community" however, in 2019, the Town of Faro successfully sold off all abandoned (surplus) homes.[917] It is unclear if the Proponent or sub-contractors purchased any of these homes for temporary staff housing purposes. Therefore, this potentially leaves little additional homes in the Town of Faro available for off-site workers during the life of the project, in particular, during active remediation. Given the conditions currently experienced in the Town of Faro, population growth will further increase housing demand and exacerbate the current low housing availability.

While the data shows that there is virtually no housing availability in the next closest community of Ross River, "Ross River housing representatives expressed concerns about chronic housing shortages and high costs of maintaining the existing stock […]. The residents of the community of Ross River are adapting to the current housing shortage in the community of Ross River by moving to the Town of Faro."[918] Its distance from the project site would make it an unlikely destination for the housing of future workers, outside of those already living in the community of Ross River.

It is likely that the project will draw the majority of its workforce from the City of Whitehorse.[919] Workers from the City of Whitehorse are likely to already have housing, and therefore it is expected that little housing changes or demands will result. Continued City of Whitehorse, territorial and federal government housing initiatives and funding, along with continued subdivision and infill development in the City of Whitehorse, are expected to manage and alleviate ongoing housing challenges experienced in the city, resulting in little effect experienced as a result of the Project.

The communities of Pelly Crossing, the Village of Carmacks, and the Town of Watson Lake are unlikely to experience increased housing pressures because of the Project, due to their distance

[916] YOR 2019-0149-0756
[917] Rudyk, "Faro's abandoned homes have all been sold," *CBC News*, December 3, 2019, https://www.cbc.ca/news/canada/north/faro-yukon-abandoned-homes-sold-1.5381828.
[918] YOR 2019-0149-0756, p. 8-121
[919] YOR 2019-0149-8532, p.260

from the project site. Those individuals who already reside in these communities may choose to work at the project site and would reside on-site at the worker camp and return to existing residences in their respective communities. Broader ongoing housing availability and affordability issues currently experienced across these communities are not expected to be exacerbated by the Project.

Any workers from outside of the territory are likely to be specialized and would be expected to stay on-site at the work camp and transition through Whitehorse via temporary lodging (i.e., hotel, motel, or bed and breakfast).

23.4.1.1 Significance Determination

The Town of Faro is likely to experience an increase in housing pressures as a result of the Project, particularly with the Proponent anticipating housing staff in the Town of Faro.. There do not appear to be new housing initiatives proposed for the Town of Faro or readily available housing, resulting in constraints on availability and affordability. Low housing availability and low housing affordability can destabilize communities, leading to out-migration and fracturing of social networks. These conditions may have a disproportionate impact on vulnerable people by creating barriers of cost and discrimination. This can heighten housing insecurity (including potential homelessness) and housing unsuitability. This, in turn, can have significantly adverse secondary effects, such as increased risk of exploitation or violence against individuals impacted by these conditions.

Providing information on estimated workforce and housing needs at the Town of Faro related to the Project, paired with reasonable efforts to protect at-risk members of the community, tracking, and monitoring of available and affordable housing, should mitigate the adverse effects described above.

The EC determines that the Project is likely to result in significant adverse effects to housing in the Town of Faro. These mitigations will allow for a collaborative and proactive approach to address housing and housing related concerns in the Town of Faro by reducing housing pressures, facilitating an understanding of evolving circumstances and contributing to control and management of housing needs in the community. As such, the following mitigations are recommended to reduce, control, or eliminate significant adverse effects:

14. The Proponent shall provide to the Town of Faro and Government of Yukon, information on estimated numbers of employees wanting to access housing in the Town of Faro. This information will support the monitoring, tracking and planning by YG and Town of Faro in regards to numbers of housing units and potential impacts on housing stock available. The Proponent will make reasonable efforts to see that the Faro Mine Remediation Project housing needs do not adversely affect at-risk members of the community through reduction in accessible rental housing.

15. The Government of Yukon, working with the Town of Faro, and with input from the Proponent, shall establish comprehensive monitoring and tracking of housing availability and affordability in the Town of Faro.

24 PUBLIC INFRASTRUCTURE

24.1 Overview

Public infrastructure refers to infrastructure facilities, systems, and structures owned and operated by government and provided to the public. This can include, but is not limited to, infrastructure and amenities such as community sewage, waste management and landfill, electricity, water, telecommunications, and the maintenance of public highways and roads.

The EC determines that the Project is unlikely to result in significant adverse effects to public infrastructure. Though it is unlikely that the majority of public infrastructure facilities will be affected by the project, waste management in the Town of Faro is likely to experience effects. While effects specifically to waste management infrastructure in the Town of Faro are likely to occur, they are anticipated to be reduced or eliminated by measures put in place by the Proponent.

24.1.1 Reason for Inclusion

Public infrastructure facilities, systems and structures are integral to the day-to-day operations and functions of communities of all sizes. Understanding and examining these elements of the affected communities in relation to the Project will allow for a realization of short and long-term changes and influence that may result from the Project. The smaller scale and scope of the affected communities in Yukon and as a result the capacity, reliability and availability of their infrastructure, serves as additional context. This is further nuanced by the more isolated nature of many of these communities.

24.2 Existing Conditions

As outlined above, the local community governments, in conjunction with the local First Nations governments, operate and maintain a suite of public infrastructure in the various communities. These are further supplemented by YG (and in certain cases funded through one-time programs and injections from the federal government) in each of the communities in the LAA and RAA. Recent funding includes new public services building in the Town of Faro, as well as upgrades to municipal water, sewers, and roads in the Town of Watson Lake,[920] while Carmacks recently received funding for a new water treatment system and improved storm water and sewage management.[921]

[920] Government of Yukon, “Statement from Minister of Community Services Richard Mostyn,” Government of Yukon, September 29, 2023, https://yukon.ca/en/news/statement-minister-community-services-richard-mostyn.

[921] Government of Yukon, “Water and wastewater infrastructure improvements to strengthen Yukon communities,“ Government of Yukon, August 2, 2019, https://yukon.ca/en/news/water-and-wastewater-infrastructure-improvements-strengthen-yukon-communities.

Ongoing operations and maintenance activities at the project site currently use on-site water, sewage, and septic utilities. Reliance on these existing infrastructure services would continue through the life of the Project.

Power supply throughout the Yukon is jointly provided by Yukon Energy Corporation and ATCO Electric Yukon (ATCO). Power demand is on the rise in Yukon, with increased capacity needs identified across the territory. A greater reliance on electric heating sources and continued economic and population growth have led to added pressures on power supply,[922] leading to additional diesel generation[923,924] projects coming online, with greater capacity to support communities across the territory. Renewable energy sources (e.g., solar and wind) have been growing throughout the territory over the last decade or so, however challenges remain pertaining to complex matters around generation, storage, and demand.[925] Throughout the last number of years, there have also been growing discussions around connecting the Yukon to the British Columbia electricity grid to further alleviate demand and move towards a more sustainable means of power generation for the territory.[926] Power to the project site is provided by an existing on-site connection to the power grid, which it will continue to use for the Project.

The Project currently uses on-site waste management by way of a landfill and incineration. This is proposed to continue for construction waste and demolition. The Proponent also proposes to continue to employ the on-site landfill and incineration (with ash being disposed in the on-site landfill) for domestic waste produced by the camp. It should be noted that the Proponent identifies the alternative of continuing with the "current practice of landfilling domestic waste in the Town of Faro landfill; this approach would depend on landfilling requirements and would require agreement to be reached with the municipality."[927] Recyclable materials are currently sorted on-site into storage bins, which are then transferred to the Town of Faro bottle depot for recycling. This practice is expected to continue for the duration of the Project.

24.3 Proponent Mitigation Measures

The Proponent intends to implement the Road and Traffic Management Plan, which should reduce and minimize community disruptions. Additionally, intends to design and implement transportation services for project works located in the Town of Faro and the community of Ross River.

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[922] Bossons, "Yukon suffers increased power disruptions in recent months," Yukon News, August 2, 2019, https://www.yukon-news.com/news/yukon-suffers-increased-power-disruptions-in-recent-months-7005041.
[923] "Diesel Facilities," Yukon Energy, n.d., https://yukonenergy.ca/energy-in-yukon/projects-facilities/diesel-facilities
[924] YOR 2023-0090; YOR 2021-0115
[925] Windeyer, "Yukon wants to electrify to slash emissions but faces a shortage of green power", *CBC News*, November 10, 2023, https://www.cbc.ca/news/canada/north/yukon-energy-green-energy-demand-1.7025154.
[926] Joannou, "'Nation-building moment': Yukon eyes connection to B.C. electricity grid," *Globe and Mail,* August 20, 2023, https://www.theglobeandmail.com/business/industry-news/energy-and-resources/article-nation-building-moment-yukon-eyes-connection-to-bc-electricity-grid/.
[927] YOR 2019-0149-8532, p.133

A Conceptual Waste Management Plan has been developed, which describes the handling, containment, storage, transportation, recycling, and disposal of different wastes, managed by a third-party contractor with appropriate permitting and authorizations in place.

Further, the Proponent has indicated that additional on-site landfills may be required to be constructed for construction waste and demolition, as project needs dictate. The Proponent has identified future engineering design work that would examine assessment and estimation of waste streams and quantities and ultimate sizing and design of an on-site non-hazardous waste landfill, along with alternative considerations for domestic waste. Lastly, the Proponent has identified the need to engage with the Town of Faro and YG to establish plans and agreements related to waste management matters.

24.4 Project Effects Characterization

24.4.1 Project Effect: Increased pressure on public infrastructure

Water, sewage, and septic systems are located on-site and no reliance on local communities for this infrastructure will occur. Water sources for both road-watering and camp sources will include nearby watercourses and water bodies, as well as collected groundwater following appropriate protocols established by DFO. The on-site potable water treatment system will be maintained and upgraded to meet site and staff needs.

Ongoing operations and maintenance activities at the project site currently use on-site water, sewage, and septic utilities. Reliance on these existing infrastructure services would continue through the life of the Project. It is not expected that water, sewage, and septic facilities in any of the communities in the LAA or RAA would be impacted by the Project.

Recently, a new community services building was built in the Town of Faro, which offers modern amenities and serves as a facility to support infrastructure and services in the Town of Faro.[928] It is not expected that water, sewer, or power infrastructure in the Town of Faro will be impacted by the Project, due in part to Project's self-reliance in these areas.

Public infrastructure and services in the community of Pelly Crossing, the community of Ross River, the Village of Carmacks, the Town of Watson Lake, and the City of Whitehorse are not expected to see changes or added pressures as a result of the Project, given their distance from the project site and the lack of reliance of the Project and Proponent on such infrastructure.

Power supply will come from the local grid using a 138 kilovolt transmission line, sub-station, and transformer that facilitate local power distribution and use on-site.[929] These are already established connections, with emergency power supply coming from on-site generators, as required. Upgrades and temporary additional electrical utilities on-site will be needed during

[928] Government of Yukon, "New Community Services Building opens in Faro," *Government of Yukon,* September 20, 2022, https://yukon.ca/en/news/new-community-services-building-opens-faro.
[929] YOR 2019-0149-8532, p.101

active remediation to facilitate demolition and new site infrastructure facilities but will not impact local community services or supply.

Power generation and supply are Yukon-wide issues, and ongoing pressures are expected to continue. However, territorial and interjurisdictional efforts, coupled with ongoing projects to expand, upgrade, and re-licence sites across the territory, will continue to provide power needs to the Yukon Territory, including to the Project. As outlined, the project site is already connected to the electricity grid and has established back-up diesel generation for emergency power generation for the site, as needed.

24.4.1.1 Significance Determination

The EC determines that the Project will not impact public infrastructure in both the LAA and RAA. Through project design and proponent mitigations, infrastructure needs will be addressed on-site, leaving public infrastructure in communities experiencing little effect from the project activities.

24.4.2 Project Effect: Waste management infrastructure in the Town of Faro is likely to experience increased use during active remediation

Recyclable materials will be stored and then transferred off-site. The project proposal currently cites continued use of the town of Faro recycling depot for such purposes. It is expected that continued use of the recycling depot will not be impacted by the project activities. It should be noted, however, that changes to recycling throughout the Yukon[930] (specifically, the ability to no longer recycle certain types of material streams, including soft plastics[931] and glass[932]) may result in increases in the domestic waste produced by the Project.

The project proposal outlines that domestic waste generated on-site by the camp/on-site workforce will be stored at an on-site landfill, as well as incinerated, as applicable. Ash from incineration would be placed in the on-site landfill. For solid waste purposes, the two on-site existing dumps will be used for solid waste, with the potential that these two sites will need to be expanded or new additional landfills may be required to appropriately manage waste on-site.[933] It is also expected that, with mill-site demolition, additional on-site containment facilities will need to be developed, facilitating on-site waste management.

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[930] Egwu, “Changes coming to Whitehorse recycling,” *Yukon News,* March 1, 2023, https://www.yukon-news.com/local-news/changes-coming-to-whitehorse-recycling-7004273.

[931] Windeyer, “No more soft plastics as Yukon recyclers brace for major changes,” *CBC News*, September 16, 2023, https://www.cbc.ca/news/canada/north/raven-recycling-soft-plastics-1.6968365#:~:text=North-,No %20more %20soft %20plastics %20as %20Yukon %20recyclers %20brace %20for %20major,material %20that %20contains %20soft %20plastics.

[932] Government of Yukon, “Non-beverage glass will no longer be accepted for recycling,” Government of Yukon, November 6, 2019, https://yukon.ca/en/news/non-beverage-glass-will-no-longer-be-accepted-recycling.

[933] YOR 2019-0149-8532

The Proponent notes in the project proposal that, during operations and maintenance of the site, the Town of Faro landfill is being used for domestic waste purposes. It appears that the Proponent sees an alternative to on-site landfilling for domestic waste, which would involve continuing the practice of employing the Town of Faro landfill, where discussion and agreements with the municipality allow. Were this alternative to be pursued, it is not clear as to whether the capacity of the Town of Faro landfill would support increased domestic waste from a camp of 304 people. Without clarity, it is assumed that use of the Town of Faro's landfill for the Project's domestic waste may result in capacity issues.

24.4.2.1 Significance Determination

The EC determines that the Project will not significantly impact waste management infrastructure in the Town of Faro. The likely effects would be limited to the 15-year active remediation period, where increased workforce and demolition activity will result in an increase in the production of waste. Most of the waste produced on-site is expected to be managed with on-site landfilling. However, recyclable materials and potentially domestic waste have been identified for off-site transfer to the Town of Faro recycling facility and, potentially, the Town of Faro landfill. Project designs, including maximizing on-site landfill use and incineration, future-work studies on municipal landfill capacity, and agreements with the Town of Faro for continued recycling and possible landfill use are expected to reduce or eliminate effects.

25 COMMUNITY SERVICES

25.1 Overview

Community services refers to those services provided by municipal, territorial, and federal governments and those available from the private and non-profit community sector. This may include, but is not limited to, services related to education, recreation, childcare, and social development and support.

The PSOA[934] identified the community services and social workers sub-component, however given the nature of social work, it was determined that it was better situated in the health and emergency services VESEC.

The EC determines that the Project is unlikely to result in significant adverse effects to community services in the region. While effects are likely to occur, specifically in the Town of Faro with potential for increased demand for some services, they are anticipated to be moderate and manageable by services currently available in the community.

25.1.1 Reason for Inclusion

Accessible and readily available community services and social worker supports are important to building strong, vibrant, and healthy communities. Many of these services improve the quality of life in a community, making the community liveable. Strong childcare and educational resources offering opportunities for all ages in the community are critical for growth and leadership. Diverse recreational opportunities support social development, cohesion, and healthy habits and lifestyles.

25.2 Existing Conditions

All communities in the LAA and RAA have available and accessible educational, recreational, and childcare services. Through recreation facilities, there are local clubs, community gatherings, team sports, and opportunities for continued growth. Yukon University campuses within the communities offer new skills, experiences, and continuing education, allowing individuals to pursue educational excellence while remaining in the community with family and friends. Childcare and K-12 schooling offer next-generation learning opportunities and ensure multi-generational communities continue to thrive.

In the last number of years, there have been additions, upgrades, and new recreation and community complexes[935,936] within the LAA and RAA. The school in Ross River, meanwhile, has

[934] YOR 2019-0149-0822
[935] Ann, “Carmacks, Yukon, celebrates grand opening of long-awaited arena.”
[936] Government of Yukon, “Celebrating a great first season at the Pelly Crossing pool.”

been in the spotlight during the last number of years, with members raising health and safety concerns.[937]

25.3 Proponent Mitigation Measures

The Proponent has identified a number of community services related mitigation measures for implementation, including providing recreational and fitness facilities at the worker camp on the project site in order to provide on-site community and quality of life and to reduce pressures in local communities on such facilities and services.

In addition, the Proponent has committed to providing support services and mechanisms for workers to find the information related to family services, including childcare, education, summer camps, parenting resources, and senior caregiving, as required. Further to this, the Proponent has identified the need to engage with the Town of Faro and YG to address matters related to childcare and other social community services as required.

25.4 Project Effects Characterization

25.4.1 Project Effect: The Town of Faro is likely to experience greater demand for community services during active remediation

The Town of Faro may experience a slight increase in population, as the Proponent has identified an expectation that upwards of 12 staff, and their family members, would likely reside in the Town of Faro. Without detailed specific information regarding these potential staff and family members, it is assumed that children would make up several individuals moving to the community, thus requiring childcare and educational services. Further, with additional community members, there would be a slightly greater demand and use and enjoyment of recreational services.

This increase in population would be limited in number. Facility and service capacity for education, childcare, and recreational services in the Town of Faro would support this moderate increase in demand. This population increase is tied to the active remediation phase, therefore, following the 15-year period, these individuals may have grown out of and no longer require some or all the community services and/or no longer choose to inhabit the Town of Faro following completion of this phase of the Project.

25.4.1.1 Significance Determination

The EC determines that the Project will not significantly impact community services in the Town of Faro. There is likely to be an increase in demand of such services, but the population increase is manageable, and services are readily available and accessible, resulting little to no adverse effect to community services resulting from the Project.

[937] Connors, “First Nation in Yukon urges territory to build new school after years of lodging complaints,” *APTN National News*, https://www.aptnnews.ca/national-news/first-nation-in-yukon-urges-territory-to-build-new-school-after-years-of-lodging-complaints/.

25.4.2 Project Effect: LAA and RAA communities are not likely to experience changes to the demand or pressures on community services because of the Project

The communities of Ross River, Pelly Crossing, the Village of Carmacks, the Town of Watson Lake, and the City of Whitehorse are generally unlikely to experience any change in the demand and pressures on community services during the life of the Project. Education and recreational services will continue to support those community members living and working in each community. The on-site project camp will offer some recreational services to those workers on-shift residing in camp.

An increase in community members choosing to be employed by the Project may result in an increase in shift-workers working two weeks on-shift at the project site. This could potentially lead to additional requirements for childcare services in communities. It is expected that this would be contained and a manageable increase in demand, due to the fact that individuals looking to work at the site will understand the implications of shift work and the need to reside on-site for their shift period, leading to already-established supports (i.e. one partner working in the community or staying at home, or extending family supports) to facilitate this type of employment.

25.4.2.1 Significance Determination

The EC determines that the Project will not significantly impact community services throughout communities in the LAA and RAA. The on-site project camp will offer recreational services to workers residing in camp. Little or no impact on educational, recreational, childcare, and other community services will be experienced in Ross River, Pelly Crossing, Carmacks, Watson Lake, and Whitehorse due to their distance form the project site. Project workers residing in these communities, when off-shift during their two-week rotation, will continue to use and enjoy services currently available in the communities.

26 HEALTH AND EMERGENCY SERVICES

26.1 Overview

Health and emergency services refer to services such as hospitals, medical clinics, and health centres and nursing services. This VESEC also includes social work services and fire protection services. Changes to the availability, accessibility, and quality of these services from potential increased demand due to project activities and a project workforce will be assessed.

The EC determines that the Project is likely to result in significant adverse effects to health and emergency services during the 15 years of active remediation as a result of increased demands for these services, which are already currently under strain**.**

26.1.1 Reason for Inclusion

Health and emergency services are foundational services within any community. These services ensure community safety, security, and health amongst community individuals and the collective. The availability of such services in a community allows for comprehensive services to residents in a timely manner and offers a sense of security. Their availability assures community members that they can continue in their day-to-day life knowing they are protected, can maintain health, and have supportive measures in place.

26.2 Existing Conditions

In recent years, health and emergency services within a number of Yukon communities are under varying degrees of strain. Particularly the smaller and more remote communities are experiencing reduced health services due to staffing shortages. In some cases, health centres have significantly reduced hours or are shuttering for periods of time. In the last 18 months, this has reached a boiling point. Concerns and frustration[938] abound with a lack of reliable services due to nursing and other healthcare professional shortages. Communities outside of the City of Whitehorse have experienced temporary closures,[939] reduced schedules and services,[940] and uncertainty due to these ongoing challenges.

[938] MacIntyre, "Community leaders want solutions as health centres in Yukon continue to reduce services," *CBC News*, October 2, 2023, https://www.cbc.ca/news/canada/north/frustration-rises-health-centres-rural-yukon-reduce-services-1.6982887.

[939] Hatherly, "Lack of nurses temporarily closes, limits services at 3 more rural Yukon health centres," Yukon News, July 18, 2023, https://www.yukon-news.com/local-news/lack-of-nurses-temporarily-closes-limits-services-at-3-more-rural-yukon-health-centres-7004558; Hatherly, "Yukon Party slams government's inability to prevent rural health centre closures," *Yukon News*, September 22, 2023, https://www.yukon-news.com/local-news/yukon-party-slams-governments-inability-to-prevent-rural-health-centre-closures-7005239.

[940] MacIntyre, "Community leaders want solutions as health centres in Yukon continue to reduce services," *Yukon News,* October 2, 2023, https://www.cbc.ca/news/canada/north/frustration-rises-health-centres-rural-yukon-reduce-services-1.6982887.

These shortages are also occurring with social workers in a number of communities. Staffing shortages, coupled with limited housing availability, have made it increasingly difficult for social work services to be consistently and readily available in some communities. As recently as October 2023, the Town of Faro expressed concerns around the lack of social workers (and other support services) in the community.[941]

To address these shortages, municipalities have urged the territorial and federal governments to implement changes, provide additional funding, and address compounding issues, such as housing. Additionally, YG recently enumerated several efforts that are underway to address health services challenges currently experienced in the territory.[942]

The Town of Watson Lake and the City of Whitehorse, two of the communities located in the RAA, have hospitals. However, these hospitals are also seeing challenges in staffing and availability of health services and healthcare providers. Major emergencies occurring on the project site will inevitably see injured workers sent to the City of Whitehorse or out of territory to larger health centres (Vancouver, Calgary, or Edmonton). The use of and reliance on the local community (mostly likely the Town of Faro), Whitehorse General Hospital, or out-of-territory facilities would be coordinated and determined through discussions amongst the Proponent and multiple levels of government.

The remaining communities rely on ambulance, nursing stations, and health centres for their day-to-day medical care. Many appointments require travel to the City of Whitehorse by community members. The City of Whitehorse, however, continues to face doctor shortages at both the hospital and family practice levels.[943]

The project site is currently under care and maintenance, which means there are requirements laid out under the *Occupational Health and Safety Regulations* pertaining to first aid provisions, health, safety, and emergency services on-site. These services will continue into active remediation. The Proponent has identified that it will engage with YG, including Emergency Medical Services and the Yukon Hospital Corporation, to bring its conceptual Emergency Response Plan to completion. This plan would outline the roles of the various organizations in dealing with on-site emergency response and service delivery.

Meanwhile, fire services throughout the LAA and RAA communities are supported by a strong volunteer base, increases in training,[944] and facility improvements[945] in a number of

[941] MacIntyre, “Mental health support still lacking in Faro, Yukon, says mayor,” *CBC News,* October 26, 2023, https://www.cbc.ca/news/canada/north/mental-health-support-lacking-faro-yukon-1.7009790.
[942] Government of Yukon, “Statement from Minister of Health and Social Services Tracy-Anne McPhee on health centre service reductions and staffing shortages,” Government of Yukon*,* July 28, 2023, https://yukon.ca/en/news/statement-health-and-social-services-minister-tracy-anne-mcphee-health-centre-service.
[943] Hatherly, “Yukon doctor fears for hospital inpatients amid physician shortage,” *Yukon News*, July 28, 2023, https://www.yukon-news.com/local-news/yukon-doctor-fears-for-hospital-inpatients-amid-physician-shortage-7113032.
[944] MacIntyre, “Fire services have returned to Pelly Crossing, Yukon, after a decade without.”
[945] Government of Yukon, “New Community Services Building opens in Faro.”

communities. Ross River recently saw new volunteer training,[946] while a new community services building, including emergency services facilities, opened in 2022 in the Town of Faro.[947] Whitehorse fire services are provided by the City of Whitehorse. Wildfire services are provided across the territory by the territorial government through the Wildland Fire Management Branch. Wildfire services are not being examined as part of this assessment.

There is a fire pump building on-site to deal with any fire emergencies that may arise (not including wildfire), which will continue to be used during active remediation. No reliance on local fire protection services for on-site fire management issues is expected.

26.3 Proponent Mitigation Measures

The Proponent will implement the Occupational Health and Safety Plan, Worker Health and Safety Protocols, worker orientation, and Emergency Response Plan, including on-site emergency services. This is expected to limit risks and serious injuries and subsequently reduce the need to rely on community and territorial health services.

26.4 Project Effects Characterization

26.4.1 Project Effect: LAA and RAA communities are likely to experience effects to health and social worker services during the active remediation phase of the Project

Healthcare provider and social worker shortages in the Town of Faro may be further exacerbated by the Project during active remediation. Where there is currently little to no available nursing or social worker services, an increase in the community residents requiring care and services is likely to prove problematic. Additionally, in circumstances of on-site accidents or emergencies that are beyond the capacity of the Proponent facilities and services, the Town of Faro, its health resources and services are likely to be utilized, causing further strain.

Other communities in both the LAA and RAA may also experience increasing demand for health and social work services. Community residents who choose to seek employment at the project site may experience increased stress resulting from shift-work schedules, as well as distance from family, friends, and the community during shift rotation. Further, while on-site health services are provided, follow-up services may be required within a community where injury, health, or other concerns arise when not at the worksite.

Increased demand for social worker supports may also be seen by family members of project-employed workers, who may be experiencing newfound stresses with their family member working shift work and/or difficulties managing under changing circumstances. Evidence shows that shift work and non-standard working hours can lead to increased family and community

[946] Government of Yukon, “Work progresses on strengthening fire services in Keno, Ross River, Old Crow and other Yukon communities.”
[947] Government of Yukon, “New Community Services Building opens in Faro.”

stresses.[948] Further, mental health, stress, and well-being of fly-in/fly-out workers is known to be impacted by shift work.[949, 950] Fly-in/fly-out work is not proposed for this project, however living at an on-site camp for two weeks and then off-shift/off-site for two weeks could lead to similar experiences of stress, relationship discord, and loneliness,[951] regardless of road access to and from the camp and project site.

In addition to the above pressures on social worker services and healthcare, the City of Whitehorse may also experience greater strain on its emergency health services. In particular, where on-site accidents or emergencies require individuals to be cared for in the City of Whitehorse, the system, professionals, and resources already under strain are likely to be adversely impacted.

26.4.1.1 Significance Determination

The EC determines that the Project is likely to significantly exacerbate already strained health and emergency services in LAA and RAA communities during active remediation. It is likely that an increase in demand for these services throughout the communities will result in significant adverse effects. The period of active remediation is 15 years, which is a substantial time period for an already fragile system to try to sustain increasing demand for such services. As such, the following mitigations are recommended to reduce, control, or eliminate significant adverse effects:

16. The Proponent shall establish a comprehensive on-site emergency and first aid services facility to minimize use of off-site first aid and emergency requirements which will limit the need to use services and resources from the Town of Faro.

17. The Government of Yukon shall work with the Proponent to identify needs or funding gaps to support additional requirements in health and emergency services in the Town of Faro that may result from the use of these services by employees of the Project.

These terms and conditions will contribute to reducing the reliance on health and emergency services of the nearby communities. Further, through collaborative and proactive efforts between the Proponent and YG, more immediate and longer-term heath and emergency services needs and funding for the Town of Faro will be managed and addressed.

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[948] Arlinghaus, et al., "Working Time Society Consensus Statements: Evidence-based Effects of Shift Work and Non-standard Working Hours on Workers, Family and Community," *Industrial Health* (2019): 184-200.

[949] Gardner, et al., "Mental Health and Well-being Concerns of Fly-in Fly-out Workers and Their Partners in Australia: A Qualitative Study," *BMJ Open* 8 no. 3 (2018).

[950] Heidenreich, "Report finds Alberta's 'fly-in, fly-out' oilsands workers face significant stress, reluctant to seek help," Global News, October 26, 2021, https://globalnews.ca/news/8328249/alberta-oilsands-worker-camps-stress-fly-in-fly-out/.

[951] CBC News, "Fly-in work and family stress: Researchers explore the pitfalls for remote workers," CBC News, October 22, 2017, https://www.cbc.ca/news/canada/north/mobile-workers-guidebook-fly-in-workers-1.4359199.

26.4.2 Project Effect: Health and emergency services will not be impacted during the 10-year operations and maintenance phase of the Project

There will be fewer workers on-site during the operations and maintenance phase, putting less strain on surrounding community health and emergency services infrastructure and resulting in an overall reduced need for such services. The nature of work at the site during the operations and maintenance phase will change, requiring fewer workers, less large equipment, and a reduction in supporting services and infrastructure, altering and reducing various hazards that will exist during active remediation. The operations and maintenance phase will focus predominantly on monitoring, inspections, and water treatment.

26.4.2.1 Significance Determination

The EC determines that LAA and RAA communities are unlikely to experience pressure during the operations and maintenance phase due to the Project. On-site medical and emergency services will scale appropriately to site and worker numbers to continue to support project site needs.

27 MENTAL HEALTH AND SUBSTANCE USE SERVICES

27.1 Overview

Mental health and substance use services refer to a variety of services related to mental health and substance use, including counselling programs, rehabilitation programs, and community and cultural supports. This VESEC will include potential changes to the availability, accessibility, and quality of these services as a result of the Project and the project workforce.

The EC determines that the Project is likely to result in significant adverse effects to mental health and substance use services in communities within the region during active remediation, as a result of increased demands on already strained services.

27.1.1 Reason for Inclusion

The WHO defines mental health as "a state of wellbeing in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community." [952] Well-being is the state in which an individual or group is able to experience health, happiness, and prosperity and includes having good mental health, life satisfaction, a sense of meaning or purpose, and the ability to manage stress.[953] Mental health services are a critical piece of infrastructure that supports individuals, their families, and the community at large in ensuring happiness, prosperity, productivity, and well-being.

Substance use goes hand in glove with mental health, as they are often inextricably entwined. When one's mental health suffers, there is an increased likelihood of substance use. Substance use is a coping mechanism for stress, trauma, grief, and depression. Substance use, however, is known to exacerbate the emotions and experiences that are often the cause of substance use in the first place. Substance use services, resources, and programs are important tools to prevent, reduce, or eliminate drug and alcohol use amongst individuals and within a community.

27.2 Existing Conditions

Mirroring shortages in social workers and healthcare providers in communities, mental health and substance use services are also under increasing strain in the territory.

As recently as October 2023, the Town of Faro was without mental health and substance use service providers:[954]

[952] World Health Organization, *Mental Health*, 2022, https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response#:~:text=Mental %20health %20is %20a %20state,and %20contribute %20to %20their %20community.
[953] World Health Organization, *Epidemiology of Childhood Mental Illness: A Review of U.S. Surveillance Data and the Literature*, 2004.
[954] MacIntyre, "Mental health support still lacking in Faro, Yukon, says mayor."

> In the Town of Faro's October newsletter, Bowers [Mayor Jack Bowers] wrote that the mental health worker that had been serving the Town of Faro left the job after being compelled to also serve more communities than agreed to. Bowers said the only mental health support that is now provided to residents is from a social worker who travels from Whitehorse once or twice a month, for a day or so.[955]

Other communities throughout the territory are also seeing strain on such services, as noted above in the health and emergency services VESEC. In many cases, a reliance on nurses and doctors to provide, mental health and substance use services, in addition to physical care, exists.

In recent years, many communities have experienced increases in mental health service needs and increasing tragedies stemming from mental health issues. In 2021, the Auditor General of Canada released a report regarding mental health services in rural Yukon,[956] which acknowledged YG's *Mental Wellness Strategy 2016-2026* and further acknowledged the important linkages and calls to action identified by the Truth and Reconciliation Commission of Canada. A key audit finding is that, despite YG's efforts, the struggle to recruit and retain staff to deliver these services is a challenge felt in many northern communities across the country.[957]

Most of the communities affected by the Project are predominantly First Nations communities. It is important to acknowledge that historical factors have resulted in First Nations communities and individuals facing greater mental health and substance use challenges: "ongoing intergenerational effects on the psychological well-being of Aboriginal communities."[958] Multiple factors and historical and social determinants of health contribute to the mental health challenges faced by First Nations. Further, "Indigenous Peoples face multiple barriers in accessing adequate mental health care, primarily due to systemic racism stemming from colonial practices and policies like residential schooling."[959] This context serves as a backdrop to better understand the complex challenges faced within these communities. These challenges, coupled with limited services and resources, have resulted in a precarious situation.

Many communities throughout the Yukon have, in recent years, also experienced greater substance use issues. The Yukon has experienced a surge in opioid use, leading to what is now

[955] MacIntyre, "Mental health support still lacking in Faro, Yukon, says mayor."
[956] Office of the Auditor General of Canada, *Mental Health Services in Rural Yukon—Department of Health and Social Services*. 2021.
[957] Office of the Auditor General of Canada, *Mental Health Services in Rural Yukon—Department of Health and Social Services*.
[958] Boksa, Joober and Kirmayer, "Mental Wellness in Canada's Aboriginal communities: striving towards reconciliation," *Journal of Psychiatry and Neuroscience* 40 no. 6. (November 2015).
[959] Health Canada, "Government of Canada announces $2.5 million for Projects to improve mental health supports for Indigenous Peoples," *Government of Canada,* July 21, 2023, https://www.canada.ca/en/health-canada/news/2023/07/government-of-canada-announces-25-million-for-projects-to-improve-mental-health-supports-for-indigenous-peoples.html.

deemed a crisis.[960] In January 2022, YG declared a substance-use health emergency, with the health minister saying that drugs are killing people and creating a mental health crisis in every community in Yukon.[961] Statistics from 2021 show that the territory has the highest per capita opioid overdose rate in Canada.[962]

Governments are working to try to address the substance use emergency through implementation of myriad tools, programs, services, and approaches outlined in the 2023 *Substance Use Health Emergency Strategy*.[963,964] First Nations governments are also declaring their own substance use emergencies[965] and working to implement in their communities and amongst their members or citizens tools, programs, approaches, services, and cultural connections to address the issue.

Municipalities are also pushing territorial and federal governments for additional funding and supports for mental health services. Most recently, this took the form of a Yukon delegation attending the Federation of Canadian Municipalities (FCM) conference and joining the resolution to have the federal government acknowledge mental health as a national emergency and better incorporate it into Canada's healthcare system.[966] The FCM has also issued a roadmap to mental health in an attempt to address mental health at the municipal level.[967]

27.3 Proponent Mitigation Measures

The Proponent will implement the Occupational Health and Safety Plan, Worker Health and Safety Protocols, worker orientation, and Emergency Response Plan, including on-site emergency services, which will provide some degree of support pertaining to mental health and substance use services. This may reduce impacts and may lessen or delay the need to rely on community and territorial health services.

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[960] Canadian Mental Health Association, "CMHA, Yukon Division Statement on the Opioid Crisis," Canadian Mental Health Association, April 9, 2021, https://yukon.cmha.ca/cmha-yukon-division-statement-on-the-opioid-crisis/.

[961] Alam, "Spike in deaths causes Yukon to declare overdose emergency," *CTV News,* January 20, 2022, https://www.ctvnews.ca/canada/spike-in-deaths-causes-yukon-to-declare-overdose-emergency-1.5747946#:~:text=The %20Yukon %20government %20has %20declared %20a %20substance-use %20health,mental %20health %20crisis %20in %20every %20community %20in %20Yukon.

[962] Alam, "Spike in deaths causes Yukon to declare overdose emergency."

[963] Government of Yukon, *Substance Use Health Emergency Strategy*, 2023, https://yukon.ca/sites/yukon.ca/files/hss/hss-substance-use-health-emergency-strategy-2023_0.pdf.

[964] Government of Yukon, "New Substance Use Health Emergency Strategy supports the health and safety of all Yukoners and communities," *Government of Yukon*, August 23, 2023, https://yukon.ca/en/news/new-substance-use-health-emergency-strategy-supports-health-and-safety-all-yukoners-and-communities.

[965] MacIntyre, "Vuntut Gwitchin chief says community in 'dire situation' with substance use crisis," CBC News, April 24, 2023, https://www.cbc.ca/news/canada/north/vuntut-gwitchin-substance-use-crisis-1.6819202.

[966] Webb, "Yukon communities join municipal leaders across country to push feds for support in several areas."

[967] Federation of Canadian Municipalities, *FCM Roadmap for Municipal Mental Health Initiatives*. n.d., https://media.fcm.ca/documents/resources/Municipal-Mental-Health-Roadmap.pdf.

27.4 Project Effects Characterization

27.4.1 Project Effect: Increased pressures on mental health and substance use services in Yukon communities during the active remediation phase

As identified in the health and emergency services VESEC, shift work and drive-in/drive-out (fly-in/fly-out) remote camp work leads to increased stress and strains on mental health. These remote work camps often result in more challenging conditions, such as:

- Logistical conditions: for example, workplaces that are isolated both physically and socially. Isolation can increase issues, such as loneliness and stress, contributing to adverse effects to mental health and well-being, such as the onset of depression and anxiety;
- Structural conditions: for example, workers may work long hours and be subject to extreme conditions (heat, noise, etc.), accommodations may not allow for adequate or sufficient sleep, leading to increased fatigue. These factors can create and worsen stress, as well as depression and anxiety; and
- Organizational conditions: for example, lack of supportive mental health programs available on-site, a workplace culture that stigmatizes mental health issues and help-seeking behaviour. Male-dominated industries (such as the resource industry) are more prone to these workplace cultures and, as a result, are associated with higher rates of mental health effects and suicide.

These challenging conditions are likely to mean more workers seeking mental health services or looking to substance use to cope and, ultimately, they and their families' requiring substance use services and supports. With substance use already identified as being in a state of crisis, the state of mental wellness amongst First Nations communities, and the limited availability of services and resources to address substance use, demand within the communities for such services as a result of the Project is unsustainable.

27.4.1.1 Significance Determination

The EC determines that the Project is likely to result in a significant adverse effect to mental health and substance use services in LAA and RAA communities. As such, the following mitigations are recommended to reduce, control, or eliminate significant adverse effects:

18. The Proponent shall provide on-site health services staff (nurses, First Aid Technicians, and/or Emergency Medical Technicians) that are trained in:
    a. Mental Health First Aid and/or have formal mental health training to provide employees with access to mental health support services; and
    b. Substance use support or formally trained in counselling to provide employees access to appropriate services.
19. The Proponent shall ensure that management and human-resources staff complete training to recognize and support mental health issues in the workplace and be able

to provide employees with access to appropriate services and resources, on and off-site.

20. The Proponent shall establish or provide private access to Employee Assistance Plan services:
    a. To provide access and ensure mechanisms are in place for employees (on- or off-site and on- or off-duty) and eligible dependants of employees to confidentially access Employee Assistance Plan services via in-person, phone, or online; and
    b. To ensure that on-site employees have the ability to utilize the Employee Assistance Plan services available (i.e., make available a private phone line or internet connection so employees can discreetly reach Employee Assistance Plan services).
21. The Proponent shall create a mentor program for Yukon First Nations employees to achieve the following goals:
    a. Develop a formal feedback process for First Nation employees to voice their concerns and address negative experiences that are resulting in mental health issues;
    b. Establish peer support program, aimed at positive mental health and addictions recovery; and
    c. Involve Ross River Dena Council, Liard First Nation, and Selkirk First Nation in further developing the program so that it meets the needs of First Nations employees.
22. The Proponent shall make efforts to reduce other stressors to First Nations employees by:
    a. Allowing First Nations employees schedule flexibility to facilitate participation in cultural practices or seasons:
    b. Establishing an elder-in-residence program; and
    c. Facilitating and supporting traditional land-use activities in proximity to the project site.

The above terms and conditions will help reduce and control effects to mental health and substance use services and the demands on them, by providing greater training, and on-site and employer-based supports for staff in a proactive, supportive and multifaceted manner. Additionally, specific culturally relevant and uniquely supportive measures for Yukon First Nations employees, developed in a collaborative manner, are innovative and proactive measures to manage mental health and substance use concerns.

28 COMMUNITY WELL-BEING

28.1 Overview

Community well-being is the conditions that allow communities and the people who live within them to flourish. It includes both the health and well-being of individuals and the communities in which they live. It is informed by cultural connection and continuity, stability (both financial and social), individual health and well-being, and relationships in the community. Health can be understood through four different elements: spiritual, mental, physical, and emotional. These elements apply to both community and individual health.

Projects do not occur in isolation in the physical landscape. Likewise, they do not occur in isolation in the social landscape. Non-medical factors influence human health. These are the conditions in which people are born, grow, work, live, and age, as well as the broader factors that determine individual health. LFN noted that:

> We have had some good discussions in earlier SATAC's about finding a robust view of health and embedding it a multidimensional notion of wellbeing. This includes some of the cultural, economic, and other social contributors to human health, just as a physical construct.[968]
>
> Overall well-being and social problems are both related to a combination of other dimensions of living conditions including domestic and cash production, strength of cultural values, social participation, physical and mental health, and a sense of local control.[969]

Effects to community well-being are likely to flow from changes to the population structure of the assessment area, changes to income levels, and the arrival of transient workers.

The assessment of project effects on community well-being includes the following:

- Changes to the population structure of the assessment area as individuals seeking work relocate to or from the assessment area
- Increased income levels within the assessment area due to employment opportunities at the Project
- Changes to communities associated with the arrival of transient workers to the assessment area

The Project will not have significant adverse effects on community well-being from changes to population structure. Changes to population structure associated with the Project may occur, but the magnitude of these changes is limited by housing availability and the limited increase in total workers in the assessment area.

[968] YOR 2019-0149-2584, p.49
[969] YOR 2019-0149-3236, p.2

The Project will not have significant adverse effects on community well-being from changes to income levels. Again, limited housing curtails the changes assessment area communities will experience. The vast majority of project workers will live on-site at the Project, limiting community exposure to project effects. Finally, the total number of workers in the assessment area associated with the Project is not vastly different than the number of workers currently on-site.

The project will not have significant adverse effects on community well-being due to an influx of transient workers associated with project activities. The use of an on-site camp and workplace policies and training reduce the significance of an influx of transient workers on community well-being.

28.1.1 Reason for Inclusion

First Nations comment submissions and input during SATAC sessions and meetings have expressed concerns that project activities will impact community well-being[970] by driving changes to the population structure, personal health and well-being, and individual income, which may be large enough to exceed the tolerance limits for community well-being.[971]

Job creation and economic input associated with the Project may change the current balance and structure of communities and families and/or contrast with traditional/cultural values, which could affect individual and community health.[972]

Yukon communities confront endemic issues, such as higher rates of crime,[973] domestic violence,[974] and negative impacts from colonization.[975]

28.2 Spatial Boundaries

The assessment area for the community well-being VESEC is not a geographic boundary, rather it is the people and communities most likely to be impacted by project effects. The EC identified affected communities from information in the project proposal and comments throughout the assessment process, SATAC sessions, and meetings with First Nations.

The spatial scope for assessment of project effects to community well-being includes members and citizens of RRDC, LFN, SFN, and the communities in which they live, and the communities where they live, as well as residents of the Town of Faro.

- RRDC, LFN, the community of Ross River, and the Town of Watson Lake:

[970] YOR 2019-0149-9158
[971] YOR 2019-0149-5662
[972] YOR 2019-0149-5406, p. 107.
[973] Human Environment Project Proposal, YOR 2017-0211-0251.
[974] This was 911.6 incidences per 100,000 population in 2014. Yukon Bureau of Statistics, 2014.
[975] Within this section, “impacts of colonization” refers to the following: residential school legacies and effects of displacement and disenfranchisement from the Indian Act and the Sixties Scoop.

- The Project is located entirely within the Traditional Territory of the Kaska Nation. The RRDC and LFN are members of the Kaska Nation. Comments from RRDC and LFN reflected both the history of effects from industrial activity in and around the Faro Mine and the potential for a continuation of these effects, or new effects from the Project. While Watson Lake is geographically removed from the project site, LFN have identified clear pathways for project effects to impact the community well-being of LFN members who reside in Watson Lake and surrounding areas.

- SFN and the community of Pelly Crossing; and
  - Comments from SFN identified a history of use of the region around the project site, in addition to concerns about the experiences and health of SFN citizens living in and around Pelly Crossing, downstream of the project site.

- Town of Faro.
  - Faro is located 20 km from the project site.

28.3 Existing Conditions

The existing conditions are the expected conditions after the North Fork Rose Creek realignment has been completed, prior to commencement of the Project. This includes the conditions resulting from historical mining activity at and around the project site and the associated impacts.

Historic mining and industrial activities at and around the project site have left a legacy of effects that inform the context of the assessment for the Project. In their comment submissions, RRDC note a legacy of racism and sexism attached to the original Faro Mine and that "...by centering opportunities entirely in the Town of Faro, the Project risks perpetuating racism and overlooking opportunities to support businesses in Ross River."[976]

This context informs the EC's assessment of the Project.

28.4 Proponent Mitigation Measures

The Proponent proposes to mitigate project effects to community well-being in the following ways:

- Housing workers for the project in a 304-person work camp to reduce disruption to nearby communities, reducing strain on community infrastructure services and isolating communities from exposure to transient workers;
- Developing and implementing a Socio-Economic Management and Monitoring Plan[977] (SMMP), implemented by the construction manager under the direction of the

[976] YOR 2019-0149-0555, pp. 9-10
[977] YOR 2019-0149-9964

Socio-Economic Working Group (comprised of affected First Nations and the Proponent), which sets out:

  - Community grievance mechanisms;
  - Indigenous awareness and safety training;
  - Information and referral services for family-related resources, such as childcare, public schools, and parenting resources;
- A workplace harassment policy developed by a qualified expert that includes:
  - Mandatory harassment prevention training;
  - Zero tolerance for sexual harassment, bullying, or gender-based violence;
  - Standards and codes of conduct in relation to the sex trade;
  - A formal feedback process for First Nations employees to voice their concerns; and
  - A process to identify and address negative experiences.
- Workplace polices that promote a safe, respectful, and inclusive environment for women and gender and sexual minorities;
- A domestic abuse policy and associated support mechanisms; and
- The provision of recreational facilities to keep workers on-site.
- Prohibiting drugs and alcohol on-site; and
- Transportation to the project site from the Town of Faro and the community of Ross River.

28.5 First Nation and Community Input

28.5.1 Ross River Dena Council

RRDC emphasized links between harvest and social structure. They describe how the ability to practice traditional activities, such as harvesting, are connected to the well-being of their members and community as a whole. RRDC's input reflects the legacy of effects associated with industrial activity that has changed how and where RRDC members live and practice many traditional activities. They describe how RRDC members are still experiencing these effects to this day.

At the SATAC II workshop, Chief Caeser explained that RRDC continues to experience effects of the original Faro Mine. In the chief's address, he stated, "The mine development not only displaced our people, but the mining activities continues to inflict social and economic as well as environmental harm to my people, something that started since the first day the exploration and development."[978]

RRDC also emphasized that the current resilience of the community of Ross River is not a mitigation to project impacts, stating:

[978] YOR 2019-0149-1912, Chief Caesar (opening statements for the SATAC workshop in January 2021)

> Ross River's 'resilience' in the face of boom-and-bust mining economies should not be considered a mitigation tool for economic or community wellness socio-economic indicators. Responsibility for the impacts of both mining and remediation should be placed solely on the Proponent, not on the community of Ross River (and a reliance on their historical 'resilience' despite colonial violence).[979]

RRDC comments described an ongoing legacy of racism and sexism associated within the Town of Faro and the Faro Mine and shared the importance of discontinuing this legacy. They note that, historically, the community of Ross River did not benefit from historical activity at the project site, unlike Faro:[980]

> The Town of Faro itself, and an associated influx of outside workers, should be considered as a potential impact on [Ross River] community well-being. The Project Proposal should include an upfront discussion about the challenges of racism and sexism and should outline mechanisms of changing the work culture beyond just 'sensitivity training', which has had limited effectiveness in the past.[981]

28.5.2 Selkirk First Nation

SFN comments focused on the importance of salmon and linkages between harvest, fish camps, and community resilience and cohesion. They noted that the salmon (and other species) harvest is not only culturally important, but also a significant financial offset, particularly for low-income families. SFN comments also explained that social and community relationships are a strong reason for choosing to live in the community of Pelly Crossing despite limited economic opportunities.

SFN highlighted the importance of salmon to their community well-being. The collective sharing of food, knowledge, and time is an important element in the well-being of their community. Salmon and other traditional practices are interconnected with this.[982]

The SFN Traditional Land Use Study[983] suggests that traditional harvesting activities are a significant financial offset to low incomes and reduce some financial dissatisfaction.[984]

The leading reasons given by SFN citizens for remaining in their community are good hunting, trapping, fishing, and other harvesting; family obligation and attachment; and community and social networks.[985] Social relationships are an important reason why people choose to remain in small communities, like Pelly Crossing, despite a lower cash-based standard of living.

[979] YOR 2019-0149-0555, p.10
[980] YOR 2019-0149-0555
[981] YOR 2019-0149-0555, p.58
[982] YOR 2019-0149-8928
[983] YOR 2019-0149-5184
[984] YOR 2019-0149-8928
[985] YOR 2019-0149-8928

28.5.3 Liard First Nation

LFN explained that their approach to community well-being is connected to occupational health, First Nations way of life, cultural vitality, identity, and self-determination. From LFN's perspective, these factors contribute to the overall health of their Nation and members.

In comments[986] on the community well-being VESEC outline,[987] LFN described the importance of using established frameworks described below:

- The social determinants of health
- The social determinants of Aboriginal health
- The Indigenous determinants of health
- Indigenous community well-being frameworks
- The Department of Finance Quality of Life Framework

These frameworks are valuable tools for monitoring the influence of this project on community well-being and other VESECs during the life of the Project.

LFN provided extensive comments on the community well-being VESEC outline.[988] They described the importance of using an Indigenous community well-being framework to understand project effects to Indigenous communities. They note that common characteristics of this framework include connection and disconnection among community members to each other and their community, well-being as a collective, not individual, pursuit, the strengths and capacity of communities, capacity-building centred within the community, and multiple dimensions of well-being (cultural, TK, strength and resilience, supports and services, learning capacity, livelihood, equity, and people patterns).

28.6 Assessment Frameworks

28.6.1 Canadian Public Health Association Social Determinants of Health[989]

The Social Determinants of Health (SDH) are social and economic factors that influence people's health. Where people grow, live, work, and age are important influences on their health. The SDH are a range of personal, social, and environmental factors that influence the health of individuals and communities.

HC lists the following determinants:[990]

- Income and social status
- Employment and working conditions
- Education and literacy

[986] YOR 2019-0149-1279
[987] YOR 2019-0149-7858
[988] YOR 2019-0149-1279
[989] Canadian Public Health Association, *What are the social determinants of health?*, n.d., https://www.cpha.ca/what-are-social-determinants-health.
[990] Government of Canada, *Social determinants of health and health inequalities*. n.d.

- Childhood experiences
- Physical environments
- Social supports and coping skills
- Healthy behaviours
- Access to health services
- Biology and genetic endowment
- Gender
- Culture
- Race/Racism

28.6.2 Quality of Life Framework for Canada[991]

This framework uses 84 indicators categorized into the "domains" of prosperity, health, society, environment, and governance. Examination of these indicators and domains occurs through the two lenses of fairness and inclusion and sustainability and resilience. A broad range of indicators in the framework produces a quality-of-life metric, which provides a tool to understand the interaction of the Project with community well-being.

28.6.3 National Collaborating Centre for Indigenous Health[992]

The National Collaborating Centre for Indigenous Health (NCCIH) is an Indigenous organization established by GC and funded through the Public Health Agency of Canada. It supports First Nations, Inuit, and Métis public health renewal and equity. During SATAC sessions,[993] LFN pointed to the Indigenous determinants of health forums as a resource for scoping VESECs and identifying indicators.

28.6.4 Community Well-Being Index

The Community Well-Being Index measures socio-economic well-being for communities across Canada over time. It has four components: education, labour force activity, income, and housing.

28.7 Indicators

In the project proposal, subsequent IRs, and SATAC sessions, indicators to assess community well-being have been identified by the Proponent. Comments from LFN, SFN, and RRDC have informed the identification of these indicators and ultimately guided how the EC assesses project effects:

[991] Government of Canada, *About the Quality of Life Framework for Canada*, 2002, https://www160.statcan.gc.ca/about-apropos-eng.htm.
[992] "Welcome to the NCCIH," National Collaborating Centre for Indigenous Health, 2024, https://www.nccih.ca/en/.
[993] YOR 2019-0149-9158

- Demographics and population, including population abundance and change, age and gender, and population mobility;
- Community and individual health via perceived physical and mental health and stress levels, life expectancy at birth, drug and alcohol use, distance to care, and obesity rates. The Community Well-Being Index and Consumer Price Index were also used by the Proponent to assess community well-being;
- Community cohesion based on jobless youth, unemployment rates, life satisfaction, social support network availability, and participation in traditional activities;
- Incidence of crime and violence;
- Alcoholism and substance use;
- Housing; and
- Availability of services and infrastructure.

The EC relied on the Proponent's identification and interpretation of indicator values during this assessment.

28.8 Project Effects Characterization

28.8.1 Project Effect: Rapid population influx into and out of the assessment area may result in pressures on families and community groups, conflict, and a change in local cultural values impacting community well-being

Rapid temporary changes to the size and composition of the population structure of assessment area communities can result in adverse effects to community well-being when conflicts and/or tensions increase between non-local workers and community residents, and as community members leave their communities, altering the structure of the community.

Population levels in the assessment area communities have not been static. The community of Ross River and the Town of Faro have grown by more than 20 %, while the population of the community of Pelly Crossing has shrunk by 10.5 %. The town of Watson Lake has changed the least, with 4.6 % growth. Table 16 shows population changes for assessment area communities:

Table 16: Population Changes from 2016 to 2021[994]

Community	Population, 2016	Population, 2021	% Change
Faro	348	440	26.4
Ross River	293	355	21.2
Pelly Crossing	353	316	-10.5
Watson Lake	1 083	1 133	4.6

[994] Statics Canada. Census Profile, 2021 Census of Population.https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&SearchText=Yukon&DGUIDlist=2021A000260&GENDERlist=1&STATISTIClist=1&HEADERlist=0

As identified in the housing VESEC (section 23), there is limited housing available in assessment area communities. This can be a potential source of conflict when workers compete with residents for available housing.

Housing in the Yukon is an ongoing concern and the subject of federal, territorial, and community planning.[995] In recent years, in particular, community and non-profit organizations have been raising the alarm surrounding housing availability and affordability throughout the Yukon. Housing availability contributes to community cohesion and population sustainability. Conversely, a lack of housing is associated with decreases in affordability, out-migration, and fracturing of social networks.

Housing availability is explored in the housing VESEC (section 23). In summary, there is limited availability of housing in the Yukon and, particularly, in the assessment area.

In the Town of Faro, located approximately 20 km from the project site, the population will likely increase as less transient project employees may choose to live there. However, based on the background level of population changes in this community, the magnitude of effects of the Project on population levels is likely to be small.

The population of Pelly Crossing may see a small decline as SFN citizens and other community members relocate to communities where employment by the Project is more accessible (i.e., Faro, Whitehorse). Again, when compared to background population changes, the magnitude of this change is minimal.

In Ross River, transportation provided by the Proponent to the project site may draw RRDC members back to the community, seeking employment. However, as there is no housing available Ross River, the magnitude of this change is limited. While a small number of employees may be able to find accommodations within the community, the lack of other accommodations curtails this influx.

With provided transportation between the project site and Ross River, RRDC members will not have to leave the community to become employees of the Project, limiting further changes to the community.

The Proponent has indicated that a 304-person camp will be established on-site to house workers. By providing housing on-site for the project workforce, the magnitude of changes to the assessment area will be limited.

28.8.1.1 Significance Determination

The Project is not likely to have significant adverse effects to community well-being through rapid population influx into and out of the assessment area. While the EC has identified changes

[995] City of Whitehorse, *Whitehorse 2040: Official Community Plan, 2023*, https://www.whitehorse.ca/wp-content/uploads/2023/04/Whitehorse-2040-Official-Community-Plan-1.pdf.

to communities in the assessment area driven by the Project, the magnitude of these changes is likely to be small and further limited by mitigations identified in the project proposal.

In most cases, the availability of housing limits the expansion of populations in communities. Housing availability in the Town of Faro is limited, and it is virtually non-existent in Ross River. Additionally, First Nations employment at major mines is typically low, limiting the magnitude of this effect on the community of Pelly Crossing.[996]

In addition, while the Project is expected to house up to 304 people in the on-site camp, the expected workforce is 156 people in two 2-week rotations of 78 people. The Project will take place on an active work site with a currently in-use work camp. For example, in 2018, 130 people were on-site.

28.8.2 Project Effect: Increased income disparity in the assessment area may impact community well-being

Employment at the Project will increase the average income of people living in the assessment area through direct employment at the Project and, indirectly, by increasing money spent in the assessment area. Changes in income can lead to increased substance use and income disparities, which can in turn lead to inter-family and inter-community relationship strain, increased violence, and individual health impacts.

However, direct and indirect employment opportunities and associated income will be most prevalent during the 15-year active remediation phase, with fewer opportunities for employment during the 10-year long-term operations and maintenance phase.

28.8.2.1 Substance Use

In scientific literature, drug and alcohol use is linked with a decline in overall individual health and well-being. It also affects well-being at the community level by damaging relationships and inhibiting users' participation in the community. For First Nations communities, drug and alcohol use is connected to historical trauma associated with colonization and other harms.[997] For First Nations affected by this project, historical activities in and around the project site are a large component of this history. Throughout comment submissions and during SATAC sessions, RRDC and LFN reiterated their concerns about resolution of this legacy.[998]

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[996] A 2016 Mining Industry Human Resources Council report suggested Aboriginal employment in major mining projects is 2-4 % of the total employment figure. Nationwide, the Aboriginal employment rate in the mining and ancillary industry is as high as 12 % of the total workforce. Data from the 2015 Minto Mine Socio-Economic Monitoring Report indicates that, in 2015, there were less than 20 SFN members employed.

[997] Council of Yukon First Nations, *Yukon First Nation Mental Wellness Workbook AHTF 2010*. 2010, https://cyfn.ca/wp-content/uploads/2013/09/MentalhealthworkbookVer1June2010.pdf.

[998] YOR 2019-0149-127

Increased income has been linked to increased drug and alcohol use,[999] disrupting community well-being by straining relationships, increasing the likelihood of domestic violence, and reducing individual health. Further, there is a link to increased property crime associated with drug and alcohol use.[1000] Freedom from crime is identified as a dimension of well-being in the Quality of Life Framework for Canada. Crime affects communities in different ways. It can undermine the social fabric or the interpersonal relations of a group by causing people to stop trusting each other, working together, and participating in their community.

28.8.2.2 Income Disparity

Further, the Project will increase income disparity among community members, which can also affect community well-being:

> Inequality matters for two reasons: (i) rising inequality slows down poverty reduction; and (ii) high inequality could weaken the basis of growth. Changes in poverty depend on both the growth rates in mean income and inequality in the distribution of benefits from growth. While an increase in mean income reduces poverty, rising inequality exacerbates poverty; hence, the net effect on poverty reduction will be slower with increasing inequality.[1001]

The Project is likely to increase the income of people living in the assessment area communities by providing additional employment opportunities. Increased income can lead to both increased opportunities for alcohol and drug use and the effects of income disparity on community well-being.

Employment opportunities in the assessment area are limited, and the assessment area communities tend to have high unemployment rates, making employment at the Project desirable. Workers living in the assessment area may also experience loss of employment and changes to income levels when the Project transitions from the active remediation stage to the operations and maintenance stage.

28.8.2.3 Significance Determination

The EC determines the Project is not likely to have significant adverse effects to community well-being through increased income levels in the assessment area.

The magnitude of change to community well-being associated with changes to income levels is likely to be small. First, LAA communities already display a range of income levels amongst community members.[1002] Most individuals employed by the project will reside in a camp at the

[999] Karriker-Jaffe et al., "Income Inequality, Alcohol Use, and Alcohol-Related Problems," *American Public Health Association* 103 no. 4 (2013): 649-656, doi: 10.2105/AJPH.2012.300882.
[1000] YOR 2019-0149-5184
[1001] Kakwani and Son, Income Inequality and Social Well-being. *Expert Group Meeting on Sustainable Development and Agenda 2030*. 2015, https://www.un.org/esa/socdev/egms/docs/2015/sd-agenda2030/Hyun-Son.pdf.
[1002] Government of Canada. Statistics Canada. *Census profile, 2021 census of population.* 2021.

project site, reducing effects on communities. Workers may choose to reside in the Town of Faro, but housing availability is limited, reducing the magnitude of this change. In other communities in the assessment area, housing is not available.

Secondly, while the Project will increase the number of people working in the assessment area, the number of people employed by the Project is not vastly different from the number of people currently working at the project site. Employment numbers at the current site have varied over the years. For example, in 2018, there were approximately 130 individuals working on-site. The Project, as proposed, suggests a maximum of 156 people will be employed, in two rotations. This also limits the magnitude of change to income levels in the assessment area.

28.8.3 Project Effect: The influx of transient workers associated with the Project can impact community well-being

Adverse effects on communities associated with exposure to transient, predominantly male, workforces are well-documented in research.[1003] This literature is also reflected in comments from affected First Nations and YG's Department of Health and Social Services. The EC has considered the implications of a male-dominated, transient workforce on workers in the occupational health and safety VESEC (section 30) and on individuals in the community personal and relational safety VESEC (section 29). Here, the EC considers how an influx of transient workers can impact community well-being in the assessment area.

LFN described how the personal safety of women and girls is fundamental to Kaska values:

> Impact to women and girls can occur both in camp and community settings. Key impacts include sexual harassment and assault, increased demand for sex trafficking and sex work, childcare, gender inequity gaps, and vulnerability of women as they seek transportation to gain access to services. Information assessing potential project-related impacts on women and girls is required to inform a comprehensives assessment of the Project on community wellness.[1004]

The influx of transient workers associated with resource extraction into communities can erode existing social controls on behaviour and foster criminal behaviour. For instance, a study on industrial development in the Greater Yellowstone region reported that the number of registered sex offenders increased two to three times faster in regions dependent on oil and gas compared to regions focused on agriculture or recreation.[1005]

[1003] National Inquiry into Missing and Murdered Indigenous Women and Girls, Reclaiming Power and Place: The Final Report of the National Inquiry into Missing and Murdered Indigenous Women and Girls, *2019*; Czyzewski and Tester, *The Impact of Resource Extraction on Inuit Women and Families in Qamanii'tuaq, Nunavut*, 2016; Moodie, Mason, and Moorcroft, *Never Until Now: Indigenous and Racialized Women's Experiences Working in Yukon and Northern British Columbia Mine Camps*, 2021.

[1004] YOR 2019-0149-9007, p.18

[1005] Power Consulting, *The Social Costs of Mining on Rural Communities*, 2019, https://static1.squarespace.com/static/571f8d69d51cd4590b8328fa/t/5d6f36781f0e4c0001145b5a/1567569534257/Power+Report.pdf.

A transient workforce is particularly associated with increased sexual violence and harassment in communities[1006] near remote industrial sites. This can erode community well-being via out-migration. People experiencing sexual harassment and violence, with no other recourse, may choose to leave their community, breaking down family and community bonds.[1007]

The Proponent has proposed the use of an on-site camp with recreational and fitness facilities as a mechanism to prevent community exposure to risks associated with transient workers. The EC is of the opinion that this will act as a mitigation mechanism to reduce potential effects in the assessment area, but it is important to note that the Town of Faro is located about 20 km from the project site via a maintained public road and the Proponent expects a number of project employees to relocate to the Town of Faro. Ease of access and project employees located in the Town of Faro increase risks to community wellness. It is expected that individuals choosing to relocate will have access to a vehicle to enable them to travel from the Town of Faro to the work site, and thus communities, throughout the assessment area.

The Proponent has committed to other mitigations to reduce effects on community well-being. These mitigations are policy- or training-related and include contracting a qualified expert for development and implementation. Mitigations identified by the Proponent in the project proposal and following Information Requests include, but are not limited to:

- Mandatory anti-harassment and anti-bullying training
- A standard of behaviour that includes zero-tolerance for any type of sexual violence or harassment
- Safe reporting mechanisms
- Community grievance reporting and tracking mechanisms
- Formal feedback programs
- A socio-economic monitoring and management plan
- A socio-economic management committee

As noted above, the use of an on-site camp for workers is an imperfect limit on the exposure of assessment area communities to transient workers and associated effects. However, combined with the policies and trainings identified above, the effects to community wellness from transient workers is likely to be limited.

28.8.3.1 Significance Determination

The EC determines the Project will not have significant adverse effects to community well-being from an influx of transient workers to the assessment area.

[1006] Caxaj, et al, “Promises of Peace and Development: Mining and Violence in Guatemala,” *Advances in Nursing Science* 36 no. 3 (2013): 213-228, doi: 10.1097/ANS.0b013e31829edd21.
[1007] Ninomiya, et al., “Indigenous Communities and the Mental Health Impacts of Land Dispossession Related to Industrial Resource Development: A Systematic Review,” *The Lancet Planetary Health* 7 no. 6 (June 2023): e501-e517.

Workers will be housed in an on-site work camp, limiting access the assessment area. The Proponent has committed to providing on-site recreation and fitness facilities and implementing policies and training to limit impacts to community wellness.

29 COMMUNITY PERSONAL AND RELATIONAL SAFETY

29.1 Overview

Personal safety focuses on the conditions necessary to prevent harm and create spaces where individuals have freedom from worry about physical safety and being victimized by hostility, aggression, and harassment.

Definitions of personal safety often focus on the individual's behaviour and the rights and responsibilities of an individual. In the Yukon, personal safety has been described more broadly to include a person's relationship with the community, the land, and others.

Personal safety is defined as the freedom from worry about physical or psychological harm, harassment, bullying, or violence. Relational safety refers to how a person's identity may expose them to different forms of discrimination, harassment, and violence. It also includes how their identity can impact their relationship with the land, their family, and their community. Indigenous women and girls and 2SLGBTQIA+ people are especially vulnerable to experiencing negative impacts to their personal and relational safety within their communities.[1008]

Relational safety takes into consideration Indigenous peoples' worldviews. Fundamental to many Indigenous worldviews is a focus on the collective, the importance of context, and the relationship with land in a full ecological sense, which includes deep connection to all things, including non-human entities. Relational safety, therefore, focuses on the broader relationships between an individual and their community, land/ecology, and other people. Relational safety captures how Indigenous and non-Indigenous women and girls and 2SLGBTQIA+ people experience safe or unsafe situations in relation to their identity, other people, the land, their community, their culture, and the societal systems in which we all live. Relational safety refers to the ways in which a person's identity can expose them to different forms of discrimination, violence, harassment, or other harms, as well as impact their relationship with the land, their family, and their community.

The project is likely to have significant adverse effects to community personal and relational safety. The mitigations proposed by the Proponent are insufficient to mitigate project effects, as described below. The EC recommends additional mitigations to improve the reporting and monitoring structure, to develop a community safety program, and to include the input of the Yukon Status of Women Council and the Yukon Aboriginal Women's Council in monitoring programs.

[1008] YOR 2019-0149-8171

29.1.1 Reason For Inclusion

Research on the experience of women and sexual minorities at industrial worksites has focused on mining and other resource extraction activities, not remediation projects.[1009] However, the direct and indirect causes of impacts to personal and relational safety are expected to be similar between resource extraction projects and the Project. The Project will operate under conditions that have been linked to impacts to personal and relational safety of Indigenous women and girls and 2SLGBTQIA+ people.[1010] These conditions include rotational shiftwork schedules, proximity to Indigenous communities, and limited availability of health and social services in nearby communities. There is also the potential for additional conditions to occur, such as having a male-dominated workplace and the presence of transient workers in nearby communities, which have been linked to impacts to personal and relational safety of Indigenous women and girls and 2SLGBTQIA+ people.

It is important to acknowledge there may be unheard voices surrounding this issue in the literature and regarding the Project specifically. First Nations and community groups may have limited response capacity. Individuals may be fearful of speaking out when commenting on the Project or participating in the monitoring program for a variety of reasons (societal stigma, job loss, etc.). Much of the research surrounding personal safety and resource extraction projects has focused on the effects to Indigenous and racialized women and girls, with little focus on sexual minorities, people with disabilities, racialized men, or other marginalized communities.

29.2 Spatial Boundaries

The assessment area for the community personal and relational safety VESEC is not a geographic boundary, rather it is the people and their communities most likely to impacted by the Project. The EC identified affected communities from information in the project proposal and from comments, SATAC sessions, and meetings with First Nations.

The spatial scope for assessment of project effects to community personal and relational safety includes members and citizens of RRDC, LFN, SFN, and the communities in which they live, as well as residents of the Town of Faro:

- RRDC, LFN, the community of Ross River, and the Town of Watson Lake
    - The Project is located entirely within the Traditional Territory of the Kaska Nation. The RRDC and LFN are members of the Kaska Nation. Comments from RRDC and LFN reflected both the history of effects from industrial activity in and around the Faro Mine and the potential for a continuation of these effects, or new effects, from the Project. While Watson Lake is geographically removed from the project

[1009] Manning, et al., A literature synthesis report on the impacts of resource extraction on indigenous women, 2018, https://www.criaw-icref.ca/wp-content/uploads/2021/04/Impacts-of-Resource-Extraction-for-Indigenous-Women.pdf.
[1010] Manning, et al., A literature synthesis report on the impacts of resource extraction on indigenous women.

site, LFN have identified clear pathways for project effects to impact the personal and relational safety of LFN members.

- SFN and the community of Pelly Crossing
    - Comments from SFN identified a history of use of the region around the project site, in addition to concerns about the experiences and health of SFN citizens living in and around Pelly Crossing, downstream of the project site.
- Town of Faro
    - Additionally, the Town of Faro is located 20 km from the project site, making it an affected community due to both its proximity and the likelihood of some workers residing in the Town of Faro during the life of the Project.

29.3 Resources

29.3.1 *Assessment Tool for Personal and Relational Safety*

Comments provided by HC requested that an additional mitigation be included in the report as follows: “refer to YESAB’s Assessment Tool for Personal and Relational Safety (2022) to establish mitigation measures for workers living at the camp.”[1011] This tool is available on the YESAB website.[1012] At this point in time, YESAB is working on developing a plan to implement this tool. Information contained within the tool is used during the assessment process to provide context for the VESEC.

29.3.2 *Never Until Now: Indigenous and Racialized Women’s Experiences Working in Yukon and Northern British Columbia Mine Camps*

This report, prepared by the Liard Aboriginal Women’s Society, uses a range of data sources to understand the experiences of Indigenous women working at and living in proximity to remote work camps or “man camps.” The health and safety of women was explored in a variety of mining environments (hard rock, placer, exploration, reclamation, and field monitoring), revealing the generally negative and often unsafe experiences of women in these environments.

29.4 Existing Conditions

The existing conditions are the expected conditions after the North Fork Rose Creek realignment has been completed, prior to commencement of the Project. This includes the conditions caused by historical mining activity at and around the project site and the associated impacts.

[1011] YOR 2019-0149-1651, p.3
[1012] Yukon Environmental and Socio-economic Assessment Board, *Personal and Relational Safety Documents*, 2024, https://yesab.ca/resources.

Historic mining and other industrial activities at and around the project site have left a legacy of effects that inform the context of the assessment for this project. In their comment submissions, RRDC noted a legacy of racism and sexism attached to the original Faro Mine and that "...by centering opportunities entirely in the town of Faro, the Project risks perpetuating racism and overlooking opportunities to support businesses in the Community of Ross River."[1013]

Yukon communities, including the community of Ross River, the Town of Watson Lake, and the community of Pelly Crossing, continue to confront endemic issues, such as higher rates of crime,[1014] domestic violence,[1015] and the negative impacts of colonization.[1016]

This context informs the EC's assessment of the Project.

29.5 Proponent Mitigation Measures

In the socio-economic effects assessment in the project proposal, the primary mitigation identified for effects to communities is the use of a work camp to isolate project workers from affected communities. This is supported by the Socio-Economic Management and Monitoring Plan,[1017] community grievance mechanisms, and provision of recreational facilities to keep workers on-site. Other mitigations include policies to support workers, prohibition of drugs and alcohol on-site, and transportation to the project site from the Town of Faro and/or the community of Ross River.

29.6 First Nations and Community Input

29.6.1 Ross River Dena Council

In their comments throughout the assessment process, RRDC brought attention to their concerns about personal safety at the work site and within the nearby communities:

> There are no strong commitments to integration of cultural programs, mental health support, land guardians, etc. on the site. This is a particularly important mitigation, given the documented struggle with camp life, including the potential for increased addictions issues and gendered/racial violence. The history of racism at Faro needs to be directly address in a meaningful way, rather than framing Ross River's resilience as a mitigation.[1018]

RRDC also noted that the Proponent does not commit to providing childcare, reducing the opportunities for parents, notably women, to become employees of the Project.

[1013] YOR 2019-0149-1912, pp. 9-10
[1014] Human Environment Project Proposal, YOR 2017-0211-025-1.
[1015] This was 911.6 incidences per 100,000 population in 2014. Yukon Bureau of Statistics, 2014.
[1016] Within this section, "impacts of colonization" refers to the following: residential school legacies and effects of displacement and disenfranchisement from the Indian Act and the Sixties Scoop.
[1017] YOR 2019-0149-9964
[1018] YOR 2019-0149-0555, p.57

29.6.2 Selkirk First Nation

SFN expressed their concern surrounding cumulative effects and how they will impact their community well-being:

> […]future project and activities will generate additional stresses on social cohesion, violence and crime, housing, traditional/cultural values and infrastructure services and may be large enough to exceed the tolerance limits for community health and well-being of the Selkirk First Nation at the community of Pelly Crossing.[1019]

29.6.3 Liard First Nation

LFN described how the personal safety of women and girls is fundamental to Kaska values:

> Impact to women and girls can occur both in camp and community settings. Key impacts include sexual harassment and assault, increased demand for sex trafficking and sex work, childcare, gender inequity gaps, and vulnerability of women as they seek transportation to gain access to services. Information assessing potential project-related impacts on women and girls is required to inform a comprehensives assessment of the Project on community wellness.[1020]

29.7 Project Effects Characterization

29.7.1 Project Effect: Reduced personal and relational safety of Indigenous and non-Indigenous women and girls and 2SLGBTQIA+ people due to increased violence, sexual harassment, and sexual abuse

Indigenous and non-Indigenous women and girls and 2SLGBTQIA+ people living in proximity to industrial worksites are frequently exposed to violence, sexual harassment, and abuse. Industrial worksites can often be hyper-masculine environments where drug and alcohol abuse occur, even with policies banning the use of such substances. These conditions create an unsafe environment for Indigenous and non-Indigenous women and girls and 2SLGBTQIA+ people.

Comments from YG's Department of Health and Social Services (HSS) drew further attention to the documented adverse effects of other major industrial projects on Indigenous women and girls and sexual minorities:

> As highlighted by the Missing and Murdered Indigenous Women and Girls' Inquiry Report and proven in a multitude of research findings, Indigenous communities often experience increased violence as a result of nearby natural resource development activities. Additionally, Indigenous women and girls and sexual minorities (2SLGBTQIA+) disproportionately experience workplace harassment and assault. Though the Project involves remediation rather than mineral extraction, many factors exist that show a

[1019] YOR 2019-0149-5662, p.1
[1020] YOR 2019-0149-9007, p.18

> potential likelihood of similar issues taking place, such as the geographic proximity to rural First Nation communities, the likely employment of Indigenous female workers, etc.[1021]

Increased drug and alcohol use is also associated with a transient workforce and linked to violence and sexual harassment rates. Banning alcohol and/or substances in camp is one tool to reduce harm associated with substances, however alcohol is available in the Town of Faro, which is approximately 20 km from the project site. This mitigation is particularly targeted at workers and discussed in more detail in the occupational health and safety VESEC (section 30). When assessing impacts to Indigenous and non-Indigenous women and girls and 2SLGBTQIA+ people within the spatial boundaries, the efficacy of an alcohol ban at mitigating impacts is reduced.

Sexual health services, counselling, or any kind of supports for people who experience violence and harassment are not available in the assessment area. The nearest supports for 2SLGBTQIA+ people and Indigenous women and girls are in Dawson City and the City of Whitehorse. Compounded with the absence of personal and relational safety supports, mental and physical health services are also strained, as discussed in section 24, public infrastructure, and section 25, community services.

The Proponent has positioned the use of an on-site camp with recreational and fitness facilities as a mechanism to prevent community exposure to risks associated with transient workers. The EC is of the opinion that this will act as a mitigation mechanism to reduce, but not eliminate, potential effects in the assessment area. The Town of Faro is accessible from the work camp via a maintained public road, and the Proponent expects a number of project employees to relocate to the Town of Faro. Ease of access and project employees located in the Town of Faro increase the risk of exposing people to violence and harassment. it is expected that individuals choosing to relocate will have access to a vehicle to enable them to travel from the Town of Faro to the work site and, thus, communities throughout the assessment area may also experience violence and harassment associated with the Project.

The Proponent, in their response to IR No. 2, describes the SMMP as a means to mitigate effects to personal and relational safety. The SMMP will outline policies, procedures, and training to mitigate effects to personal and relational safety. As described by the Proponent, the SMMP is insufficient to mitigate this project effect, however it can act as a foundation that, with the input of affected communities, First Nations, and advocacy groups, can become sufficient.

29.7.1.1 Significance Determination

The adverse effects of major resource extraction projects on 2SLGBTQIA+ people and Indigenous women and girls are well-documented. The Project shares many features of this type of project despite being a remediation project. Recent case studies in similar remote northern contexts have demonstrated that natural resource operations lead to community

[1021] YOR 2019-0149-6359, p.17

increases in domestic violence, sexual assault, and other forms of abuse towards Indigenous and non-Indigenous women and girls and 2SLGBTQIA+ people.[1022]

Domestic violence, sexual assault, and other forms of abuse often lead to additional negative effects, such as anxiety, post-traumatic stress disorder, substance use, depression, panic disorder, and physical injury, that affect women, children, and broader family networks. The effects are generally long-term (sometimes lasting multiple generations) and can be irreversible.[1023]

Sexual health services, counselling, or any kind of support (such as women's shelters) are limited in the assessment area. While the Proponent has committed to providing these services for employees, non-employees may experience violence and harassment. The Proponent commits to establishing a grievance tracking system for community members, however it is unlikely to be used by community members experiencing violence and sexual harassment, nor will it prevent harms, rather it is a reactive measure to prevent harm from occurring after the original incident.

The mitigations identified by the Proponent, such as policy and procedure measures, housing workers in an on-site work camp, and the SMMP are not sufficient to reduce the significance of project effects to personal and relational safety in affected communities.

The Project will likely increase gender-based violence and harassment in the assessment area. As noted earlier, research shows a correlation between the introduction of industrial camps in remote regions in Canada's North and increases in violence against women. The EC recognizes that this is a large recurring issue that needs to be addressed. The mitigations recommended are adapted from YG's response to the National Inquiry into Missing and Murdered Indigenous Women and Girls (MMIWG)'s calls to action.[1024] The development and funding of a community safety plan and monitoring will reduce the risk of experiencing violence and harassment for non-employees in the affected communities where support services are not available.

[1022] Gibson and Scoble, "Regenderneering Mining: A Survey of Women's Career Experiences in Mining; Tallichet, Barriers to Women's Advancement in Underground Coal Mining," *Canadian Institute of Mining* 97 no. 1082 (2004):55-61, doi: https://caid.ca/JAICH2005v3n1p115.pdf; National Inquiry Into Missing and Murdered Indigenous Women and Girls (MMIWG). Reclaiming Power and Place: The Final Report of the National Inquiry into Missing and Murdered Indigenous Women and Girls; Gibson, Yung, et al., Indigenous Communities and Industrial Camps: Promoting *H*ealthy *C*ommunities in *S*ettings of *I*ndustrial Change*,* 2017; Stockwell, "Capturing Vulnerability: Towards a Method for Assessing, Mitigating, and Monitoring Gendered Violence in Mining Communities in British Columbia," *University of British Columbia*, MASc thesis (2015).

[1023] World Health Organization, *Violence against women,* 2021, https://www.who.int/news-room/fact-sheets/detail/violence-against-women; Government of Canada, The Chief Public Health Officer's Report on the State of Public Health in Canada 2016 - A Focus on Family Violence in Canada. 2016.

[1024] Yukon Aboriginal Women's Council, *Changing the Story to Upholding Dignity and Justice: Yukon's Missing and Murdered Indigenous Women, Girls and Two-spirit+ People Strategy*, 2020, https://yawc.ca/files/changing-the-story-to-upholding-dignity-justice-yukon-s-mmiwg2s-people-strategy-2020.pdf.

The EC determines that the project is likely to have significant adverse effects on community personal and relational safety. The mitigations described by the Proponent will not be sufficient to mitigate affects to personal and relational safety in affected communities. As such, the following mitigations are recommended to reduce, control, of eliminate significant adverse effects to community personal and relational safety.

23. The Proponent shall develop and fund a community safety plan for the Project in consultation with the communities and the Government of Yukon for the community of Ross River, the Town of Faro, and the Town of Watson Lake and invite the following parties to participate in the development of a monitoring program to ensure that the Project's effects on personal safety are adequately monitored:
    a. Yukon Status of Women Council;
    b. Yukon Aboriginal Women's Council;
    c. Liard Aboriginal Women's Society; and
    d. Whitehorse Aboriginal Women's Circle.

30 Occupational Health and Safety

30.1 Overview

In this VESEC the EC assesses impacts associated with ambient noise, dust levels, and the personal and relational safety of workers.

The EC determines that the Project will not have significant adverse effects to workers related to noise or dust exposure. Noise levels throughout the project site are below *Workplace Health Regulations* (WHR) thresholds. The workers camp will experience elevated noise levels with the potential to disrupt sleep, however this effect is mitigated through the proposed design of the camp.

Dust-related health effects to workers, while likely and adverse, are not significant. The project proposal indicates workers will be exposed to dust levels beyond YAAQS. However, the modelling used to determine this was based on a worst-case scenario. While exceedances of dust levels are likely to result in short-term health effects through contaminant inhalation, exceedances are predicted to occur infrequently and intermittently. The Dust Management Plan[1025] provides a suite of measures to control and reduce workers' exposure to dust related health effects.

The EC determines that the Project will result in significant adverse effects to the personal and relational safety of workers. As a remote industrial project, like other projects with documented impacts to women, BIPOC (Black, Indigenous, and people of colour), and 2SLGBTQIA+ workers, the Faro Mine Remediation Project is unlikely to differ from the documented experiences of women, BIPOC, and 2SLGBTQIA+ workers in the resource extraction industry based on the project design.[1026] However, workplace policies and standards are outlined in the project proposal, along with subsequent IRs, that mitigate these effects. The Proponent commits to developing practices, with the support of a qualified expert, to protect women, BIPOC, and 2SLGBTQIA+ project workers.

30.1.1 Reason for Inclusion

The project proposal included human health as a VESEC to assess potential project effects to First Nations members and citizens, workers, residents of the assessment area, and other members of the public. However, upon review of information provided in the project proposal and comments from participants, the EC determines that a VESEC focused specifically on the

[1025] YOR 2019-0149-9964

[1026] National Inquiry into Missing and Murdered Indigenous Women and Girls, Reclaiming Power and Place: The Final Report of the National Inquiry into Missing and Murdered Indigenous Women and Girls; Czyzewski and Tester, "The Impact of Resource Extraction on Inuit Women and Families in Qamanii'tuaq, Nunavut"; Moodie, Mason, and Moorcroft, "Never Until Now: Indigenous and Racialized Women's Experiences Working in Yukon and Northern British Columbia Mine Camps."

project effects to workers is needed to include legislation, risks, and effects unique to workers in assessment of this project.

The occupational health and safety VESEC includes the physical and non-physical health and safety of project workers at the project site. Workers will be housed in on-site accommodation and scheduled to work for two weeks at a time, exposing them to the ambient noise and dust conditions of the project site.

Research on the experience of female, BIPOC, and 2SLGBTQIA+ workers at remote industrial worksites has focused on mining and other resource extraction activities and not remediation projects.[1027] The Project is very similar to other major resource extraction projects and will operate under conditions that have been linked to impacts to personal and relational safety, particularly for female, BIPOC, and 2SLGBTQIA+ workers, who disproportionally experience violence and harassment.

Violence against women appears to consistently take place in association with the development and operations of natural resource activities, with First Nations women being particularly vulnerable. The Final Report of the National Inquiry into MMIWG states that Indigenous women, girls, and gender and sexual minorities are being "targeted by colonial violence embedded within institutions, structures, and systems, as well as interpersonal violence, where these encounters occur." The report goes on to note that Indigenous women are specific targets of violence due to "Canada's colonial legacy [which] has forced Indigenous women and girls into dangerous and precarious social and economic conditions, which in turn has made them more vulnerable to different kinds of violence." [1028] In addition, many First Nation people, of all sexes and genders, experience higher levels of socio-economic vulnerability as a result of direct or indirect trauma experienced through residential schools and other colonial legacies. It is important to note that although there is little data regarding violence against gender and sexual minorities, it is assumed that a similar situation exists for this population. Finally, the effects of harassment, abuse, assault, and bullying, in both the workplace and communities, can cause physical and psychological harm with long-term effects.

30.1.2 Other Matters Considered

There were other issues related to worker safety raised in comments, including camp design, particularly around hygiene and food safety practices, and emergency response planning on-site. Off-site emergency response facilities and measures are discussed in section 25, community services.

[1027] Manning, et al., "A Literature Synthesis Report on the Impacts of Resource Extraction for Indigenous Women"; Moodie, Mason, and Moorcroft, "Never Until Now: Indigenous and Racialized Women's Experiences Working in Yukon and Northern British Columbia Mine Camps."
[1028] National Inquiry into Missing and Murdered Indigenous Women and Girls, Reclaiming Power and Place: The Final Report of the National Inquiry into Missing and Murdered Indigenous Women and Girls.

When considering these comments, the EC determined that the issues raised were due to information gaps in the project proposal and that an existing suite of regulations and guidelines governs the operation of remote camps for large workforces and emergency preparedness. These information gaps have been resolved in IR responses and no further assessment is necessary.

30.2 Legislation and Guidelines

30.2.1 Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise[1029]

In the absence of Yukon-specific evaluation criteria for noise effects to the health of workers, the Proponent used HC guidelines to evaluate project noise. These guidelines do not have enforceable standards or thresholds; instead, they provide general information on predicting health effects related to noise during assessment of major infrastructure projects.

30.2.2 Yukon Ambient Air Quality Standards and Canadian Air Quality Standards

These guidelines identify maximum acceptable concentration levels of CACs in the environment. While not specific to workers or dust, these guidelines identify acceptable thresholds for air quality in total TSP, which can be used to assess worker exposure to dust levels at and around the project site.[1030]

30.2.3 *Occupational Health and Safety Act*

The WHR under the *Occupational Health and Safety Act* stipulate conditions to limit worker exposure to contaminants and to mitigate potential adverse health and safety effects.

30.3 Spatial Boundaries

The LAA for this VESEC is determined by where workers are most likely to experience effects of the Project. Section 8C.2.3 of the *Faro Mine Remediation Project: Appendix 8C Noise Effects Assessment*[1031] uses an LAA of the MDF of the project buffered by 1.5 km for assessing project effects related to noise. This boundary is the limit of where adverse project effects of noise are predicted. The RAA is this area plus an additional 5 km buffer.

For assessing impacts to occupational health and safety, the spatial boundary includes the LAA and RAA described above and in the project proposal.

Figure 8C.2-1 in the *Faro Mine Remediation Project: Appendix 8C Noise Effects Assessment* depicts these boundaries and is repeated below as Figure 23.

[1029] Government of Canada, Guidance for evaluating human health impacts in environmental assessment: noise, 2017, https://publications.gc.ca/site/eng/9.832514/publication.html.
[1030] The current CAAQS were developed in 2020; the current YAAQS will apply up to January 2025, at which point the revised 2025 standards will be implemented. The EC has chosen to apply the 2025 standards, given the timeline for the Project.
[1031] YOR 2019-0149-4418

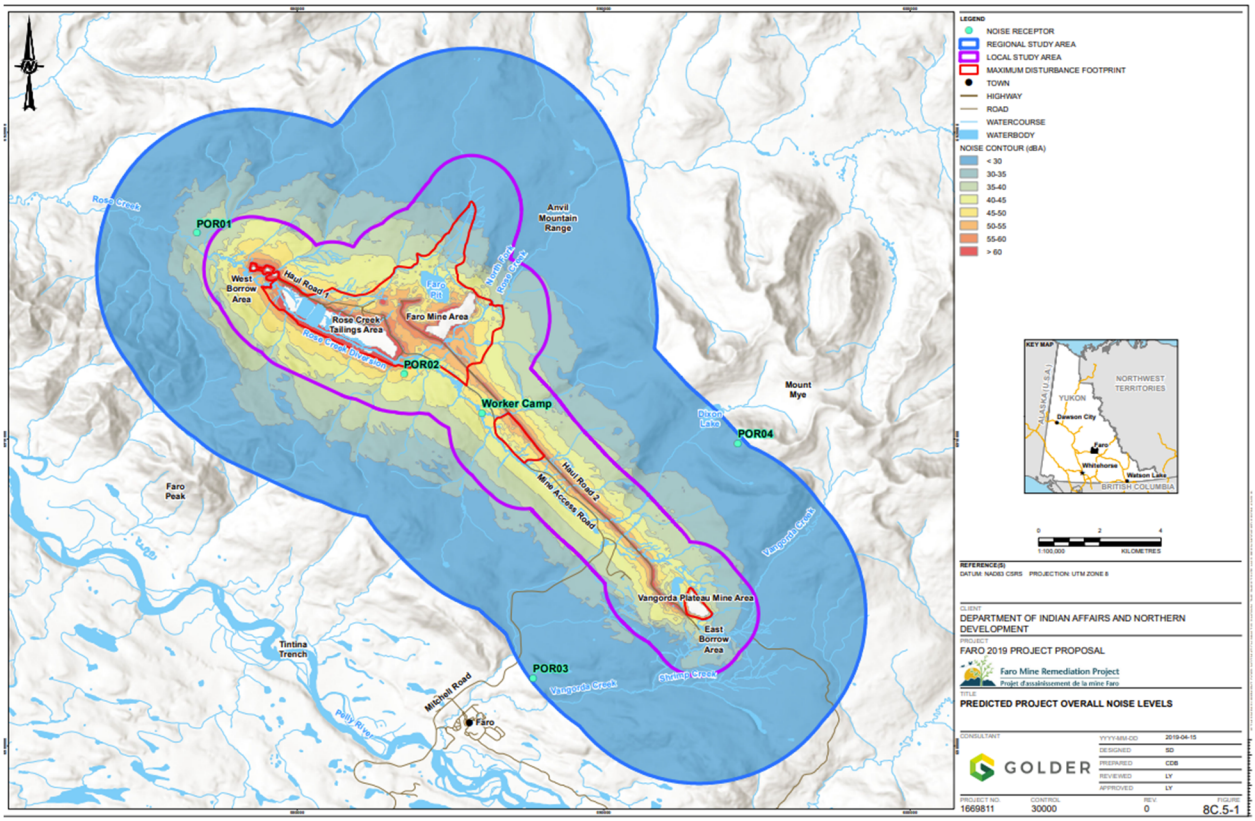

Figure 23: Predicted Noise Levels for the Project[1032]

30.4 Existing Conditions

The guidelines in the WHR were used to establish a point from which to evaluate the effects of project-related noise and dust on workers. *Appendix 8C Noise Effects Assessment*[1033] uses criteria from *Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise*[1034] to establish existing noise conditions and understand how the Project will modify these conditions.

Section 4(3) of the WHR describes thresholds where PPE is required for steady state (or constant) noise and impact noise. These values are summarized in Table 17.

[1032] YOR 2019-0149-4418
[1033] YOR 2019-0149-4418
[1034] Government of Canada, *Guidance for evaluating human health impacts in environmental assessment: noise*.

Table 17: Noise Exposure Thresholds for PPE Requirements

Steady State Noise	
Noise Level (dBA)	**Maximum Unprotected Daily Exposure Time (hours)**
85	8
88	4
91	2
94	1
97	0.5
100	0.25
103+	0
Impact Noise	
Noise Level (dBA)	**Maximum Number of Impacts (per 24 hours)**
118	14 400
121	7 200
124	3 600
127	1 800
130	900
133	450
136	225
139	112
140	90
140+	0

Section 46(4) of the WHR lists permissible concentrations for dust exposure (among other substances). The WHR limits workers to 1 mg/m^3 of dust exposure for up to eight hours or 3 mg/m^3 for 15 minutes without PPE.

The reference point used for evaluation of project effects to the personal and relational safety of workers is prior to the workers' employment at the Project.

30.5 Proponent Mitigation Measures

The project proposal does not describe mitigations that are restricted to workers but does speak to reducing noise and dust generation at the project site.

30.5.1 Noise

In *Appendix 8C Noise Effects Assessment,* the Proponent commits to fitting mufflers and maintaining internal combustion engines to reduce noise emissions. The Proponent also commits to locating and designing the worker camp in such a way to reduce its exposure to project noise.

30.5.2 Dust

Workers are exposed to elevated dust conditions, as well as noise. The project proposal does not specifically focus on effects to workers, however mitigations described in the air quality VESEC (section 8) apply to workers. These mitigations include the following management plans:

- Dust Management Plan
- Materials Management Plan
- Borrow Management Plan
- Adaptive Management Plan

In the Dust Management Plan, the Proponent identifies mitigations to address dust, including site speed limits, minimizing driving and hauling distances where possible, applying dust suppressants and road-watering measures during critical periods, limiting the number of vehicles on-site, and ongoing road maintenance. Measures from the other management plans listed above include applying minimum disturbance areas, progressive rehabilitation and revegetation, stockpile orientation, and incorporation of wind breaks.

30.5.3 Personal Safety

In its response to IR No. 2,[1035] the Proponent identifies a socio-economic monitoring plan as a "foundation to support workers." This plan will implement and adhere to human-resources policies and strategies to protect workers from harassment and violence. The workplace harassment and violence policy will align with the *Yukon Human Rights Act.* Workplace protocols/processes to address harassment and violence are positioned as a key mitigation for effects to personal and relational safety of workers by the Proponent. Some of these policies include a workplace harassment policy, drug and alcohol use policy, and short-term disability policy. The mine construction manager will be obliged to offer a confidential harassment reporting line, Indigenous sensitivity training for all workers, and worker and community grievance mechanisms; prohibit alcohol and drug use; provide on-site emergency services and full-time security on-site; develop harassment prevention training with the support of a qualified expert; develop an anti-harassment and bullying policy; develop standards for behaviour at the workplace, including zero tolerance for sexual harassment; and include First Nations people in the development of policy and training programs.

30.6 Project Effects Characterization

30.6.1 Project Effect: Reduced worker health from exposure to noise

Figure 8C.5-1 of *the Faro Mine Remediation Project: Appendix 8C Noise Effects Assessment* depicts noise levels for the LAA and RAA. It also shows receptor locations and the placement of the worker camp. This map is included as Figure 23 and indicates that noise levels are below thresholds where PPE would be required, or where workers are at risk for hearing

[1035] YOR 2019-0149-7010, p.123

impairment, throughout the assessment areas. However, workers will be on-site 24 hours a day for two weeks at a time. Exposure to ongoing noise of this nature can lead to negative impacts.

The *Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise* provides a framework for understanding the effects of ongoing exposure to noise. This framework uses the following criteria to assess operational or long-term construction noise effects:

- High annoyance
- Sleep disturbance
- Speech comprehension

There is nowhere on-site where the speech comprehension criteria of the HC guidelines are met or exceeded. As such, this is not considered further in this VESEC. The discussion will focus on the high annoyance and sleep disturbance criteria.

The project proposal notes that the framework evaluates change in noise levels, not noise exposure, and makes the argument that despite being 4 % beyond the HC threshold, workers' exposure to high-annoyance noise is not significant as workers do not have previous experience of noise levels on-site.

Workers may be exposed to other sounds while operating heavy equipment, during construction, and while carrying out other duties. Workplace health and safety legislation serves to protect workers during these scenarios.

While at the camp, workers are likely to be exposed to elevated noise levels. While noise levels are below WHR thresholds for PPE requirements and some of the thresholds identified in the HC Criteria, it should be noted that workers are exposed to these noise levels for 24 hours a day, two weeks at a time. The Proponent identifies 45 dBA as a threshold for sleep disturbance; the workers' camp is predicted to experience 48 to 49 dBA throughout a 24-hour cycle. However, this prediction does not account for the sound-dampening effect of camp buildings. The Proponent notes that buildings will be designed to reduce total noise emissions by 19 dBA.

The Project is likely to expose workers to elevated noise levels, however these noise levels are unlikely to have negative health effects,[1036] and mitigations, such as building design and placement, will reduce the decibel level of sounds workers are exposed to.

30.6.1.1 Significance Determination

The EC determines that the Project is not likely to cause significant adverse effects to workers, who will be exposed to noise-related project effects throughout their time at the project site. Generally, project-related noise is below thresholds where harm is likely. However, the EC also takes into account that workers are on-site for extended periods of time during their evaluation.

[1036] Government of Canada, *Guidance for evaluating human health impacts in environmental assessment: noise*.

Despite the potential for extended exposure to project noise, the EC concludes that workplace health and safety legislation, coupled with building and camp design, protect workers from the adverse effects of noise exposure.

30.6.2 Project Effect: Reduced worker health from exposure to dust

As described in section 8, air quality is likely to exceed TSP thresholds identified in air quality standards in portions of the LAA during active remediation. The dust present at the site is largely related to the movement of vehicles on-site, the excavation of soil and removal of vegetative mat, the transport of gravels and soil, and wind erosion from unvegetated surfaces (e.g., tailings pond). As workers will on be on-site likely working two-week shifts, the workers are likely to be exposed to reduced air quality for 24 hours a day during those two weeks.

The project proposal notes:

- "For the 24-hour averaging period, the change in maximum TSP concentration is 913 % of the YAAQS."
- "For the annual averaging period, the change in maximum TSP concentration is 402 % of the YAAQS."

The Proponent notes that predicted ambient concentrations are conservative and that these concentrations represent worst-case meteorological and operational conditions.[1037] For example, the maximum TSP concentrations listed above include the assumption that all heavy equipment will operate at maximum emission rates 20 hours per day annually.

Air quality analyses demonstrate that dust levels will exceed YAAQS thresholds, which are established to protect human health, predominantly within the LAA and, more specifically, at the worker camp. Given these findings, off-duty workers are likely to experience negative health effects from contaminant exposure.

Following active remediation, impacts to air quality conditions and dust levels are expected to fall due to a decrease in site activity, such as construction and major earthworks.

While exceedances of dust levels are likely to result in short-term health effects through contaminant inhalation, exceedances are predicted to occur infrequently and intermittently. Further, this estimation is based on conservative and worst-case scenario modelling undertaken by the Proponent. Exposure to dust will thus be infrequent and short in duration (e.g., 24 hours). Effects are reversible once contaminant concentrations are reduced. Implementation of health, safety, and monitoring mitigation measures at the on-site worker camp and throughout the life of the Project by the Proponent will further reduce or eliminate effects.

Wind erosion is expected to contribute to contaminant emissions during operations and maintenance—specifically, erosion of the remediated mine tailings and waste rock areas, particularly during the period where vegetation is not yet established. However, given the

[1037] YOR 2019-0149-0334

implementation of progressive reclamation, grass and shrubs are expected to be established in most areas at the end of active remediation or within the temporal scope of the Project. With successful revegetation efforts, susceptibility to wind erosion will be minimized, reducing fugitive dust emissions and a low likelihood of exceeding standards.

30.6.2.1 Significance Determination

The EC determines that the Project will not result in significant adverse effects to worker safety from dust inhalation.

Although workers will be exposed to dust concentrations that exceed acceptable levels, these exceedances are predicted to occur infrequently and intermittently. Furthermore, the Proponent has indicated that a health, safety, and monitoring program will be established to address concerns related to dust.

30.6.3 Project Effect: Risk of harassment and violence in remote camp

Women, BIPOC, and 2SLGBTQIA+ people who work in and around industrial worksites are frequently exposed to sexual and racial harassment and abuse. Industrial worksites can often be hyper-masculine environments where drug and alcohol abuse occur, even with policies banning the use of such substances. Women employed at industrial worksites are often in low-paying positions, such as laundry and housekeeping, where they are working alone in isolated areas of the camp. These conditions can create an unsafe environment.[1038] The Project includes the establishment and use of a 304-person camp, where there is a risk of harassment and violence.

Comments from YG HSS drew further attention to the documented adverse effects of other major industrial projects on Indigenous women and girls and sexual minorities:

> As highlighted by the Missing and Murdered Indigenous Women and Girls' Inquiry Report and proven in a multitude of research findings, Indigenous communities often experience increased violence as a result of nearby natural resource development activities. Additionally, Indigenous women and girls and sexual minorities (2SLGBTQIA+ disproportionately experience workplace harassment and assault. Though the Project involves remediation rather than mineral extraction, many factors exist that show a potential likelihood of similar issues taking place, such as the geographic proximity to rural First Nation communities, the likely employment of Indigenous female workers, etc.[1039]

[1038] National Inquiry into Missing and Murdered Indigenous Women and Girls, Reclaiming Power and Place: The Final Report of the National Inquiry into Missing and Murdered Indigenous Women and Girls; Czyzewski and Tester, "The Impact of Resource Extraction on Inuit Women and Families in Qamanii'tuaq, Nunavut"; Moodie, Mason, and Moorcroft, "Never Until Now: Indigenous and Racialized Women's Experiences Working in Yukon and Northern British Columbia Mine Camps."
[1039] YOR 2019-0149-6359, p.16

The experiences of women, BIPOC, and 2SLGBTQIA+ people in remote camp-based resource extraction projects are well-documented. YG HSS, RRDC, LFN, and SFN raised concerns on this matter for the Project. YG HSS noted that sexual health services are not available in the LAA and the nearest supports of this type are in Dawson City (530 km away) or Whitehorse (358 km away). The project proposal does not include a discussion of the potential impacts of the Project on the personal safety of women, BIPOC, and 2SLGBTQIA+ people. SFN questioned this absence in IR No. 2 and, in IR No. 3, the Proponent committed to developing a range of policies and procedures to protect women, BIPOC, and 2SLGBTQIA+ people in the workplace.

Throughout the socio-economic effects assessment in the project proposal, the primary mitigation identified for effects to personal safety is the use of a work camp, isolating workers from the LAA. However, in the case of women, BIPOC, and 2SLGBTQIA+ people working and living at the camp, this mitigation is ineffective. The worker camp is located 20 km from the Town of Faro, and it is not infeasible for workers to access or have alcohol delivered to the camp, despite a dry camp status. This again reduces the ability of the camp to mitigate effects to the personal and relational safety of workers.

The Proponent will implement policies and protocols that will ensure that members of these demographics, nor any other worker, are not at risk for abuse or assault. The project proposal notes that health and emergency services on-site are limited to first aid requirements based on the *Occupational Health and Safety Regulations* and there is no provision for mental health supports.

The Proponent commits to developing a mandatory regular harassment prevention and anti-bullying training program that is delivered to all individuals working on-site. A standard for behaviour and code of conduct will be developed, which will include zero tolerance for harassment, sexual harassment, violence, and gender/sexual-minority violence, with safe reporting mechanisms. The Proponent also commits to developing a formal feedback program for First Nations people.

All of these policies and programs will be developed with the assistance of a qualified expert. Given the development of these policies, standards, and tools, effects to the personal and relational safety of workers are less likely to occur and will be dealt with appropriately and in a timely manner should they occur.

30.6.3.1 Other Matters Considered

HC, in comments[1040] on the personal and relational safety component of the community well-being VESEC,[1041] recommended that the EC “refer to *YESAB’s Assessment Tool for Personal*

[1040] YOR 2019-0149-1651, p.3
[1041] YOR 2019-0149-7858

and Relational Safety[1042] to establish mitigation measures for workers living at the camp." YESAB developed this tool to inform assessment methodologies on personal and relational safety, however the tool has not been implemented into assessment practices at this point in time.

30.6.3.2 Significance Determination

The EC determines that the Project will not result in significant adverse effects to the personal and relational safety of workers. The mitigations provided by the Proponent are sufficient to control project effects to workers personal and relational safety.

As a remote industrial project like other projects with documented impacts to women, BIPOC, and 2SLGBTQIA+ workers, the Faro Mine Remediation Project is unlikely to differ in the documented experiences of these workers in the resource extraction industry.[1043] However, the Proponent has indicated that policies, standards, and tools will be developed to protect women, BIPOC, and 2SLGBTQIA+ workers. The development of these materials is to be done with the support of a qualified expert, ensuring that the materials used to protect the personal and relational safety of project workers is done according to the best practices of health and well-being practitioners.

[1042] Yukon Environmental Socio-economic Assessment Board*, Assessment Tool for Personal and Relational Safety*, 2022, https://yesab.ca/wp-content/uploads/2023/08/20220927_Final-Personal-and-Relational-Safety-Assessment-Tool.pdf

[1043] National Inquiry into Missing and Murdered Indigenous Women and Girls, Reclaiming Power and Place: The Final Report of the National Inquiry into Missing and Murdered Indigenous Women and Girls; Czyzewski and Tester, "The Impact of Resource Extraction on Inuit Women and Families in Qamani'tuaq, Nunavut"; Moodie, Mason and Moorcroft, "Never Until Now: Indigenous and Racialized Women's Experiences Working in Yukon and Northern British Columbia Mine Camps."

31 First Nation Land Use and Sense of Place

31.1 Overview

This VESEC discusses First Nation use of land and resources and related activities, as well as the relationship of these activities with First Nation members or citizens' experiences on the land.

In the context of this VESEC, First Nation land use is broadly defined as both contemporary and traditional land-use activities integral to the culture, health, and lives of First Nations members or citizens. Activities can include, but are not limited to, the harvesting of wildlife, fish, and plants; trapping; cultural pursuits and traditional activities; and the use of waterways, trails, and camps.

This VESEC includes potential effects to the practice of First Nation land uses from project activities (such as direct loss of use of the project site and adjacent areas) as well as to the availability, accessibility, and quality of resources.

Sense of place refers to a valued individual or collective connection to a physical location or landscape. These landscapes are locations of cultural lore, histories, knowledge, and identity. Effects to sense of place are those that undermine or degrade the existing relationship to the land and/or destroy the physical evidence of this relationship. At its worst, the result of these effects is a loss of identity.[1044]

In their comment submission, SFN noted that sense of place is not just about specific sites, but about landscapes and territory that First Nations people use and occupy. Sense of place is tied to "history, stories, geographical features, place names, those kinds of things - how does a place evoke thoughts, feelings, and memories. It's peaceful enjoyment of place in the absence of fear and sensory disturbance."[1045]

> The life of stories is fueled in part by an active traditional life on the land. The loss of traditional lands and historic ruptures in the social and cultural fabric of Selkirk traditional use (as discussed in Chapter 6) affects and is affected by the decline in the collective knowledge and application of stories in everyday life. In turn, a positive, mutually reinforcing relationship between a traditional way of life and knowledge derived from stories that support that way of life begins with time on the land. Spending time on the land is not just as an expression of sovereignty, but also the means by which stories are filled with meaning and contribute to the sustainability of the way of life from which they were born.[1046]

[1044] YOR 2017-0211-1819
[1045] YOR 2019-0149-3563, p.31
[1046] YOR 2019-0149-9030, p.118

In their comment submissions, LFN and RRDC indicated that sense of place is intrinsically connected to traditional land use. Historical accounts indicate that for the Ross River Dena, animal harvesting was a "[…] central and integrative part of the economic mix and social life. The harvest, therefore, provided both a source of food and the social structure supporting satisfaction and meaning in life."[1047]

Understanding changes to First Nation land use and sense of place within the area of the Project focused on determining the extent of current use and how Project activities may affect use.

The EC determines that the Project will not result in significant adverse effects to First Nation land use and sense of place. The project proposal identifies continued opportunities for First Nation land use in the assessment area as the threshold used for significance for this component. Given the limited amount of First Nation land use at this time and mitigations identified by the Proponent, the Project is expected to have limited effects on contemporary First Nation land use and sense of place during active remediation and operations and maintenance.

31.1.1 Reason for Inclusion

In the VESEC outline published to the YOR on September 5, 2023, the First Nations way of life VESEC was divided into four sub-components: traditional and contemporary Indigenous land use, sense of place, cultural keystone areas, and cultural continuity. It is arguable that a reduction in sense of place is one of the mechanisms that discourages First Nations land use. It is equally arguable that this pathway of effects flows in the other direction and impacts to First Nation land use are drivers of changes to sense of place. Throughout comment submissions, First Nations identified the importance of land-based practices and their relationship with the land to maintain sense of place. Project activities that have the potential to discourage traditional land use impact sense of place by reducing the opportunities for people to access and experience these lands and associated uses. Because of this, the EC has combined these components into a single VESEC. Cultural keystone areas will be discussed in a separate VESEC (section 32).

31.2 Spatial Boundaries

The assessment area for First Nation land use and sense of place is defined by First Nations' Traditional Territories that overlap with the Project site, are adjacent to the project area, or are downstream from the project site. Rather than define a discrete spatial boundary, the EC assesses First Nation land use and sense of place based on where project effects are likely to affect the VESEC.

The assessment area for this VESEC includes:

[1047] Weinstein, *Just Like People Get Lost: A Retrospective Assessment of the Impacts of the Faro Mining Development on the Land Use of the Ross River Indian People*; Weinstein, *The Ross River Dena: A Yukon Aboriginal Economy.*

- The RRDC and the community of Ross River
- The Project lies wholly within the Traditional Territory of RRDC and the community of Ross River is approximately 50 km from the project site. RRDC are a member of the Kaska Nation; the project site is within the Kaska Nation boundary.
- SFN and the community of Pelly Crossing
- SFN Traditional Territory extends to within 50 km downstream from the project site on the Pelly River, and the community of Pelly Crossing is downstream of the Project.
- LFN and the Town of Watson Lake
- LFN are a member of the Kaska Nation. Furthermore, in comment submissions throughout the assessment process for this project, LFN have identified project effects on LFN traditional and contemporary land use.

31.3 Existing Conditions

Existing conditions are defined as the expected conditions at the project site after the North Fork Rose Creek realignment has been completed, prior to commencement of the Project. However, the project site and surrounding landscape have a long history of industrial activity and, prior to that, use by First Nations. First Nations use continues to this day despite large-scale changes to the landscape.

Undoubtedly, historic activity at the Faro Mine has changed First Nation land use and sense of place. Throughout comment submissions, affected First Nations identified a legacy of racism, perceived and experienced contamination, and mismanagement of the site after active mining ceased. During historical operations, First Nations people were completely barred from accessing lands around the project area. In addition, industrial activity has increased access to the region, forcing traditional land users to compete with mineral exploration, other resident hunting, and tourism.

In this light, the existing conditions include within them this history of use. They are not to be viewed as snapshot in time, but instead as a sum total. Both the Kaska Nations affected by the Project (RRDC and LFN) and SFN have provided comments detailing their extensive history in and around the project site.

This context informs the existing conditions used by the EC to establish how project effects are understood.

31.3.1 LFN and RRDC Traditional Land Use

The LFN and RRDC Kaska Nations lived semi-nomadically, hunting, fishing, trapping, and gathering within their Traditional Territories. They identified two key traditional land use areas within the assessment area: Tsē Zūl (Mount Mye, Blind Creek, and the Swim Lakes), and the Pelly Lakes and Campbell Creek region. The Tsē Zūl area was one of the most important breadbaskets to the RRDC or, as Weinstein remarked, “one of the rare places where, as the

elders say, 'there is everything' – moose, caribou, gophers, whistlers, fresh water fish and salmon."[1048]

The 1992 and 1993 Weinstein reports provided to the EC discuss topics key to understanding Kaska land use prior to industrial activity in the RAA. They provide a specific description of traditional land-use activities and describe mining-related changes to these activities. Some of these changes include:

- Intensity of use
- Abandonment of downstream fish harvesting
- Abandonment of hunting in the area
- Decline in traditional use of fisheries
- Decline in trapping in the area

Despite changes to trapping in RRDC's Traditional Territory associated with activity at and around the project site, group trapping concession #405, which overlaps the project site, and group trapping concession #415, which is adjacent to the project site, are currently in use by RRDC members.

31.3.2 SFN Traditional Use

SFN submitted their 2017 Traditional Land Use Study[1049] to support comment submissions throughout the assessment process. This study provides comprehensive descriptions and discussions related to traditional and contemporary land uses, creating an extensive picture of SFN's way of life. This includes, but is not limited to:

- A description of traditional resources and seasonal harvest[1050]
- A description of contemporary traditional use[1051] (e.g., specific places downstream of the Town of Faro, fishing places)
- A description of spiritual values, teaching, knowledge, health, and laws related to land[1052]
- A description of pressures impacting traditional land use (e.g., declines in Chinook salmon harvesting, the exercise of treaty rights associated with salmon harvesting)[1053]
- A discussion on the evolutions of SFN traditional use[1054]

[1048] Weinstein, *Just Like People Get Lost: A Retrospective Assessment of the Impacts of the Faro Mining Development on the Land Use of the Ross River Indian People*; Weinstein, *The Ross River Dena: A Yukon Aboriginal Economy.*
[1049] YOR 2019-0149-9030
[1050] YOR 2019-0149-9030, p. 29
[1051] YOR 2019-0149-9030, p. 39
[1052] YOR 2019-0149-9030, p. 74
[1053] YOR 2019-0149-9030, p. 103
[1054] YOR 2019-0149-9030, p.89

SFN further provided, as part of their comment submission, the *Faro Mine Closure Project: Traditional Knowledge Study Final Report* (2008),[1055] which captures point-in-time data and information regarding socio-environmental values for SFN. This includes special areas and uses as well as identified and experienced environmental changes.

31.4 Proponent Mitigation Measures

The Proponent has identified the following mitigation measures for project effects on First Nations land use:

Mitigation measures for increased dust, noise, and other emissions:

- Implementation of dust, noise, and other management plans
- The application of road watering as needed throughout the year
- Follow the revegetation treatments outlined in the Revegetation Plan
- Revegetate borrow areas as soon as feasible
- Apply road-watering as needed throughout the year
- Provide enhanced worksite contaminant testing for workers (if they choose to participate)

Mitigation measures for project activities that adversely affect water quality and the health of humans, animals, fish, and plants:

- Implement the Water Management Plan and Materials Management Plan
- Capture and treat contaminated groundwater prior to it reaching the receiving environment
- Discharge water within the May-October window
- Implement surface water quality thresholds that are protective of aquatic, terrestrial, and human end uses

Mitigation measures for project activities that increase the disturbance footprint:

- Use previously disturbed areas wherever possible
- Implement the Borrow Management Plan, which includes limiting the effects of vegetation removal and alteration
- Sequence remediation activities to limit the amount of new disturbance at any one time, to the extent feasible, within the context of overall project optimization
- Control access to rehabilitated areas
- Maintain access routes to the land; if this is impossible, provide alternate access
- Implement access management approaches that do not inhibit access for traditional land uses

Mitigation measures for workplace policies may limit access to traditional land uses for project employees:

[1055] YOR 2019-0149-5184

- Provide transportation to and from the community of Ross River for RRDC employees
- Allow flexible work schedules to prevent rotational schedules from interfering with First Nations land use and cultural pursuits
- Prohibit staff from hunting or fishing while on work rotation, while living in camp, or during work hours
- Maintain access routes to the land; if impossible, provide alternate access
- Implement access management approaches that do not inhibit access for First Nations land uses

In addition to the mitigation measures identified above, the Proponent has identified monitoring and management actions with specific details, targets, and undertakings as part of the Environmental and Socio-Economic Management and Monitoring Framework.[1056] This details the monitoring and adaptive management actions that will be undertaken so that the Project facilitates achievement of five overarching objectives for the Faro Mine.[1057]

The following follow-up and monitoring programs are proposed:

- Evaluate the effectiveness of reclamation and other mitigation actions, and modify or enhance as necessary through monitoring and developing updated mitigation measures (if needed)
- Identify unanticipated negative effects, including possible accidents and malfunctions
- Contribute to the overall continual improvement of operations and maintenance of the project site

The following monitoring and/or management plans are relevant to this VESEC:

- Terrestrial Management and Effects Monitoring Plan (Volume IV, Appendix 11B)
- Aquatics Effects Monitoring Plan (Volume IV, Appendix 11D)
- Socio-Economic Management and Monitoring Plan (Volume IV, Appendix 11F)
- Borrow Management Plan (Volume IV, Appendix 11A, Section 11A.4)
- Water Management Plan (Volume IV, Appendix 11H)
- Materials Management Plan (Volume IV, Appendix 11E)
- Dust Management Plan (Volume IV, Appendix 11A, Section 11A.3)

[1056] YOR 2019-0149-9964
[1057] YOR 2019-0149-1170

31.5 First Nation and Community Input

31.5.1 Ross River Dena Council

The area around the Faro Mine, including Mount Mye (Tsē Zūl), was traditionally used by RRDC, primarily as a hunting and gathering location.[1058] According to Weinstein (1992), much of this traditional use was displaced when the mine was developed in the late 1960s.

In their comment submissions, RRDC described the significant legacies of the Faro Mine impacting traditional land use. They noted that many of these impacts are still ongoing to this day: "The mine development not only displaced our people, but the mining activities continues to inflict social and economic as well as environmental harm to my people, something that started since the first day the exploration and development."[1059] Perceived contamination of water and historic dust deposition has caused RRDC members to avoid the region: "People either don't have access to hunting areas because of the mine, because of over-hunting, or because they don't trust that the animals are healthy to eat. Wildlife and vegetation monitoring is an important part of that."[1060] And: "the idea of 'perceived contamination' gives the impression that real contamination won't/hasn't happened, or that 'perception of contamination' isn't just as harmful to traditional activities as scientifically validated contamination."[1061]

RRDC also described how overhunting along the exploration and project access roads and increased access in the region for hunting and recreational activities continues to impact RRDC members' ability to use the area. This effect is compounded by declining wildlife populations in the region. RRDC Elders reported that:

- The Magundy caribou herd and other non-migratory woodland caribou are no longer observed in the area
- The Tay River caribou herd has been partially displaced from the area
- Groundhogs (marmots) have disappeared from the area, and gopher (ground squirrel) numbers are reduced
- Salmon, whitefish, and connie fish (inconnu) are less available
- There are fewer wolves, moose, and grizzlies in the area

31.5.2 Selkirk First Nation

SFN described in comment submissions and during SATAC sessions how historic and ongoing activity at the project site has negatively impacted SFN citizens and driven SFN citizens to avoid the region: "the Faro Mine project including development, operation and care-and-maintenance has had long standing, negative effects on citizens' uses of land and water, as well as

[1058] Weinstein, *Just Like People Get Lost: A Retrospective Assessment of the Impacts of the Faro Mining Development on the Land Use of the Ross River Indian People*.
[1059] YOR 2019-0149-1912, Chief Caesar (opening statements for the SATAC workshop in January 2021)
[1060] YOR 2019-0149-3563, p.38
[1061] YOR 2019-0149-7773, p.2

avoidance and displacement from traditional harvesting and use of the area."[1062] For example, SFN noted that the Faro Mine on its own, and in combination with other projects and activities, has contributed to cumulative effects, resulting in the decline of Chinook salmon stocks and harvest, as well as spawning and rearing habitat.[1063]

SFN are particularly concerned with effects to salmon populations. They noted how salmon harvest has declined and that this is linked to both how they use the land and their well-being: "We've seen the decline of our salmon to an extent where we can't practice our own traditional ways anymore. We can't harvest from the land anymore. Within those [land claim] agreements, conservation now restricts us from practicing our inherent right."[1064]

Additionally, like RRDC, SFN noted that perception of contamination in the region has changed how SFN view the area: "Contaminants perceived or actual do affect where people choose to go/harvest on the landscape. There are relevant linkages between Land Use and Perceived Contamination."[1065] And: "Up here, Faro, those people don't let us know what chemicals are coming down the river right now. Affects our health, our food source."[1066]

31.5.3 Liard First Nation

In comment submissions, LFN also described ongoing impacts associated with historic industrial activities at the Faro Mine.

LFN noted that "traditional land use is one (of many) aspects central to the exercise of Kaska rights. The ability of Kaska people to participate in traditional land use, and therefore exercise their Kaska rights has been eroded. The Faro Mine has contributed to the ongoing erosion of Kaska rights and title." And:

> There are several active and abandoned mines in Kaska territory that continue to impair LFN members' exercises of Kaska Aboriginal rights and title, even to the point of extinguishment in some cases. Impaired rights include but are not limited to traditional land use, spiritual and cultural practices, governance of lands and resources within our territory, and enjoyment of the economic benefits from our land.[1067]

Like RRDC and SFN, LFN shared similar concerns about how their perception of contamination has shaped how LFN members use the area.

[1062] YOR 2019-0149-9767, p.7
[1063] YOR 2019-0149-9767
[1064] YOR 2019-0149-9030, p.103
[1065] YOR 2019-0149-3563, p.9
[1066] YOR 2019-0149-9030, p.93
[1067] YOR 2019-0149-6463, p.3

31.6 Project Effects Characterization

31.6.1 Project Effect: Increased dust, noise, and other emissions associated with the Project reduce First Nation land use

Project activities, such as construction, development of borrow areas, roadworks, decommissioning, and operation of static and mobile internal combustion engines, will increase noise levels during active remediation. Project vehicles on roadways and development and use of borrow areas will increase dust emissions, particularly during active remediation. These activities will deter Indigenous land users from using the area during the active remediation period (15 years).

As noted throughout comment submissions, land use is an important part of the cultural identify of First Nations.

The Proponent expects the noise levels to be at the “annoyance level” within 1.5 km of the MDF. As discussed in the air quality VESEC and the project proposal, dust levels from project activities may result in TSP that exceeds YAAQS in the assessment area.

31.6.1.1 Significance Determination

The project site has a history of large-scale industrial development and is not a pristine wilderness environment. The limited use of the project site for First Nations land uses and sense of place reflects this history. The project proposal (section 8.0, Socio-Economic Effects Assessment)[1068] notes that the project site is not commonly used by First Nations land users. Project effects from noise and dust emissions are limited to a 1.5 km area around the project site.

Interviews with Kaska traditional land users suggest that while the project site and surrounding area were historically a key traditional use area, during mine operations and the abandonment period, traditional land use closest to the project site has been largely displaced by non-Indigenous land users.

The EC expects that First Nation land use and sense of place will remain mostly unaffected by active remediation as there will be no, or minimal, changes to noise and dust levels when compared to existing conditions beyond the immediate project location.

The timing of these effects is also temporary, limited to the active remediation phase of the Project, and are entirely reversible on the completion of the active remediation phase.

The EC determines that the Project will not have significant adverse effects on First Nation land use and sense of place because of noise, dust, and other emissions.

[1068] YOR 2019-0149-0756

31.6.2 Project Effect: Project activities that adversely affect water quality and the health of humans, animals, fish, and plants reduce First Nation land use and sense of place

Historical industrial activity has left a legacy of contamination driving First Nation land users from the project site and changing the view of the site from an area of cultural importance to a contaminated site. The EC notes that the perception of contamination can influence land use and sense of place identically to experienced contamination. First Nation (and other land users) will avoid a site that is perceived to be contaminated, driving the same project effects as experienced contamination.

Contamination not only affects land use—it also affects how the land is viewed, influencing relationships with the land. At the time of assessment, the project site is viewed as, and is, contaminated.

31.6.2.1 Significance Determination

Historic activity at the Faro Mine has impacted First Nation land use and sense of place. Comment submissions from affected First Nations identified a legacy of racism, contamination, mismanagement, and associated changes to this VESEC. In addition, industrial activity has increased access to the region, forcing traditional land users to compete with mineral exploration, other resident hunting, and tourism.

The Faro mine site is one of the largest contaminated sites in Canada. Historical mining and subsequent abandonment have altered affected First Nations use and relationship with not only the project site, but the larger landscape. This legacy provide context for the EC's assessment of this project effect.

The EC determines the Project is unlikely to have significant adverse effects on First Nation land use and sense of place because from project activities that adversely affect water quality and the health of humans, animal, fish or plants. As a remediation project, The Project sets out to address issues of contamination in and around the project site by treating water. The Project, as proposed, will not further contaminate the project site. In addition, as a remediation project, it may ultimately reduce contamination at, and downstream of, the project site.

31.6.3 Project Effect: Project activities that change or reduce access in the project area can impact First Nation land use and sense of place

The project proposal describes roads and trails in the MDF that First Nation land users use to access areas beyond the MDF. During the active remediation phase, project activities may require that the Proponent change or limit access to certain access roads and trails in the project area in the interest of public safety.

These restrictions can limit First Nation land use within and beyond the MDF of the Project. However, the Proponent has committed to an "access management approach,"[1069] maintaining

[1069] YOR 2019-0149-0756, p.36

access wherever possible by providing alternative routes and developing new trails linking existing roads and trails rendered inaccessible by project activities. The Proponent also commits to maintaining or replacing existing institutional controls to limit non-First Nation land uses.

The Project is expected to have minor and local changes to access during the active remediation phase and no effects during the operations and maintenance phase.

The Project is likely to change how roads and trails in the MDF are accessed. Project activities will require the Proponent to modify roads and trails for public safety and to access borrow sources.

31.6.3.1 Significance Determination

The EC determines that the project will not have significant adverse effects to First Nations land use and sense of place because of changes to or reductions in access within the MDF of the Project.

Although the project's MDF footprint will expand during the lifetime of the Project and affect how land users access less disturbed areas in the vicinity of the Project, access will be managed using an access management approach to maintain access to currently accessible areas.

The project proposal contains mitigations sufficient to reduce the significance of project effects on access roads and trails. The Proponent commits to maintain access to roads and trails during active remediation by providing or creating alternative access. Roads and trails with institutional controls on them will see these controls replaced once project activities no longer need that road or trail.

32 CULTURAL KEYSTONE AREAS

32.1 Overview

Cultural keystone areas are important locations of First Nations' history, cultural lore, and ritual land use. Project activities can impact the tangible and intangible characteristics of these sites, or lead to outright loss

The EC determines that the Project will not result in significant adverse effects to cultural keystone areas. Effects to cultural keystone areas are predicted to be site-specific, occur once, and often be permanent. However, the project site is not an undisturbed area and new disturbances to cultural keystone areas are expected to be limited. In addition, measures identified in the project proposal will mitigate predicted effects to this VESEC. Overall, the net decrease in the integrity of existing identified cultural keystone areas is expected to be small relative to existing conditions.

32.1.1 Reason for Inclusion

SFN noted in their input that cultural keystone areas should not be understood restrictively (e.g., an exceptional indicator in identity), but rather expansively. This includes places that are significant for a variety of reasons, as well as places that were important before the Project was in place.[1070]

In their Traditional Land Use Study, SFN provided descriptions of contemporary traditional use areas, including specific places downstream of the Faro Mine. Additional information is also provided in SFN's Faro Closure Project Traditional Knowledge Study.[1071]

LFN note that, "…Kaska rights are being displaced everywhere there are roads and trails..." and that "[w]hile the Faro mine represents a disturbance of epic scale and consequence, it is part of an emerging pattern of land and resource disturbance that requires careful consideration…"[1072]

In 1992 and 1993, Weinstein produced two reports that examined the land use and history of RRDC in the Faro region. These reports, coupled with SFN and LFN traditional land use and TK studies, help to characterize the cultural keystone areas, spiritual sites, and important places in and around the project site.

32.2 Spatial Boundaries

The assessment area for the cultural keystone areas is defined by the First Nations' Traditional Territories that overlap with the project site, are adjacent to the project area, or are downstream

[1070] YOR 2019-0149-3563
[1071] YOR 2019-0149-5184
[1072] YOR 2019-0149-1242, p.5

from the project site. Rather than define a discrete spatial boundary, the EC considers cultural keystone areas based on where project effects are likely.

The assessment area for this VESEC includes:

- RRDC and the community of Ross River.
- The Project lies wholly within the Traditional Territory of RRDC, and the community of Ross River is approximately 50 km from the project site. RRDC are a member of the Kaska Nation.
- SFN and the community of Pelly Crossing.
- SFN Traditional Territory extends to within 50 km downstream from the project site on the Pelly River, and the community of Pelly Crossing is downstream of the Project.
- LFN and the Town of Watson Lake.
- LFN are a member of the Kaska Nation. Furthermore, in comment submissions throughout the assessment process for this project, LFN have identified project effects on LFN traditional and contemporary land use.

32.3 Existing Conditions

Existing conditions are defined as the expected conditions at the project site after the North Fork Rose Creek realignment has been completed, prior to commencement of the Project. However, the project site and surrounding landscape have a long history of industrial activity and, prior to that, use by First Nations. Historic activity at the project site has altered First Nations' relationship with project site and surrounding region.

In their comment submissions, affected First Nations have identified a legacy of racism, perceived and experienced contamination, and mismanagement of the site after active mining ceased. In addition, industrial activity has increased access to the region, forcing traditional land users to compete with mineral exploration, other resident hunting, and tourism.

The existing conditions for this VESEC include within them this history of use. They are not to be viewed as snapshot in time, but instead as a sum total. LFN, RRDC, and SFN have provided comments detailing their extensive history in and around the project site.

RRDC and LFN lived semi-nomadically, however the Weinstein report[1073] notes that Tsē Zūl (Mount Mye, Blind Creek, and the Swim Lakes area) had three permanent habitation sites, as well as at least 26 archeological sites. The Tsē Zūl area was one of the most important breadbaskets to the RRDC or, as Weinstein[1074] remarked, "one of the rare places where, as the

[1073] Weinstein, *Just Like People Get Lost: A Retrospective Assessment of the Impacts of the Faro Mining Development on the Land Use of the Ross River Indian People*; Weinstein, *The Ross River Dena: A Yukon Aboriginal Economy.*

[1074] Weinstein, *Just Like People Get Lost: A Retrospective Assessment of the Impacts of the Faro Mining Development on the Land Use of the Ross River Indian People*; Weinstein, *The Ross River Dena: A Yukon Aboriginal Economy*

elders say, 'there is everything' – moose, caribou, gophers, whistlers, fresh water fish and salmon." Pelly Lakes and the Campbell Creek region is also identified as a key traditional land use area.[1075]

The SFN Traditional Land Use Study (2017)[1076] provides a comprehensive description of traditional and contemporary land uses in and around the Project including traditional resources and seasonal harvest, patterns on use, and changes to SFN traditional use. SFN further provided, as part of their comment submission, the *Faro Mine Closure Project: Traditional Knowledge Study Final Report* (2008),[1077] which captures point-in-time data and information regarding socio-environmental values for SFN. This includes special areas and uses.

This context informs the existing conditions used by the EC to establish how project effects are understood.

32.4 Proponent Mitigation Measures

The project proposal identifies the following mitigation measures for project activities that increase the disturbance footprint of the Project:

- Use previously disturbed areas for project activities (as possible).
- Provisions in the Heritage Resources Management Plan such as the chance-find procedure for unidentified heritage resources can apply to more tangible cultural keystone areas. Furthermore, employing members or citizens of affected First Nations as environmental monitors can improve adherence to the Heritage Resources Management Plan.
- Avoid known cultural keystone areas during the Project by Identifying and restricting access.
- Establishing disturbance free zones around both tangible and intangible sites.

32.5 Project Effects Characterization

32.5.1 Project Effect: An increase in the disturbance footprint of the Project may impact known and previously unidentified cultural keystone areas

Project activities that increase the disturbance footprint, such as major earthworks, land-clearing, excavation, development of borrow areas, access development, and decommissioning activities can alter the integrity and accessibility of cultural keystone areas.

Cultural keystone areas, including identified (known) and previously unidentified (unknown), are rare, protected, and non-renewable. Impacts to cultural keystone areas are often permanent and irreversible. Changes to the availability, accessibility, and surrounding context of cultural keystone areas can often be managed through mitigation. However, there are cases where

[1075] Faro Mine Remediation Project, *History of the Mine*, 2022, https://faromineproject.ca/history-of-mine/.
[1076] YOR 2019-0149-9030
[1077] YOR 2019-0149-5184

project activities affect the physical integrity of the site, or outright destroy it. Understanding these effects focuses on characterizing the extent and nature of potential physical disturbance to known and unknown cultural keystones areas. While there is overlap with the Project's treatment of heritage resources, cultural keystone areas are both tangible and intangible.

Potentially important cultural keystone areas that exist beneath the surface or sites located in unidentified areas are at the greatest risk of adverse impacts.

32.5.1.1 Significance Determination

The EC determines that the Project is unlikely to have significant adverse effects to cultural keystone areas through an increased disturbance footprint. Disturbances to known cultural keystone areas can be effectively controlled by the mitigation measures described above, namely by avoiding disturbing these sites, by applying the provisions in the Heritage Resource Management Plan to intangible and tangible cultural keystone areas and using previously disturbed areas for ground-disturbing activities as much as possible.

The Project may reveal, through land-clearing activities, unidentified sites of importance to First Nations. Disturbance to these sites can be mitigated by adapting the chance-find protocol identified in the Heritage Resources Protection Plan.

33 HERITAGE RESOURCES

33.1 Overview

Heritage resources are important to social and cultural identity and provide the present-day community with its connection to its past. These resources occur throughout the landscape and its physical features. Considering heritage resources is a valuable part of the EC's assessment to protect the sites, objects, and artifacts that mark Yukon history and establish knowledge of the evolving relationship between the land and its peoples and resources. A heritage resource is defined under s. 2 of 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) A 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
>
> (d) or an area that is of aesthetic or cultural value, including a human burial site outside a recognized cemetery.

The EC assesses the effects caused by project activities on the heritage resources VESEC. The term "heritage resources" refers to resources that are valued for their association with social and cultural identity and provide people with a connection to their past

The changes to the landscape and terrain from project activities may result in the loss, alteration, or destruction of one or more heritage resources, if present. Based on the historic use of the area and the information provided during the assessment process, the EC determines that the Project will not result in significant adverse effects to heritage resources.

33.1.1 Reason for Inclusion

The project proposal included cultural and heritage resources as a VESEC with paleontological sites, archeological sites, historic sites, and human remains outside a registered cemetery as sub-components. The EC determined that First Nations' ability to maintain and/or reconnect to their languages, culture, and other specific heritage interests are discussed separately in the cultural keystone areas VESEC (section 32).

Tangible heritage resources may generally prove difficult to locate. Objects, artifacts, and sites can be vulnerable to project activities, specifically ground-clearing and disturbance activities. The consequence of non-mitigated effects could be changes in the integrity of heritage resources or their permanent destruction. For this reason, the EC assesses potential project impacts on heritage resources.

33.1.2 Historic Mining Structures

Comments provided by the Government of Yukon indicated that significant adverse effects to historical mining structures will occur due to the demolishing of historic buildings, stating:

> Significant adverse effects are anticipated for the historical mining structures. Mitigation measures to reduce or eliminate impacts to historical structures during remediation are not presented in the [Heritage Resources Overview Assessment], [Heritage Resources Impact Assessment, or [HRPP] for the Project.
>
> Given the degradation and/or contamination of the historical mining structures, preservation of the buildings may not be practical. As such, historical structures shall be documented prior to demolition and their details submitted to Government of Yukon, Historic Sites Unit. Documentation may include completing as-found drawings, blueprints and/or photographs for historical buildings scheduled for demolition.[1078]

The Proponent has ensured that the site and its buildings have been subject to significant documentation, photographs, and assessments to determine their structural viability, contamination, and demolition program. The EC understands the importance of documenting mining history in the Yukon but based on the existing documentation, pathways of effects due to the demolition of these buildings are unlikely. As such, historic mining structures are not discussed further in the screening report.

33.2 Spatial Boundaries

The spatial boundaries for assessing potential effects to heritage resources include the MDF of the Project and the LAA. The MDF covers 2 003 ha and includes existing disturbances (i.e., the Faro Mine area, Rose Creek tailings area, Grum overburden dump) and the proposed additional footprint related to project activities (e.g., borrow material sources, water diversion channel modifications). The MDF was selected to characterize where heritage resources may be encountered during ground-disturbing activities.

Heritage resources in the LAA are also considered for context in this VESEC. The EC recognizes that many activities in surrounding areas to the MDF may have adversely affected heritage resources that, although separated by a spatial distance, may contribute to a loss of heritage resources collectively.

33.3 Legislative and Other Requirements

Heritage resources are protected under both federal and territorial statutes and regulations, including the *Laws of General Application* [*Historic Resources Act* (2002), *Archaeological Sites*

[1078] YOR 2019-0149-9736, p.32

Regulation (2003)], as well as under Chapter 13 of the *Umbrella Final Agreement*.[1079] Human burials are also protected under the *Cemeteries and Burial Sites Act*.

33.4 First Nation and Community Input

33.4.1 Liard First Nation

LFN raised concerns about heritage resources in their adequacy review comments and, more specifically, on the levels of disturbance that will be respected by the Proponent. The socio-economic effects assessment provided by the Proponent stated that "it is imperative that adequate mitigation is implemented to reduce adverse effects to levels that are acceptable to the cultural group(s) represented as well as to the Heritage Unit of the Government of Yukon."[1080] However, it is unclear to LFN how these levels will be determined, and they ask the Proponent to share "Information about the mechanisms by which acceptable levels of adverse effects on heritage resources […] to assess the efficacy of proposed mitigation measures."[1081]

In their comments on IR No. 1 response, LFN raised further concerns about cumulative effects on heritage resources, mentioning that the cumulative effects assessment provided by the Proponent "identifies some anticipated adverse effects on archaeological resources. Nowhere is there discussion of cumulative effects on semi-tangible to intangible elements of culture."[1082] LFN also disagreed with the maximum spatial extent of effects on cultural and heritage resources being identified as the "maximum disturbance footprint." LFN stated, "This may be the case for physical heritage resources but may not be the case for other cultural resources."[1083] The following statement summarized their concerns about effects to heritage resources:

> […] there are serious gaps in the Proposal in relation to consideration of the full scope of semi-tangible and intangible elements of culture. This is equally relevant for cumulative effects assessment as it is for project-specific effects assessment. Long-term (multi-generation) alienation from a location, for example, can have substantial and broad-spectrum effects on the transfer of traditional and cultural knowledge, place-based knowledge, piece of mind, and other impacts on culture holders.[1084]

33.5 Existing Conditions

The project area has been used and inhabited by First Nations for thousands of years. First Nations citizens and members use their Traditional Territory in all seasons for traditional harvesting (e.g., hunting, trapping, fishing, and gathering). Archaeological and heritage sites found in the area provide additional evidence of pre-mine traditional land use.

[1079] Government of Canada, Council for Yukon Indians, and Government of Yukon, *Umbrella Final Agreement between The Government of Canada, The Council for Yukon Indians and The Government of the Yukon.*
[1080] YOR 2019-0149-0756, p.63
[1081] YOR 2019-0149-8863, p.8
[1082] YOR 2019-0149-3258
[1083] YOR 2019-0149-3258
[1084] YOR 2019-0149-3258, p.4

The project proposal indicates that there are at least 29 heritage sites found in the project area (described in volume III, section 8.3).[1085] These sites consist of 25 prehistoric surface or sub-surface lithic artifact scatters and three historic sites. No human remains had been identified in the MDF or LAA at the time of this assessment. One discovery of palaeontological remains has been recorded within the MDF and LAA.

The characterization of existing conditions completed by the Proponent is largely based on a review of data from previously completed heritage impact assessment studies and management documents by Ecofor and Stantec within the MDF and LAA, including the following:

- Heritage Resource Overview Assessment for the Proposed Faro Mine Remediation Project (Ecofor 2012)
- Heritage Resources Management Plan for the Faro Mine Complex (Ecofor 2013)
- Historic Resource Impact Assessment of the Proposed Faro Mine Interim Works Borrow Areas – Permit 13-26ASR (Ecofor 2014)
- Historic Resource Impact Assessment of the Proposed Faro Mine Interim Works Areas – Permit 15-03ASR (Ecofor 2016)
- Historic Resources Impact Assessment of the Faro Mine Complex Study Area – Permit 16-10ASR (Stantec 2016)
- Historic Resources Impact Assessment of the Faro Mine Complex Study Area – Permit 17-16ASR (Stantec 2018)

The Heritage Resources Protection Plan (HRPP) draws upon these heritage assessments. Protocols for the management of heritage resources proposed by the Proponent are an amalgamation of those developed in these documents.

Comments provided by YG's Department of Tourism and Culture provided the following information regarding heritage resources based on its definition of heritage resources:

> Thirty-five archaeological sites, three historic structure sites, and one quaternary paleontological find have been recorded within the LAA as a result of heritage baseline studies conducted for the Project. It should be noted that the project location has not been subject to a full inventory of sites to date and it is possible and probable that undocumented heritage resources are present within the project area. In addition, undocumented heritage resource sites could be discovered through the course of project activities.[1086]

33.6 Proponent Mitigation Measures

The Proponent has included the following proposed mitigation, monitoring, and management associated with heritage resources.

[1085] YOR 2019-0149-2609
[1086] YOR 2019-0149-9736, p.30

Section 11.4 of the project proposal describes the HRPP, which was developed to provide guidance for the protection of heritage resources during the Project. The plan divides the project area into three components: areas requiring a Heritage Resources Impact Assessment (HRIA), assessed areas with known heritage resource locations, and assessed areas with no known heritage resource conflicts. Appendix 11C provide details regarding this plan.

Mitigation includes provisions for avoidance through partial project redesign or relocation to limit impacts to the heritage resource. Where avoidance is not possible, emergency mitigation activities may be necessary, including systematic data recovery or application of site protection measures, such as erecting fencing or barricades to protect the site or capping the site area with fill. Appropriate protection measures will be identified on a site-specific basis. Chance-find management guidelines have been developed for the appropriate response to the unanticipated discovery of either disturbed or intact heritage materials during remediation activities associated with the Project. The EC understands that where avoidance is not possible site management and mitigation measures shall be determined by the Yukon Heritage Resources Unit. Any disturbance to an archaeological site requires authorization and an Archaeological Site Regulations Permit.

The Proponent has indicated that prior to any borrow activities at the location of recorded heritage and archaeological resources, or in areas that have not been previously subject to an HRIA, potential impacts to heritage and archaeological resources will be assessed as outlined in the Heritage Resources Protection Plan (volume IV, appendix 11C) and as regulated through the *Yukon Historic Resources Act* RSY 2002, c.109 (*Archaeological Site Regulations*).[1087] The Proponent has developed a chance-find management procedure, which ensures that Kaska Dena are made aware of any discoveries. The EC understands that Kaska Dena includes both RRDC and LFN. Known heritage sites will be flagged with “No Work Zone” flagging tape and “No Disturbance Zone” signage will mark each location. A 30 m no-work buffer will be established around the site.

33.7 Project Effects Characterization

33.7.1 Project Effect: Loss, alteration, or destruction of heritage resources

Project activities involve the reclamation and remediation of sites where works have already occurred, as well as new disturbance such as clearing, stripping and excavation of borrow sources (Figure 24), modification of existing creeks and drainages, and the improvement and development of access roads. Moving earth or clearing land in areas not previously disturbed may result in the loss, alteration, and/or destruction of a heritage resource (all or part of a heritage resource); isolation from its natural setting; or the introduction of physical, chemical, or visual elements that are out of character with the heritage resource and its setting.

[1087] YOR 2019-0149-9964

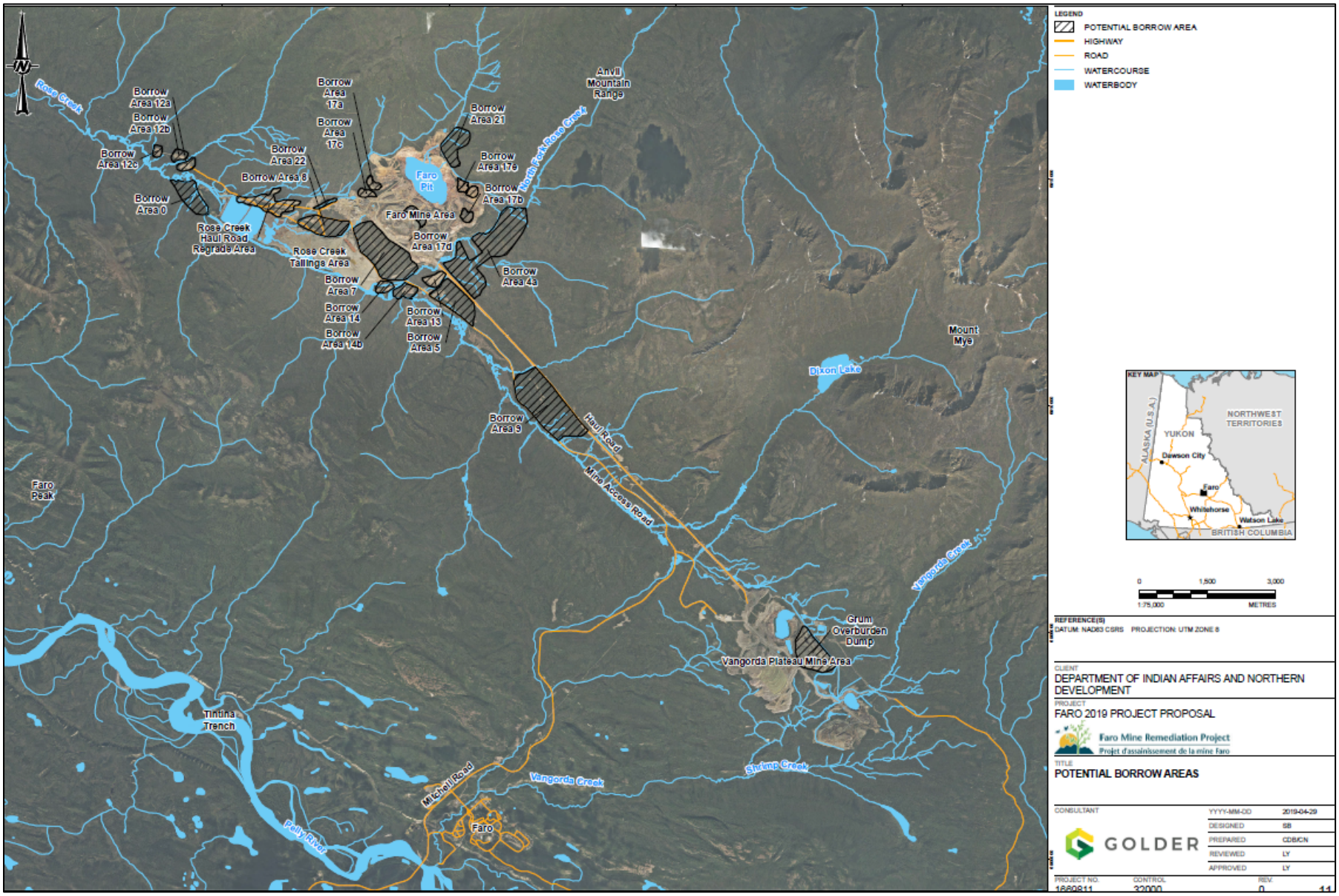

Figure 24: Potential Borrow Areas[1088]

Heritage resources are not confined to a particular area or feature of the Yukon landscape; they may be situated on the ground or in water, at the surface or subsurface level. The value of heritage resources may be vested in both their physical and material features, and they may have symbolic importance. Heritage resources can be fragile and deteriorate through contact. If destroyed, they are irreplaceable. Consequently, effects are often irreversible.

Many heritage resources are inconspicuous and hard to detect. Given the ground-disturbing activities and the elevated potential for the presence of heritage resources within the project area, it is possible that the Project will result in the alteration, fragmentation, or loss of documented or undocumented heritage resources, should they exist. Because the loss of heritage resources is irreversible and permanent, damage or destruction of heritage resources is considered a significant adverse effect. Avoidance of heritage resources is the only effective mitigation against such effects and can be achieved by surveying areas with elevated potential ahead of ground-disturbing activities.

The following comments were provided by YG's Department of Tourism and Culture in regard to the HRPP:

> The [P]roponent's commitment to the [HRPP] and the existing regulatory framework, are considered effective in the reduction of significant adverse effects on known heritage resources as well as any unanticipated heritage resource sites that may be discovered by chance during project activities. Providing that the above-mentioned commitments are employed and standards are followed, no residual or cumulative effects to the valued environmental and socio-economic component of Heritage Resources are expected to result from the proposed project.[1089]

Based on the existing conditions, heritage resources are present within the MDF and LAA and are likely to be encountered based on the historical use of the area described by First Nations. The project footprint underwent a Heritage Resource Overview Assessment (HROA) in 2013, as well as eight HRIAs on various regions of the LAA prior to ground disturbance (2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021). Based on the current understanding of heritage resources within the LAA, the additional measures described in section 33 to protect and preserve heritage resources, and the commitment to notify affected First Nations upon the discovery of a heritage resource, significant adverse effects to heritage resources are unlikely.

33.7.1.1 Significance Determination

The EC determines that the Project will not result in significant adverse socio-economic effects to heritage resources.

Although effects to heritage resources are adverse, the likelihood of project activities resulting in the loss, alteration, or destruction of heritage resources is low based on the current knowledge

[1089] YOR 2019-0149-9736, p.31

of heritage resources within the LAA and MDF, the proposed activities listed in the HRPP, and existing legislation.

34 INDIGENOUS ECONOMIES

34.1 Overview

In this assessment, Indigenous economies refer to "…the flow of natural and monetary resources within a designated social group."[1090] They integrate social, cultural, and environmental aspects of life locally.[1091] To LFN, Indigenous economies include a multitude of economic sectors.[1092] For example, Indigenous families may support each other with childcare, eldercare, and educational activities (e.g., making traditional clothing).[1093] These economies are also not "frozen in time;" they have evolved with other modern economies and are connected to both domestic and international markets.[1094]

Comment submissions indicated that the affected communities should be classified as "mixed economies,"[1095] where members depend upon both wage and non-wage economies. Wage-based activities include activities where wages, hours of work, and payment occur, generating income for workers. Non-wage-based activities include, but are not limited to, informal activities, knowledge sharing, trade, child and eldercare, social enterprises, home-based workers, artisans, and subsistence economy.

The EC determines that the Project will not result in significant adverse effects to Indigenous economies. The mitigations proposed by the Proponent are sufficient in addressing concerns.

34.1.1 Reason for Inclusion

The wage economy of communities in the assessment area is largely driven by services from the federal, territorial, and First Nations governments, with the largest proportion of people employed in government and community services sectors.[1096] Retail, construction, accommodation, and food services also make up a large part of the wage economy in these communities.[1097] In addition to these revenue streams, the communities of Ross River and Pelly Crossing and towns of Watson Lake and Faro are all involved in economies supported by hunting, fishing, timber harvest, and other traditional activities.[1098] For example, in Ross River in the early 1990s, up to 60 % of community food supply came from traditional foods.[1099] The majority of household income in Ross River was from a combination of wage and non-wage

[1090] Weinstein, *The Ross River Dena: A Yukon Aboriginal Economy*.
[1091] Weinstein, *The Ross River Dena: A Yukon Aboriginal Economy.*
[1092] YOR 2019-0149-1605
[1093] YOR 2019-0149-1605
[1094] YOR 2019-0149-1605, p.5
[1095] YOR 2019-0149-9158, p.3
[1096] YOR 2019-0149-2609
[1097] YOR 2019-0149-2609
[1098] YOR 2019-0149-2609
[1099] Weinstein, *The Ross River Dena: A Yukon Aboriginal Economy.*

activities, where one family member's primary economic activity may have been harvesting while the other may have been a full-time wage-based job.[1100]

All communities in the project area have immense potential to develop and create businesses supported by traditional activities. Economic growth is important to the affected communities. In Ross River, in 2006, RRDC developed the vision statement that "In 20 years Ross River will be a healthy, strong, stable, united community driving a diverse and sustainable regional economy."[1101] Community vision statements like this one speak to the priority of these communities to have varied and sustainable economies.

The importance of Indigenous economies to community members within the assessment area was identified in comments as a concern. Impacts to economic-related activities for wage- and non-wage-based activities include, but are not limited to, job creation, job retention, career progression, economic output, and disturbance to community dynamics. The following have been identified as potential effects to the Indigenous economies in the assessment area:

- The migration of local Indigenous individuals to work at the project site will negatively alter community dynamics and local economies.
- The growing presence of non-Indigenous employees at the project site will negatively affect First Nations regional economies.
- Barriers to career progression for Indigenous employees and their access to management positions will impede growth of Indigenous economies.

The EC assesses the effects caused by project activities on the Indigenous economies VESEC. Based on mitigations proposed by the Proponent and information provided during the assessment period, the EC determines that the project will not result in significant adverse effects to Indigenous economies.

34.2 Spatial Boundaries

The spatial assessment boundaries have been identified and defined by the Traditional Territories of SFN, RRDC, and LFN. The assessment area includes the following communities:

- The community of Ross River
- The community of Pelly Crossing
- The Town of Watson Lake
    - In comments submitted in IR No. 1, LFN raised issues with the project proposal's determination on spatial extent and economic impact. LFN mentioned that they are predominantly based near Watson Lake, however they may undertake traditional activities throughout the entire Kaska Dena territory, including the project area. LFN's members and businesses may want to relocate to take

[1100] Weinstein, *The Ross River Dena: A Yukon Aboriginal Economy*.
[1101] Ross River Dena Council, *Building on Strength: An Economic Development Strategy for Ross River*.

> advantage of economic opportunities associated with the Project, which in turn would impact community wellness in LFN communities.[1102]

- The Town of Faro
    - The EC recognizes that members or citizens of the affected First Nations also live in the town of Faro and, as such, it is included in this VESEC. However, the primary focus is on the other three communities.

34.3 First Nations and Community Input

34.3.1 Ross River Dena Council

RRDC has provided YESAB with technical reports and engaged in bilateral meetings. One concern raised by RRDC in the SATAC II meeting was that contamination at the site affects how members work and interact with the surrounding landscape:[1103]

> People avoiding certain areas has been mentioned. It is also linked to Indigenous economies in terms of wage economy at in the town of Faro because people are afraid to work on site or in the area of Faro, so trust and contamination has an impact on traditional, but also contemporary Indigenous economies.[1104]

During SATAC II, RRDC emphasized the vital connection between wildlife and public trust, highlighting barriers people face to accessing hunting areas because of the mine or overhunting, or because they don't trust that the animals are healthy to eat.[1105] These impacts have tangible economic consequences for household food in the community.

RRDC members maintain a profound connection to their landscapes and local environments, deeply rooted in their culture and ancestral history. Consequently, if their local economy deteriorates, they are less likely to relocate.[1106] The health of wildlife and fish is intrinsically linked to this economy.[1107] RRDC raised concerns about the immediate economic benefits gained from the Project:

> There should be some mechanism in place to ensure that the historic economic marginalization Ross River experienced doesn't continue to happen, and to track/measure the success/failure of economic opportunities. Mitigation will need to include expanding relationships with RRDC, Dena Nezzidi, Faro Secretariat, and Ross River businesses, in order to ensure long-term economic and infrastructure benefits for Ross River.[1108]

[1102] YOR 2019-0149-1605
[1103] YOR 2019-0149-3563
[1104] YOR 2019-0149-3563, p.13
[1105] YOR 2019-0149-3563
[1106] Weinstein, *The Ross River Dena: A Yukon Aboriginal Economy*.
[1107] Weinstein, *The Ross River Dena: A Yukon Aboriginal Economy*.
[1108] YOR 2019-0149-0555, p.57

RRDC highlighted the possibility of adverse effects if their community does not benefit economically from the Project.[1109] RRDC mentioned that potential mitigations include implementing a mechanism to track and measure the successes or failures of the economic opportunities for RRDC members.[1110] The Project could better support sustainable long-term positions in the community of Ross River, including administrative support, community liaising, and management.[1111] "By centering activities entirely in the Town of Faro the project risk perpetual racism and overlooking opportunities to support businesses in Ross River."[1112]

Furthermore, they are concerned that barriers exist for members and their career growth: "Elders would like to see long-term career opportunities for Ross River members, including management positions."[1113]

RRDC would prefer sustainable job creation and skill development, however "temporary jobs are better than no jobs where there is high unemployment."[1114]An Elder from RRDC, Brian Hemsley, stated: "If there are still jobs after the funding ends then it's job creation. If the jobs disappear when the funding ends, that's a make-work project."[1115]

34.3.2 Selkirk First Nation

SFN has participated in several bilateral meetings with YESAB and contributed with relevant and pertinent information and studies regarding SFN, their history, concerns, issues, and interests: "Selkirk members are hopeful this project will help them be able to use this land again."[1116]

SFN observed a notable lack of data and resources essential for accurately characterizing impact pathways in socio-economic VESECs.[1117] Project assessments currently lack a comprehensive understanding of the intricate connection between the biophysical environment and the well-being of subsistence-based economies, food security, and cultural wellness.[1118] This lack of data speaks to the need for incorporating socio-economic monitoring, similar to the Minto Mine SFN Traditional Use Study in the Project.

Throughout the SATAC sessions, SFN highlighted the interconnectedness of traditional use and socio-economic and cultural well-being.[1119] Traditional use relates to health of the land, water,

[1109] YOR 2019-0149-0555
[1110] YOR 2019-0149-0555
[1111] YOR 2019-0149-0555
[1112] YOR 2019-0149-0555, pp.9-10
[1113] YOR 2019-0149-0555, p.2
[1114] Ross River Dena Council, *Building on Strength: An Economic Development Strategy for Ross River*, 2006, https://yukonomics.ca/reports/Economic_Development_Strategy_for_Ross_River.pdf.
[1115] Ross River Dena Council, *Building on Strength: An Economic Development Strategy for Ross River*.
[1116] YOR 2019-0149-9158, p.15
[1117] YOR 2019-0149-8702
[1118] YOR 2019-0149-4384
[1119] YOR 2019-0149-9158

cultural well-being, and traditional economy.[1120] The ability of SFN citizens to engage in traditional use within their Traditional Territory is affected by various factors, including the strength of social networks, employment, exchanging of traditional foods, mental health, and shared TK.[1121] Through SATAC II, the importance of traditional use evolved into several VESECS, one of them being Indigenous economies. SFN commented that Indigenous economies as a VESEC was the direct result of engagement during the SATAC meetings.[1122]

SFN expressed a general concern regarding encroachment, displacement, and disturbance affecting their traditional land use and economy.[1123] Particularly, SFN is worried about the cumulative effects of many projects within their Traditional Territory.[1124] For example, increased access and presence of non-local land users and hunters may cause SFN citizens to avoid areas to avoid stark contrasts in respective hunting cultures.[1125] During SATAC IV, SFN emphasized that enduring and adverse effects of the Faro Mine's operation and care and maintenance have had long-standing, negative effects on members or citizens' use of land and water, as well as avoidance and displacement from traditional harvesting and use of the area.[1126] The mixed economy and social cohesion are important to SFN. SFN citizens are hopeful the Project will help them use the land again, but that will, in part, depend on the scope of the Project.[1127]

34.3.3 Liard First Nation

LFN actively supported the conception and adoption of Indigenous economies as a unique VESEC, considering it an important standalone topic.[1128] LFN has identified several interests, issues, and concerns related to the VESEC.

LFN emphasized that when YESAB assesses the potential adverse effects on the Indigenous economies VESEC, it is important to understand that these economies exist in the contemporary world, connecting to domestic and international markets.[1129] This perspective aligns with the economic development section of Watson Lake's community plan, which articulates a long-term goal of maintaining a stable and diversified economic base.[1130]

[1120] YOR 2019-0149-9158
[1121] YOR 2019-0149-9158
[1122] YOR 2019-0149-8702
[1123] YOR 2019-0149-9030
[1124] YOR 2019-0149-9030
[1125] YOR 2019-0149-9030
[1126] YOR 2019-0149-9767
[1127] YOR 2019-0149-9158
[1128] YOR 2019-0149-1605
[1129] YOR 2019-0149-1605
[1130] Town of Watson Lake, *Town of Watson Lake Official Community Plan, 2021*, https://watsonlake.municipalwebsites.ca/ckfinder/connector?command=Proxy&lang=en&type=Files&currentFolder= %2F&hash=c245c263ce0eced480effe66bbede6b4d46c15ae&fileName=Bylaw %2021-10 %20OCP(2).pdf.

LFN expressed concern over the displacement of their members from home communities for temporary work placements, recognizing the potential for cultural erosion of traditions, language, and values.[1131] LFN asserted that the Proponent should do more than "provide a few jobs" but consider economic reconciliation in its scope.[1132] LFN suggested that the Proponent has an opportunity to establish negotiated government-to-government agreements, acknowledging past events and moving beyond simplistic approaches to wealth transfer.[1133]

Moreover, LFN identified barriers to employment for Kaska members and the potential re-traumatization due to reminders of colonization and intergenerational trauma connected with the Faro Mine.[1134] They highlighted that, when the Faro Mine was operational, there were intended economic benefits for the Kaska people. However, despite initial Indigenous employment, jobs were tried and abandoned due to poor working conditions and discrimination.[1135] In the second operational year of the Faro Mine, Indigenous employees constituted 10 % of the workforce, but this percentage declined to 1 % as more Indigenous people left their jobs.[1136] Given these historical difficulties attracting and keeping Indigenous workers at similar projects, there are legitimate concerns about the proportion of work benefits likely to accrue from the Project to Yukon First Nations communities.

LFN spoke to the importance of adopting a trauma-informed approach in providing training and specialized skills to support employee readiness of community members.[1137] Human-resources policies need to support "Indigenous employee retention, such as (but not limited to) access to Elders, appropriate time off for traditional activities, community responsibilities and grievance, financial management support, counselling support, employee cultural education and anti-harassment training."[1138]LFN commented[1139] on the Indigenous economies VESEC in the DSR[1140] noting a lack of consideration for economic reconciliation. Specific concerns focused on potential job instability arising from temporary employment, Indigenous economies becoming economically dependent on the Project and data gaps for characterizing baseline effects.

34.4 Proponent Mitigation Measures

The Proponent has included proposed mitigation, monitoring, and management related to the Indigenous economies VESEC. In general, mitigations associated with this VESEC include maximizing the participation of Indigenous employees, strengthening capacity through training opportunities for Indigenous employees, and maximizing the participation of local Indigenous

[1131] YOR 2019-0149-1605
[1132] YOR 2019-0149-1605, p.4
[1133] YOR 2019-0149-1605
[1134] YOR 2019-0149-1605
[1135] Ross River Dena Council, *Building on Strength: An Economic Development Strategy for Ross River*.
[1136] Ross River Dena Council, *Building on Strength: An Economic Development Strategy for Ross River*.
[1137] YOR 2019 -0149-1605
[1138] YOR 2019 -0149-1605, p.3
[1139] YOR 2019 -0149-8575
[1140] YOR 2019 -0149-7502

businesses.[1141] The EC has outlined some of the notable mitigations below. For the complete list of mitigations, refer to Tables 11F. 3-1 and 11F. 3-2 in Appendix 11F of the project proposal.[1142]

34.4.1 Maximizing Indigenous Employment

The Proponent intends to build a procurement strategy, incorporating preferential hiring and retention of Indigenous peoples.[1143] Alongside this preference, the Proponent will enable employees to participate in seasonal hunting and fishing, grant Elders access to the site for cultural and spiritual guidance, and, where possible, allow Indigenous employees to attend major community and cultural events.[1144] Additionally, the Proponent will develop a mandatory Indigenous sensitivity training for all staff.

34.4.2 Strengthening Capacity and Training

The Proponent will collaborate with affected Indigenous communities and educational providers to identify gaps in regional capacity and skills, enhancing training opportunities for local employees.[1145] Training for transferable in-demand skills, such as heavy equipment operator and general labour, will also be provided.[1146] Furthermore, a specific training program focused on developing Indigenous employees for foreman and supervisory roles will be created.

34.4.3 Maximizing Participation of Indigenous Businesses

The Proponent expresses a commitment to maximize contracting of Indigenous businesses. Strategies include an engagement plan to enhance Indigenous business participation, development of bid proposals in consultation with affected First Nations, and advanced notice and additional points in the bidding process.[1147]

34.4.4 Monitoring

The Proponent has developed two monitoring plans for socio-economic mitigations, including: the SMMP, reviewed annually, and the AMP, reviewed monthly and annually. Additionally, the Proponent intends to incorporate a socio-economic committee into its governance structure in collaboration with First Nations.[1148]

The SMMP evaluates the Proponent's success is achieving targets for maximizing Indigenous recruitment and retention, training and capacity development, and maximizing contract opportunities for Indigenous businesses. The SMMP consists of a management component,

[1141] YOR 2019-0149-0756
[1142] YOR 2019-0149-9964
[1143] YOR 2019-0149-9964
[1144] YOR 2019-0149-9964
[1145] YOR 2019-0149-9964
[1146] YOR 2019-0149-9964
[1147] YOR 2019-0149-9964
[1148] YOR 2019-0149-0658

which identifies measurements to mitigate potential adverse effects, and a monitoring component to assess effectiveness of mitigations and determine any necessary modifications.[1149]

The AMP provides a framework for the Proponent to respond quickly to changing conditions at the site. While not explicitly outlined in the SMMP, the Proponent has indicated that the AMP framework applies to socio-economic conditions.[1150]

The Proponent's commitments include:

- The integration of a socio-economic committee to the project governance structure with an oversight committee that includes First Nations leadership and support of First Nations technical advisors;[1151]
- Bilateral meetings, technical review committees, and workshops on key issues with First Nations technical advisors;[1152] and
- community engagement with First Nations members or citizens.

The Proponent has included mitigation measures for several other VESECs and associated intermediary components identified that may reduce, eliminate, or control the significance adverse impacts of project activities. These include those for:

- Surface water quality
- Fish and fish habitat
- Aquatic health and productivity
- Atmospheric greenhouse gases
- Moose
- Woodland Caribou
- Avian wildlife
- Housing
- Health and emergency services
- Mental health and substance use services
- Community personal and relational safety
- Public trust

Mitigation measures for those VESECs are identified in the relevant sections for consideration and are incorporated into the significance determination through the holistic and cumulative effects assessment methodology.

[1149] YOR 2019-0149-9964
[1150] YOR 2019-0149-9964
[1151] YOR 2019-0149-0658
[1152] YOR 2019-0149-0658

Additional mitigation measures have been proposed by the Proponent as part of the Environmental and Socio-Economic Management and Monitoring Framework for Local and Traditional Land Use[1153] and include:

Land access:

- Avoid new project footprint disturbances, to the extent practicable
- Maintain, to extent possible, ongoing access to land used for local and traditional purposes. Establish alternative routes, if necessary
- During active remediation, inform affected First Nations and general public of limited access to land
- Implement access control measures (barriers), where necessary
- Implement the Road and Traffic Management Plan
- Engage in discussions with affected trappers and/or affected cabin owner(s) to determine if compensation for the potential loss of current use is required
- Implement the Heritage Resources Protection Plan
- Develop and implement an access management approach to limit project effects and allow access to traditional areas beyond the Project

Resource use:

- Implement mitigation measures described for water, fish, vegetation, wildlife, noise, and air to limit effects on resources
- Prohibit staff from hunting or fishing while on work rotation, living in camp, or during work hours

In addition, monitoring of local and traditional land use will include monitoring of indicators that may reduce opportunities to practice traditional activities. Indicators (of note) include:

- Project employment of affected First Nations people
- Total local employment
- Training hours for Indigenous employees
- Participation in skills training programs for Indigenous employees
- Total project contract expenditures on Indigenous businesses
- Grievances related to reduced income opportunities due to limited or restricted access to land used for local activities (e.g., hunting, outfitting, trapping)
- Grievances related to reduced access to land used for traditional activities (e.g., hunting, outfitting, trapping

34.5 Existing Conditions

The communities of Pelly Crossing and Ross River and the towns of Watson Lake and Faro all have defined economic visions and goals. It is important to note that each of these goals and

[1153] YOR 2019-0149-9964

vision statements include the words “diverse” or “sustainable,” speaking to the desire to incorporate varied new businesses and increase skilled labour in their populations:

- Selkirk First Nation Community Plan, 2007[1154]
- “Pelly Crossing will have a diverse sustainable economy that will make our community a good place to live, work and play.”
- Ross River Dena Council Economic Plan, 2006[1155]
- “In 20 years, Ross River will be a healthy, strong, stable, united community driving a diverse and sustainable regional economy.”
- Watson Lake Official Community Plan, 2021[1156]
- “…Maintain a stable and diversified economic base, including government, forestry, tourism, mining, oil and gas, agriculture, and big-game outfitting.”
- Forever Faro – Integrated Community Sustainability Plan, 2013[1157]
- “Faro will be an attractive, sustainable, economically viable and united community.”

34.5.1 Non-Wage Economic Activities

The area around the Faro Mine, including Mount Mye (Tsē Zūl), was traditionally used by First Nations as a resource-rich harvesting site.[1158] Mount Mye (Tsē Zūl) was considered a rare landscape where all the food necessities were available for First Nations people, including, but not limited to, caribou, salmon, moose, sheep, and berries.[1159] Much of the traditional use in the area was displaced when the mine was developed in the late 1960s.[1160]

SFN, LFN, and RRDC all have unique economies that incorporate both non-wage and wage-based activities. These economies incorporate important cultural dynamics and reciprocity. SFN identified a data gap concerning impact pathways on traditional use and economic well-being, hindering how we understand effects on non-wage activities.[1161]

The SFN Traditional Use Study[1162] illustrates their economy is heavily influenced by the availability of traditional foods and the willingness for citizens to share resources and provide valuable social roles, such as childcare.[1163] Survey data from the community of Pelly Crossing reveals the vast majority (> 80 %) of citizens depend on traditional foods, with a large amount (> 25 %) of household food coming from harvesting. Approximately 80 % of community

[1154] Selkirk First Nation, *Selkirk First Nation/Pelly Crossing Integrated Community Sustainability Plan 2007*, https://emrlibrary.gov.yk.ca/cs/ICSPs/icsp_selkirk_fn_pelly_crossing.pdf.
[1155] Ross River Dena Council, *Building on Strength: An Economic Development Strategy for Ross River.*
[1156] Town of Watson Lake*, Town of Watson Lake Official Community Plan*.
[1157] Town of Faro, *Forever Faro Volume 1: Integrated Community Sustainability Plan 2013*, 2013, https://www.whistlercentre.ca/wp-content/uploads/2014/09/Forever-Faro-ICSP-FINAL.pdf.
[1158] Ross River Dena Council, *Building on Strength: An Economic Development Strategy for Ross River*.
[1159] Ross River Dena Council, *Building on Strength: An Economic Development Strategy for Ross River*.
[1160] Ross River Dena Council, *Building on Strength: An Economic Development Strategy for Ross River*.
[1161] YOR 2019-0149-4384
[1162] YOR 2019-0149-9030
[1163] YOR 2019-0149-9030

members report sharing substantial portions of their harvested foods, alongside sharing gear, equipment, childcare responsibilities, TK, and wage-work responsibilities.[1164] In their study, SFN expressed concerns about traditional use, reporting the steady decline of traditional harvested food within community households.[1165] Considering insights from the SFN Traditional Use Study and feedback from the other affected First Nations, it is evident that wildlife health and community well-being are vital to the success of these economies.

34.5.2 Population, Income, and Employment

The household median incomes in the communities of Pelly Crossing and Ross River and the towns of Watson Lake and Faro fall far below the Yukon average (see Table 18 below). Ross River and Pelly Crossing have considerably lower household incomes, at roughly 60 % of the Yukon average (see Table 18). Unemployment rates surpass the Yukon average in each affected community, with Pelly Crossing experiencing rates three times higher and Ross River doubling the Yukon average. The total unemployed population across Pelly Crossing, Ross River, and Watson Lake is approximately 213, as per Statistics Canada's most recent census (See Table 28). Despite these economic challenges, the Proponent notes a high level of trades and labour capacity in these communities, with 24.4 % of the adult population in Pelly Crossing holding a trades certificate or diploma.[1166] Business capacity in the affected communities is also strong.

Table 18: Population, Income, and Employment Rates Among the Affected Communities[1167]

Community	Total Population	Population Growth	Median Total Household Income	Employment Rate	Unemployment Rate	Unemployed People
Pelly Crossing	316	-7.4 people/year	$ 63,200	49.0 %	25.0 %	61
Ross River	355	12.4 people /year	$ 61,200	45.8 %	15.6 %	46
Faro	440	18.4 people /year	$ 78,500	51.4 %	12.5 %	36
Watson Lake	1 133	10 people /year	$ 78,500	53.8 %	11.7 %	106
Yukon Average	40 232	871.6 people/ year	$ 100,000	66.8 %	6.8 %	2 228

[1164] YOR 2019-0149-9030
[1165] YOR 2019-0149-9030
[1166] YOR 2019-0149-0756
[1167] Government of Canada, *Census Profile, 2021 Census of Population, Pelly Crossing, Settlement*; Government of Canada, *Census Profile, 2021 Census of Population, Ross River, Settlement*; Government of Canada, *2021 Census of Population, Faro, Town*; Government of Canada, *Census Profile, 2021 Census of Population*, *Watson Lake, Town*; Government of Canada*, 2021; Census of Population, Yukon*.

34.5.3 First Nations-Owned Businesses

Collectively, SFN, RRDC, and LFN operate 19 registered businesses across diverse sectors. SFN have three registered businesses, with services in consulting, business, administration, equipment, and construction.[1168] RRDC have 10 registered businesses, with services in consulting, construction, remediation, heavy equipment handling, road maintenance, forestry, chemicals and fuel, emergency services, and management.[1169] LFN has six registered businesses, with services in administration and management, construction, emergency services, landscaping, and equipment rental.[1170]

34.5.4 Staffing at the Project Site

According to the Proponent, in 2018, 130 full- and part-time staff were employed to oversee work at the site.[1171] In addition to the existing care and maintenance staff already working at the complex, the Proponent estimates there may be another 78 personnel on-site daily during active remediation.[1172] The maximum capacity for housing at the site is estimated to be 304 people,[1173] indicating an additional 174 staff may be employed. The Proponent estimates that over the 25-year scope, 5 814 full-time jobs will be created through direct and indirect effects of the Project.[1174]

34.6 Project Effects Characterization

The EC has evaluated the effects of an increased labour force at the project site to determine if there are significant adverse effects on this VESEC. While the rise in transport trucks, dust, noise, and water treatment may be relevant to this VESEC, these activities have been assessed in other sections, including First Nations land use and sense of place, air quality, water quality, and wildlife VESECS. In their response to the project DSR,[1175] LFN commented on the Indigenous economies VESEC effect characterization.

Firstly, LFN raised concerns around job instability of the Project due to temporary employment. Given the Federal government's backing and responsibility to the Project, bankruptcy and/or abandonment are unlikely outcomes for the Project, ensuring a high likelihood of the Project's

[1168] Government of Yukon and Yukon First Nations Chamber of Commerce, *Yukon First Nations Business Registry, Selkirk First Nation*, 2024, https://yukon-first-nations-business-registry.service.yukon.ca/search?f %5B0 %5D=first_nation %3A43.
[1169] Government of Yukon and Yukon First Nations Chamber of Commerce, *Yukon First Nations Business Registry, Ross River Dena Council*, 2024, https://yukon-first-nations-business-registry.service.yukon.ca/search?f %5B0 %5D=first_nation %3A42.
[1170] Government of Yukon and Yukon First Nations Chamber of Commerce, *Yukon First Nations Business Registry, Liard First Nation*, 2024, https://yukon-first-nations-business-registry.service.yukon.ca/search?f %5B0 %5D=traditional_territory %3A148.
[1171] YOR 2019-0149-0756
[1172] YOR 2019-0149-0756
[1173] YOR 2019-0149-8967
[1174] YOR 2019-0149-5807
[1175] YOR 2019-0149-8575

continuation over its 25-year scope. Additionally, the temporal scope allows employees the opportunity to potentially work for 25 years, which is three times longer than the average job tenure (8.4 years) in Canada. [1176] Considering it is unlikely the Project will go bankrupt, prematurely ending the Project, and that the temporal scope is far above the average job tenure, the EC has not further explored job instability as an effect to assess.

LFN has expressed a concern that Indigenous economies may become dependent on income generated from this Project. While the Project's scale could foster dependency, the long temporal scope provides opportunities for local economies to anticipate and adapt as the Project nears its end of life. The independent review body and monitoring requirements offer mechanisms for affected First Nations to address economic dependency issues, mitigating any potential adverse effects. For the reasons given, the EC has not assessed economic dependency further in the assessment process.

Finally, LFN's highlighted data gaps in understanding baseline information for the Indigenous economies VESEC. This concern may be addressed through the independent review body, which, in part, will recommend ongoing studies for the Proponent to fund.

34.6.1 Project Effect: The migration of local Indigenous individuals to work at the Project site will negatively alter community dynamics and local economies

The Proponent anticipates that the Project will generate new opportunities for Indigenous people in the assessment area community. Economic development plans for Pelly Crossing, Ross River, and Watson Lake all speak to increasing work opportunities to address high unemployment and income disparity. The Project may require up to 174 more positions,[1177] potentially helping to address high unemployment in the assessment area. The Proponent has suggested that initial skilled trades capacity in these communities exists.[1178] The desire for employment, coupled with initial labour capacity, suggests many Indigenous people will accept employment opportunities generated though the Project.[1179]

If the Proponent succeeds in hiring a large number of Indigenous people from the assessment area, there could potentially be adverse effects on the Indigenous economies VESEC. Employees will work at the site in two weeks on and two weeks off rotation.[1180] Absence of Indigenous member from their home communities during their two week shifts on-site may negatively affect economic dynamics. For example, while Indigenous workers are on-site, they may not be able help with community childcare or traditional harvesting, which may degrade community cohesion and the local economy.

[1176] Government of Canada, Statistics Canada. *Table 14-10-0055-01 Job tenure by industry, annual*. 2024. https://doi.org/10.25318/1410005501-eng
[1177] YOR 2019-0149-8967
[1178] YOR 2019-0149-0756
[1179] YOR 2019-0149-0756
[1180] YOR 2019-0149-2609

To LFN, there is a potential risk that Kaska members joining the workforce could experience re-traumatization due to triggers associated with past traumas linked to the Faro Mine. The EC assumes that all affected First Nations share similar connections to the area and could be affected similarly. This potential trauma could disrupt local community dynamics, adversely impacting this VESEC. Specifically, if Indigenous people are re-traumatized, it will likely affect their social, educational, and work productivity. To address negative legacies associated with the Faro Mine, the Proponent will have mandatory Indigenous sensitivity training for all workers and allow Elders on-site to provide spiritual and cultural guidance to First Nations workers.[1181]

34.6.1.1 Significance Determination

The EC determines that the Project will not significantly adversely affect Indigenous economies as a result of Indigenous members or citizens leaving their home communities for work at the Project. Mitigations provided by the Proponent to address this effect are adequate.

One benefit to the proposed work schedule is that, in a four-week period, employees will enjoy more time off compared to a standard five-day work week (i.e., 14 days versus eight). This additional time off provides Indigenous employees increased flexibility to commute home and participate in community activities. The Proponent has also committed to flexible scheduling, enabling Indigenous workers to take additional time off to participate in seasonal hunting and fishing, as well as important cultural or community events.[1182] Should employees express a need, the Proponent is prepared to assist workers in finding suitable childcare, eldercare, and other family-related services through human-resources policies.[1183]

The Proponent has committed to monitoring effectiveness of socio-economic mitigations through a socio-economic committee, the SMMP, and the AMP. Active participation from First Nations partners will be essential in these monitoring programs. The EC expects that any concerns related to ongoing effectiveness of proposed mitigations related to Indigenous economies will be resolved with First Nations involvement in the socio-economic committee and monitoring plans proposed.

34.6.2 Project Effect: The growing presence of non-Indigenous employees at the project site will negatively affect First Nations regional economies

The Project is expected to have a workforce composed of both Indigenous and non-Indigenous individuals. The increased presence of non-Indigenous employees is likely to introduce diverse ideas and cultural practices to the region, potentially impacting Indigenous traditions and culture. Concerns were raised by SFN about the potential for continued disturbance and encroachment, as previous activities related to the Faro Mine have discouraged citizens from

[1181] YOR 2019-0149-1605
[1182] YOR 2019-0149-9964
[1183] YOR 2019-0149-9964

using the area. RRDC and LFN also expressed worries about overhunting of caribou and moose, at one point proposing a partial hunting ban on non-Kaska hunters.[1184]

While the Project is anticipated to boost the regional economy and population growth, the cultural contrasts in harvesting practices and the growing number of non-Indigenous workers may adversely affect how Indigenous peoples use the area and, consequently, their economies. For example, Indigenous workers may take on western views of hunting in place of Indigenous practices around harvest. This adverse effect becomes more likely when the 25-year duration of the Project is taken into consideration.

To address these concerns, all employees will undergo mandatory Indigenous sensitivity training, aiding non-Indigenous employees in understanding and respecting cultural practices of Indigenous people in the area. While Indigenous employees may take time off for important seasonal hunting and fishing, employees at the site are prohibited from hunting or fishing while living or working in camp. Additionally, the Proponent has provided a monitoring framework, outlined in the SMMP, to track grievances related to local and traditional use in the area, allowing for adjustments in mitigation responses as needed.

34.6.2.1 Significance Determination

The EC determines that the Project will not significantly adversely affect Indigenous economies because of the influx of non-Indigenous employees. The Proponent has proposed sufficient mitigations to respond to adverse effects related to the increase in non-Indigenous workers in the area.

The Proponent's policies around hunting at work, training, and socio-economic monitoring are all measures that are anticipated to mitigate adverse effects. Additionally, the mandatory Indigenous sensitivity training and regular presence of Indigenous Elders on-site may expose non-Indigenous people to Indigenous practices, hopefully fostering a positive and diverse workplace culture for everyone.

34.6.3 Project Effect: Barriers to career progression for Indigenous employees and their access to management positions will impede growth of Indigenous economies

There are many barriers to employment and career progression for Indigenous members or citizens[1185], as highlighted in the Dena Cho report:"Elders would like to see long-term career opportunities for RRDC members, including management positions."[1186] These concerns align with existing literature, indicating there are substantial barriers for Indigenous people in resource

[1184] Connors, "Kaska nations concerned with 'over-hunting' in their territories," *APTN National News,* August 16, 2021, https://www.aptnnews.ca/national-news/kaska-nations-concerned-with-over-hunting-in-their-territories/.
[1185] YOR 2019-0149-0555
[1186] YOR 2019-0149-0555, p.2

and mining sectors. These barriers include, but are not limited to, systemic racism, capacity limitations, and trauma from colonial legacies.[1187]

The Bank of Canada has identified growth and diversification in Indigenous economies across Canada; however, persistent barriers hinder their economic advancement.[1188] These studies emphasize the importance of education and skill development in driving economic growth.[1189] If a substantial portion of the Indigenous community population is employed through the Project, without the opportunity for skill development and career progression to positions such as supervisor or manager, there is a risk that local economies will not grow and will fail to diversify.

To address capacity and career progression concerns, the Proponent commits to a training and employment program focusing on local content. This program will include targeted skills training and development for foreman and supervisory positions, specifically designed for Indigenous employees and candidates. Additionally, the Proponent pledges to consult with affected First Nations and educational providers to identify gaps and enhance training opportunities for local Indigenous candidates.

34.6.3.1 Significance Determination

The EC determines that the Project will not result in significant adverse effects to career progression for Indigenous employees. The mitigations proposed by the Proponent are sufficient in addressing concerns. The Proponent has committed to providing more than just entry-level positions for Indigenous employees. The EC anticipates the Proponent's employment program will help Indigenous employees grow to higher-level positions, such as foreman and supervisory roles, fostering long-term skill capacity within their communities. As Indigenous employees assume greater supervisory responsibilities, their expanded skillsets are expected to benefit the regional economies.

[1187] Beaudoin, et al., "Participation of Indigenous Employees in the Quebec's Forestry Sector: Opportunities and Barriers," *Equality, Diversity and Inclusion* 41 no. 5, (2022): 693-708; Holcombe and Kemp, "From Pay-out to Participation: Indigenous Mining Employment as Local Development?" *Sustainable Development* 28 no. 5 (2020):1122-1135; Baruah and Biskupski-Mujanovic, "Indigenous Women's Employment in Natural Resource Industries in Canada: Patterns, Barriers and Opportunities," *Women's Studies International Forum* 99 (2023) doi: https://doi.org/10.1016/j.wsif.2023.102784.

[1188] Cheung and Chernoff, "An Overview of Indigenous Economy in Canada," *Bank of Canada* (2023), doi: https://doi.org/10.34989/sdp-2023-25.

[1189] Hulten and Ramey, "The Importance of Education and Skill Development for Economic Growth in the Information Era," *University of Chicago Press* (December 2018).

35 RECREATIONAL AND COMMERCIAL LAND USE

35.1 Overview

The project proposal discusses local and traditional land use as a VESEC and identifies three sub-components: traditional land use, local non-Indigenous land use, and commercial land use. However, the EC determined that a different approach was needed to fully consider the nuances of both Indigenous and non-Indigenous land use. The recreational and commercial land use VESEC focuses on non-Indigenous land uses, while project effects related to Indigenous land use are considered in section 31, First Nation land use and sense of place.

Additionally, the PSOA[1190] describes a land use VESEC with the sub-components recreational land use and commercial land use. The EC notes considerable overlap between these sub-components and associated project effects. Therefore, in this FSR, the EC combines the sub-components into a single VESEC called recreational and commercial land use.

As described above, recreational and commercial land use consists of tourism, outfitting, hunting, and other non-Indigenous land-based activities. Land users typically avoid the project site itself to carry out land-based activities, but the Project is expected to interact with land users in the vicinity of the Project. Therefore, recreational and commercial land uses in proximity to the Project may be impacted by project activities, particularly during active remediation.

These land-use activities include, but are not limited to, tourism, outfitting, non-Indigenous wildlife harvest, commercial and personal fuelwood harvest, wildlife viewing, and trapping, as well as access to landscapes to carry out these activities. The assessment of project effects on recreational and commercial land use assesses:

- Reduced land use due to increased noise and dust emissions associated with project activities
- Changes to land use due to the expansion of the footprint of the Project
- Changes to, or reduced, access

The EC determines that the Project will not have significant adverse effects on recreational and commercial land use. Recreational and commercial land users typically avoid the existing disturbed areas of the project site, favouring more intact sites for tourism, outfitting, non-Indigenous wildlife harvest, commercial and personal fuelwood harvest, wildlife viewing, and trapping. Although project activities might alter access to roads and trails, the Proponent commits to maintain access throughout the life of the Project. Since recreational or commercial land uses do not typically occur on the project site, the magnitude of project effects is limited on this VESEC. This, coupled with the mitigations developed by the Proponent, serve to reduce significance.

[1190] YOR 2019-0149-0822

35.1.1 Reason for Inclusion

Tourism has become a major focus of the Town of Faro and is a priority in Faro's Integrated Community Sustainability Plan, completed in 2013.[1191] The Town of Faro and the surrounding area host a variety of accommodations, a visitor information centre, and hiking, mountain biking, and wildlife-viewing activities geared towards tourism. The Town of Faro also hosts an annual crane and sheep-viewing festival.

More generally, tourism is an important sector to the Yukon economy, providing a source of diversification in an economy that is relatively dependent on public-sector spending. The Yukon Bureau of Statistics reported that $ 146.1 million, 5.0 % of Yukon's total GDP, was attributed to tourism in 2018.[1192] Much of the Yukon's tourism is based on its vast landscapes and wildlife-viewing opportunities.

In addition to tourism, land use by people living in the LAA includes timber harvesting at several sites near the Project and hunting for moose and caribou in the assessment area. Some of these land uses occur on public land that is accessed via the project site.

The Project overlaps with outfitting concession # 8 and is adjacent to outfitting concession # 9. Outfitting concessions rely on intact wilderness areas to conduct guided hunting, fishing, and other wilderness tourism activities.

35.1.2 Activities Beyond the Spatial Scope of Assessment

Broadly, the region hosts a range of other land-use activities. For instance, the North and South Canol roads are important wilderness accesses for hunting, wilderness tourism, and recreation throughout the year. The Lapie and Ketza rivers, accessed via the South Canol Road and Robert Campbell Highway, are used annually by paddlers.

In the community of Ross River, the Raven's Nest Bed and Breakfast provides accommodation, offers art/artist and cultural workshops, and sells artwork.

Group trapping concession # 405 is discussed in the First Nations land use and sense of place VESEC, and neither the project site, nor the assessment area, overlaps with other trapping concessions.

These activities take place beyond spatial boundaries where the EC predicts project effects to be likely. The project proposal indicates that dust and noise emissions and changes to roads and trails are limited to the assessment area described below. The EC also considered whether land-use activities beyond the spatial scope of this VESEC would be impacted by project traffic. However, the project proposal notes that project-related traffic in the region will be fewer than

[1191] Town of Faro, *Forever Faro, Volume 1: Integrated Community Sustainability Plan 2013.*
[1192] Government of Yukon, *Yukon Business Survey, 2019*, https://yukon.ca/sites/yukon.ca/files/ybs/2019_business_survey_report.pdf.

one additional truck a day. In light of this, the EC determines that no further consideration of these land-use activities is required.

35.2 Spatial Boundaries

The spatial boundary for assessing potential effects to recreational and commercial land use is the area where land users are most likely to experience project-related effects. This boundary is the MDF, the access road, and other project roads, with a 1.5 km buffer to capture effects related to noise and dust emissions in this assessment.

35.3 Existing Conditions

Existing conditions for this VESEC are defined as the conditions at the project site upon completion of the North Fork Rose Creek realignment, prior to commencement of the Project.

Ongoing land use in the vicinity of the project site informs the existing conditions for the recreational and commercial land use VESEC. The project site overlaps with the municipal boundary of the Town of Faro and is located near the community of Ross River. In addition, roads and trails in the project area provide access for various land-use activities.

Other land use in the spatial scope includes:

- Outfitting concession # 9, held by Deuling Stone Outfitters Ltd
- Outfitting concession # 8, held by MacMillan River Adventures, overlaps with Anvil Creek and the lower portion of Rose Creek, downstream from the Project
- Timber harvest
- Timber is harvested for personal and commercial uses. The Mount Mye Timber Harvest Plan[1193] identifies a timber harvest area east of the project site. Additional fuelwood areas are identified at:
    - Swim Lakes, east of the Faro Mine;
    - Lapie burn, near Ross River in the Lapie River drainage;
    - Ketza burn, 50 km south of Ross River in the Ketza River drainage; and
    - Coffee Lake, 25 km southeast of Ross River.
- Wildlife harvest
- Access for GMSs 4-44 and 4-46 occur via a public road running through the project site. A threshold hunt limits moose harvest in these GMSs to 15 animals.[1194]
- Fishing
- The Town of Faro residents reportedly use the Pelly River east and upstream of the project site.
- Recreation and tourist activities:

[1193] Government of Yukon, *Mount Mye Timber Harvesting Plan (2011)*, 2011, https://emrlibrary.gov.yk.ca/forestry/TimberHarvestPlans/draft_mount_mye_thp.pdf
[1194] Government of Yukon, *Yukon Hunting, Regulations Summary 2023 -2024*.

- There are six bed and breakfast accommodations and one hotel in the Town of Faro. There is an additional bed and breakfast located just outside of the town's municipal boundaries. A wilderness experience is advertised by these accommodation providers as a reason to visit the Town of Faro;
- The Town of Faro Golf Course;
- The Town of Faro hosts the Sheep and Crane Viewing Festival annually early in May, the Ice Worm Squirm event in March, and the Faro Open Golf Tournament in July. The Town of Faro is the centre for these events;
- The Faro shooting range;
- Wildlife-viewing areas;
- The Campbell Region Interpretive Centre, located in the Town of Faro, provides services to visitors and houses a museum;
- Hiking and mountain-biking trails, such as the Dena Cho Trail, a 67-km multi-use trail between the Town of Faro and the community of Ross River along the Ross and Pelly rivers;
- The North Canol and South Canol highways used throughout the year for hunting and wilderness tourism activities;
- The Lapie River, regularly used for canoe and kayak trips, including two Yukon-organized gatherings, as well as used by Whitehorse-based commercial operators offering paddling instruction courses; and
- The Pelly River, used for recreational paddling (canoe-camping) trips by Yukon residents and national and international tourists.

35.4 Proponent Mitigation Measures

Project effects to recreational and commercial land use are likely to result from project activities that:

- Increase noise and dust
- Increase the footprint of the Project
- Reduce access

Mitigations for project-related noise include using appropriate mufflers systems on internal combustion engines and using quieter alternatives when available. The Proponent will monitor noise levels during active remediation to determine whether project-related noise emissions are below the predicted thresholds.

The Proponent proposes to mitigate adverse effects resulting from dust emissions by the provisions in the Dust Management Plan.[1195] These mitigations consist of implementing speed limits on-site and on the access road, the application of dust suppressants and road-watering, minimizing driving distances, and a commitment to regular road maintenance. In addition to these mitigations, the Revegetation Plan outlines an incremental and ongoing revegetation

[1195] YOR 2019-0149-9964

strategy to minimize dust from non-road sources. The Proponent's plan to limit additional disturbances, when possible, and sequence remediation will also serve to mitigate dust emissions.

The Proponent proposes to mitigate project effects related to increasing the footprint of the Project by utilizing previously disturbed areas as much as possible and sequencing remediation efforts throughout project phases. Other mitigations include limiting the effects to vegetation and alteration as described in the Borrow Management Plan. The sequence of remediation activities aims to limit the total disturbance at any point in time, where and when feasible.

The Project has the potential to reduce or change access to roads, trails, and parking areas on and around the project site. The Proponent mitigates this effect by a commitment to maintain existing access, where possible. If project activities modify existing access, the Proponent will construct additional access, including the relocation of parking areas and pullouts that conflict with project activities. Fences or gates controlling access to existing roads or trails removed during the life of the Project will be replaced. The Proponent also commits to maintaining access to maintained public trails by constructing additional roads or trails, if needed.

35.5 Project Effects Characterization

35.5.1 Project Effect: Increased noise and dust will discourage recreational and commercial land use

Project activities such as construction, development of borrow areas, roadworks, decommissioning, and operation of static and mobile internal combustion engines will increase noise levels during active remediation. Project vehicles on roadways and development and use of borrow areas will increase dust emissions, particularly during active remediation. These activities will deter land users from using the area for recreational and commercial purposes during the active remediation period (15 years). Noise and dust generation will reduce the wilderness experience of land users.

The Proponent expects the noise levels to be at the "annoyance level" within 1.5 km of the MDF. The boundary of the LAA was defined by this noise threshold. As discussed in the air quality VESEC and the project proposal, dust levels from project activities may result in TSP that exceed YAAQS in the LAA.

Land-use activities within the LAA generally consist of users traversing the LAA to access sites beyond the LAA and of local fishing at the pumphouse pond.

Comments provided regarding recreational and commercial land use were predominantly tied to the First Nations land use and sense of place and cultural keystone areas VESECs. Specific comments pertaining to tourism and non-Indigenous land use were limited and very general in nature.

The project site has a history of large-scale industrial development and is not a pristine wilderness environment. The limited use of the project site for recreational and commercial land

uses reflects this history. The project proposal (section 8.0, Socio-Economic Effects Assessment)[1196] states that the project site is not commonly used for recreational and commercial land-use purposes, such as wildlife and timber harvest, outfitting, and wilderness tourism.

Recreational land use is not likely to occur within the LAA as these pursuits typically rely on intact wilderness areas. Recreational land use is known to occur in the RAA and includes campgrounds, hiking trails (the Dena Cho Trail), and other land uses that rely on the North and South Canol roads, Lapie and Ketza rivers, and the Robert Campbell Highway. The EC expects that these recreational areas will remain mostly unaffected by active remediation as they are outside of the LAA and will experience no, or minimal, changes to noise and dust levels when compared to existing conditions.

There are no commercial land-use activities that take place in the spatial scope. Outfitters use roads and trails within the spatial scope for access, however project activities that alter access are discussed in section 35.

Project effects that discourage land use adversely affect the ability of people to recreate by discouraging activities such as wildlife viewing, fishing, hiking, and biking. Wilderness tourism is a source of income in the assessment area. Wildlife and timber harvest can offset food and heating expenses, linking adverse effects to recreational and commercial land use to the financial stability of people living in the region. This is of particular importance for the two outfitting concessions affected by the Project.

Recreational or commercial land uses do not typically occur on the project site, except for access to other areas, as discussed below. The mitigations in the project proposal for noise, dust emissions, vegetation management, and road-watering, coupled with the phasing of project activities to reduce total noise and dust emissions, minimize project effects on recreational and commercial land use. In addition, the magnitude of project effects from noise and dust emissions is concentrated in the LAA. The timing of these effects is also temporary, limited to the active remediation phase of the Project, and the effects are entirely reversible on completion of the active remediation phase.

Table 12 in the air quality VESEC (section 8) indicates TSP levels beyond YAAQS thresholds beyond the LAA in the Rose Creek drainage. The absence of land-use activities in the LAA and Rose Creek drainage reduces the risks associated with TSP exposure. Land-use activities in the LAA and Rose Creek drainage are typically ephemeral in nature, utilizing the project site for access to areas beyond the LAA.

35.5.1.1 Significance Determination

The EC determines that the Project will not result in significant adverse effects to recreational or commercial land use, because of increased noise and dust.

[1196] YOR 2019-0149-0756

While the Project is likely to have adverse effects, the existing condition of limited land use in the LAA, coupled with the Proponent's mitigations, serves to reduce the significance.

35.5.2 Project Effect: Project activities that increase the project footprint can conflict with recreational and commercial land use opportunities

The Faro Mine has adversely affected recreational and commercial land use since the commencement of mining operations in 1969. In this time, recreational and commercial land users have adapted by utilizing other areas.[1197] Project activities, such as major earthworks, land-clearing, grubbing, infrastructure development, development and use of borrow areas, cover construction, landscaping and revegetation, and new access roads and stream crossings will increase the MDF project footprint of the site, encroaching on other land uses. This enlargement of the disturbance footprint can further alienate land users from the area by reducing its wilderness character.

Specifically, the increase in the project footprint overlaps with timber-harvest activities. The project proposal identified several personal fuelwood harvest areas in the assessment area and notes that, for safety considerations, the Swim Lakes timber-harvesting area may be closed during active remediation, preventing timber harvest in this area. Land users in the assessment area who typically rely on this site for fuelwood will be adversely affected.

However, other timber-harvesting locations in the assessment area will continue to be available. These include the Lapie burn near the community of Ross River, the Ketza burn 50 km south of the community of Ross River, and Coffee Lake, 25 km southeast of the community of Ross River. Closer to the Town of Faro, the Magundy River personal fuelwood area will remain available.

Once temporary restrictions on the Swim Lakes timber-harvest area are lifted for operations and maintenance, the availability of timber-harvesting areas will return to the existing conditions. Temporary closure of the Swim Lakes timber harvest area will occur during active remediation. The Proponent is unclear on the duration of closure, specifically whether the temporary closure will last the duration of the 15-year active remediation phase or if it will be only a portion of the 15-year period. Regardless, other timber-harvest areas that are identified in timber-harvest plans in the project region remain available to land users for personal fuelwood harvest through the 15-year active remediation period. The Project will affect how land users access less-disturbed areas, which is explored below.

35.5.2.1 Significance Determination

The EC determines that the project activities will not result in significant adverse effects to recreational or commercial land use, resulting from an increase in the project footprint of the Project.

[1197] YOR 2019-0149-0756

Project activities like major earthworks, land-clearing, grubbing, infrastructure development, development and use of borrow areas, cover construction, landscaping and revegetation, and new access roads and stream crossings will increase the disturbance footprint of the Project and adversely affect land users. These activities of the Project will impede timber harvest in the Swim Lakes area.

Although land use in the Swim Lakes timber-harvest area will be hindered, other timber-harvest areas are in proximity and provide alternate harvesting opportunities. Furthermore, this effect is reversible once the active remediation phase of the Project ends. Given the relatively short-term and reversible nature of these effects and the availability of alternate timber-harvest areas, significant adverse effects are not likely.

35.5.3 Project Effect: Project activities will change or reduce access in the MDF

The project proposal describes roads and trails in the MDF that commercial and recreational land users use to access wildlife-viewing, timber- and wildlife-harvest opportunities, and fishing areas.

During the active remediation phase of the Project, the Proponent may need to implement access restrictions on some roads and trails. These restrictions can limit recreational and commercial land use. Project activities require that the Proponent change or limit certain access roads and trails in the project area in the interest of public safety.

Section 8A Socio-Economic Effects Existing Conditions[1198] of the project proposal describes how the existing project site is used for access. It notes road, trails, and parking areas used by hunters, outfitters, hikers, and ATVers, including use to access an outfitting basecamp.

The Proponent has committed to an “access management approach,”[1199] maintaining access wherever possible by providing alternative routes and developing new trails linking existing roads and trails rendered inaccessible by project activities. The Proponent also commits to maintaining or replacing existing institutional controls.

The Project is expected to have minor and local changes to access during the active remediation phase and no effects during operations and maintenance.

The Project is likely to change how roads and trails in the MDF are accessed. Project activities will require the Proponent to modify roads and trails for public safety and to access borrow sources.

[1198] YOR 2019-0149-2609
[1199] YOR 2019-0149-0756, p.36

35.5.3.1 Significance Determination

The EC determines that the Project will not result in significant adverse socio-economic effects to recreational or commercial land use because of changes or reduced access in the MDF of the Project.

Although the project footprint will expand during the lifetime of the Project and affect how land users access less-disturbed areas in the vicinity of the Project, access will be managed using an access management approach to maintain access to currently accessible areas.

The project proposal contains mitigations sufficient to reduce the significance of project effects on access roads and trails. The Proponent commits to maintain access to roads and trails during active remediation by providing or creating alternative access. Roads and trails with institutional controls on them will see these controls replaced once project activities no longer need that road or trail.

36 PUBLIC TRUST

36.1 Overview

Public trust is defined as the confidence of affected persons and communities in the ability of the Proponent to fund, manage, and complete the Project. Comments received recommended that perpetual management of the Project and the legacy left for future generations be evaluated as independent sub-components of this VESEC. These topics are so closely linked to oversight, long-term funding and governance that it was determined that they cannot be addressed independently. Therefore, the EC assessed these topics together as they relate to perpetuity and the future legacy of the project site. The assessment of project effects on Public Trust includes the following:

- Concerns and impacts related to the ability of GC to oversee and govern the site in perpetuity
- Concerns and impacts that relate to public confidence in the ability of GC to fund the Project
- Reduced public trust due to ineffective complaint management

36.1.1 Reason for Inclusion

Although the project proposal did not consider public trust as a VESEC, there are other examples[1200] for including VESECs related to ongoing public confidence in the government appropriately funding, operating, and governing the Project. The project proposal describes project activities for a 25-year period, divided into a 15-year active remediation period and a 10-year operations and maintenance period. However, the project site will require long-term monitoring and perpetual management and governance past the 25-year project period. Future generations and public funds will be responsible for financing active water treatment, water management, and infrastructure management perpetually.

Participants have explained during SATAC sessions, comment submissions, and IRs that there is a lack of trust in the GC appropriately funding, operating, and governing the project site far into the future.

First Nations expressed the importance of First Nation government representation in project governance and decision making. The effects of this project will impact today's First Nations and communities, as well as future generations well past the temporal scope of this Project. For the reasons above, the EC determines there is a need to include public trust as a VESEC.

[1200] United Keno Hill Mines Reclamation Project (YOR 2018-0169); Mackenzie Valley Review Board, *Giant Mine Remediation Project,* # EA0809-001.

36.2 Spatial Boundaries

The history surrounding the management, abandonment, and environmental degradation at the Faro Mine has left a legacy of concern felt by individuals and communities throughout the Yukon. Questions about how the site has been and will be managed, funding for long-term remediation, and future outcomes of the site have the potential to impact public trust throughout all Yukon communities. However, to focus the assessment process, the EC has chosen to establish spatial boundaries based on comments from participants and the public and from SATAC sessions. The LAA for the public trust VESEC is as follows:

- The Traditional Territory of the RRDC and the community of Ross River
- The Traditional Territory of LFN and the Town of Watson Lake
- The Traditional Territory of SFN and the community of Pelly Crossing
- The Town of Faro

The RAA used for this VESEC will include:

- The City of Whitehorse

36.3 First Nation and Community Input

Concerns related to public trust were identified by participants throughout the assessment of this project. These concerns are centred around the erosion of public trust during the years of operation and development of the mine; the subsequent management and enforcement by the regulators who oversee the Project; the delay in the remediation of the site (20+ years), which has led to significant deterioration of environmental conditions; and a lack of appropriate funding and governance structure. Commenters noted there is a lack of confidence that the remediation plan and long-term maintenance of the site will survive future changes in government or issues of budgetary controls. Commenters also noted that some aspects of the Project, once constructed, are functionally irreversible without the input of massive public resources, so alternative studies and risk assessments should be part of the development of the Project.

Considerations for future generations were also brought forward through comments with recommendations that the operations and maintenance of the site should be done in a robust and resilient manner to reduce the burden for future generations. Also, by including First Nation participation in decision-making, the focus could shift the decision-making from short-term cost-savings to long-term success.

36.3.1 Ross River Dena Council

The most recent comments submitted by RRDC on public trust expressed support for the current governance model while also raising concerns for long-term monitoring, funding, and clear governance.

36.3.2 Selkirk First Nation

SFN highlighted the importance of “good governance” in their comment submissions, correspondence and during SATAC sessions. They also noted that having the people most

affected by the Project involved in governance of the site is a mechanism to reduce adverse effects across most VESECs:

> Without good governance that addresses the four key issues raised in SFN's seeking views submission, there is much greater potential for adverse effects on both environmental and socio-economic VESECs. When potentially affected people are involved in decision-making, they will bring vigilance that influences how the project responds to changes observed in environmental conditions […] governance that addresses the issues raised in SFN's submission will reduce the risks of significant adverse effects on almost all VESECs, and it will improve the condition of public trust.[1201]

SFN also discussed accountability mechanisms and examples for ensuring that site governance is adequate:

> Indicators for accountability are the existence of accountability mechanisms, both internal and external/independent (e.g., independent watchdog), as well as the ongoing performance of those mechanisms. Performance of internal accountability mechanisms can be monitored by an independent watchdog agency, and performance of that agency can be monitored by audits of as has been done recently for both the Independent Environmental Monitoring Agency (Ekati Mine) and Giant Mine Oversight Board.[1202]

SFN identified legacy concerns and issues around long-term outcomes, including the importance of evaluating this project against the five overarching objectives:

> There can be instances where remediation doesn't adequately address legacy effects and therefore leaves existing significant adverse effects cause by historic mine activities. At the very least, EC should evaluate whether outcomes of the [Project] will leave VESECs in a position where they are not experiencing ongoing significant adverse effects from the project itself and that the outcome can be maintained in the long-term.[1203]

SFN recommended that the Proponent be required to establish a governance framework for the Project that acknowledges and enacts (empowers) affected First Nations, including SFN, in roles as stewards of their lands and decision-makers. Examples of this include:

- Participation in strategic decision-making
- Participation in decision-making about adaptive management responses and implementation of any socio-economic agreements
- Reviewing and providing input about project management, implementation scheduling, technical matters, monitoring (environmental, socio-economic), and all other matters related to the project

[1201] YOR 2019-0149-9767, p.3
[1202] YOR 2019-0149-9767, p.4
[1203] YOR 2019-0149-9767, p.10

36.3.3 Liard First Nation

In their comment submissions, LFN noted that the Kaska perspective on the Project is much broader than that of the Proponent, stating that the Proponent views this project as a remediation project only, which is not how Kaska people experience it:

> The Faro Mine has affected the Kaska people since the development and operation of the mine through both environmental and social harms. These harms are compounded by the historical impacts of colonization and acculturation, a strong sense of cultural shame and grief rooted in the inability to protect traditional lands, and multiple current and projected mine and infrastructure projects in traditional Kaska territory. Remediation work itself interferes with important exercises of Kaska rights. A holistic, reconciliation-based approach is necessary in this assessment that considers past and ongoing harms from the construction, operation, and remediation of the mine.[1204]

In LFN's comments on the VESEC outlines, reconciliation was included as a key component of public trust, stating that reconciliation needs to be at the forefront of governance:

> LFN included some proposals on governance models and oversight in the draft reconciliation agreement we previously presented to Canada; the ideas and structures presented in the draft agreement require careful and respectful consideration by the Proponent.[1205]
>
> […] For LFN, and for many Indigenous peoples across Canada, the Federal government's Principles Respecting the Government of Canada's Relationships with Indigenous People ("Reconciliation Principles" or "Principles") were celebrated as Canada laying out a roadmap forward for our governments to move into the future together successfully. Public trust, in relation to the Faro project and other mine projects, will require Canada to actually adhere to these promises and the sub-component of reconciliation should integrate them into the VESEC. Indeed, the Principles may, at this point in outline development, provide the most clearly defined outcomes, measures, or targets in the Board's toolbox in relation to public trust.[1206]

The reconciliation agreement identified by LFN highlights several topics to ensure good governance and improve public trust:[1207]

- The oversight/governance structure should not be unilaterally developed and imposed. Meaningful engagement and responsive inclusion of First Nations input is important at every step.
- Long-term funding for the reclamation and monitoring in perpetuity must be ensured to advance rebuilding of trust and advancing reconciliation.

[1204] YOR 2019-0149-9801, p.2
[1205] YOR 2019-0149-0428
[1206] YOR 2019-0149-0428, p.2
[1207] YOR 2019-0149-0428, p.8

LFN commented on the Faro DSR[1208], highlighting that the Project does not holistically consider "social, cultural and economic wounds of the Faro Mine on Kaska communities." LFN suggested the Proponent should "engage with affected First Nations to develop meaningful cultural healing programs as an integral part of the Project" to improve the overall socio-ecological system.

36.4 Existing Conditions

Existing conditions are defined as the conditions at the project site upon completion of the North Fork Rose Creek realignment, prior to commencement of the Project. The project site and the surrounding landscape have a long history of industrial activity, allegations of mismanagement, and environmental degradation, which has reduced the public's trust in the government's ability to manage the site. This legacy shapes the existing conditions for the public trust VESEC.

Participant comments characterized the existing conditions for public trust. These comments highlighted the lack of trust in GC and YG to appropriately fund and manage the site in perpetuity. LFN specifically raised the issue of reconciliation in their comments on the public trust VESEC outline.[1209] These comments emphasized the current lack of public trust that exists and their request to address the legacy of the Project:

> Reconciliation is not just about what happens from here forward. It is not about enabling Crown government to do the bare minimum of consultation to meet their Haida spectrum responsibilities and avoid litigation. It is not just about pressing First Nation concerns to reconcile with what colonial Canadian governments intend to do anyway. Reconciliation means addressing past harms. Nothing in the public trust document is seriously oriented towards past harms, and the Kaska perspective on them. This VESEC cannot be used simply as a baseline "where we are now" but must include how we arrived here - since that diagnosis is essential to funding a cure.[1210]

36.5 Proponent Mitigation Measures

Public Trust was not included as a VESEC in the project proposal. However, the Proponent has included mitigation, monitoring, and management actions associated with long-term funding, oversight, governance, and management of the site into perpetuity.

Section 1.3.1 of the project proposal describes a governance structure for the Project, with input coming from oversight and technical review committees and an independent peer review panel. In addition, the Proponent has proposed bilateral working groups with each affected First Nation and with YG.[1211]

The Proponent describes the governance structure as follows:

[1208] YOR 2019-0149-7502
[1209] YOR 2019-0149-0428
[1210] YOR 2019-0149-0428, p.6
[1211] YOR 2019-0149-5339

> The Faro Mine Remediation Project governance model that has been developed – and which includes an Oversight Committee, Technical Review Committee, Working Groups, and Independent Review Panel – reflects the specific project delivery model and interests of the relevant stakeholders. These committees are intended to cover all aspects of the Project and ensure the participation of stakeholders in the oversight and function of the Project.
>
> The Oversight Committee brings together the leadership and senior representatives from each party to discuss their overall vision for the Project and how to best reflect it throughout project implementation. It provides an opportunity to check in on established governance processes. This committee meets annually.
>
> The Bilateral Working Groups are a forum for representatives from Canada and each of the affected First Nation to discuss matters such as information sharing protocols and how TK and land use information can be shared most appropriately with the Project. These working group meetings take place on a quarterly basis, or as required.
>
> The Technical Review Committee provides First Nation representatives and their technical advisors with an opportunity to provide feedback and influence the design of the Remediation Plan as it is being refined. This committee meets on a bi-weekly basis.[1212]

The response to IR No. 2-10[1213] provides some additional information about the structure and notes that governance is still under discussion. The July 2021 response to IR No. 3-25[1214] confirms that governance discussions with First Nations are still ongoing. The Proponent, in IR No. 2-10, also states that "going forward, the project team will continue to have appropriate governance mechanisms and processes in place for affected First Nations to effectively present and incorporate their view and interests, inclusive of traditional knowledge, in the management and decision-making processes associated with the Faro Mine Remediation Project."[1215]

In an effort to include First Nation participation in the governance structure, the Proponent has also indicated that "the governance agreement commits to working with affected First Nation governments as full partners to advance the implementation of the Project." The governance agreement ensures representation from each of the affected First Nations and provides multiple venues and frequent meeting opportunities for First Nation representatives to communicate their views and interests, inclusive of TK, in project management and decision-making processes.[1216]

The governance agreement described above includes the following commitments from the Proponent:

[1212] YOR 2019-0149-7010, p.35
[1213] YOR 2019-0149-7010, p.253
[1214] YOR 2019-0149-8140
[1215] YOR 2019-0149-5339, p. 5
[1216] YOR 2019-0149-7010, p.164

- The integration of a socio-economic committee to the project governance structure with an oversight committee that includes First Nation leadership and support of First Nation technical advisors
- Bilateral meetings, technical review committees, and workshops on key issues with First Nation technical advisors
- Community engagement with First Nation members or citizens

The Proponent presented this governance structure to the oversight committee in a meeting on January 28, 2020. They indicated that, at this time, all parties generally endorsed the proposed approach for governance of the Faro Mine Remediation Project. Despite this, comments continued to express concerns regarding the oversight committee, particularly the need for an independent committee. Public support for this project strongly depends on the trust the public has in those managing it and the belief that they are acting in the public's interest.

36.5.1 Project Governance Model

The following information on the governance model (Figure 25) is summarized from GC's presentation at SATAC IV.1170F[1217] The goal of the governance model, as indicated by the Proponent, is to ensure involvement and input from First Nations and other stakeholders throughout all aspects of the process. The governance model has been changed, adapted, and adjusted over the years as it moves through the project life cycle. The Proponent has indicated that it will likely change again as the Project progresses through future phases of the Project. The external governance framework shown below provides a mechanism for FN and YG leadership to provide feedback and recommendations on project decisions through the oversite committee. Final responsibility and decision-making power is held by the Deputy Minister of CIRNAC.

[1217] YOR 2019-0149-4632

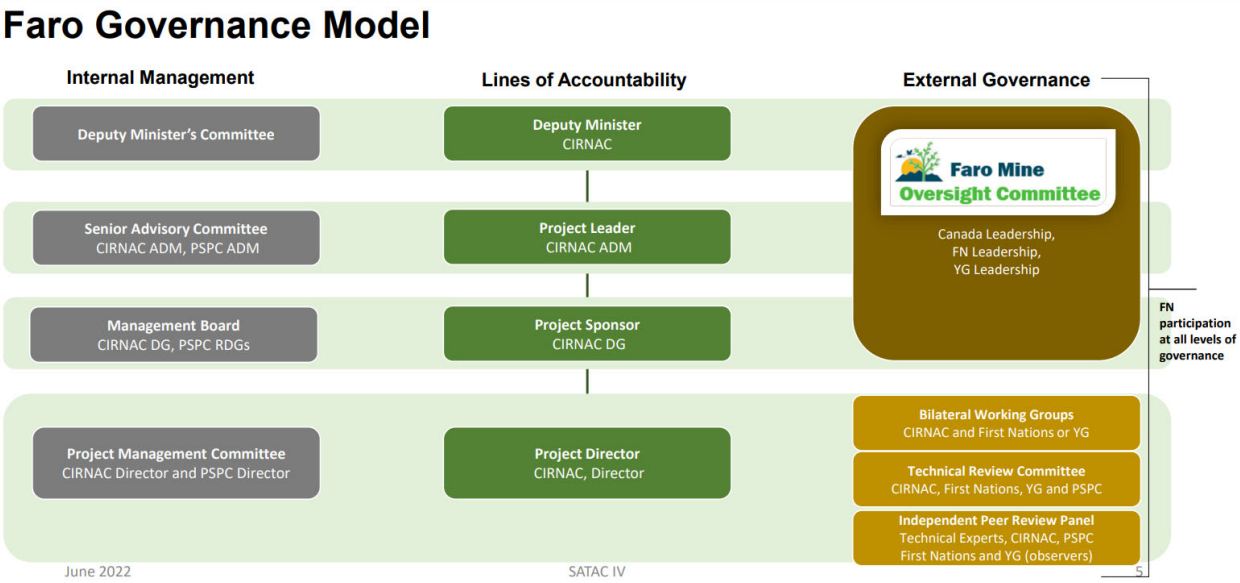

Figure 25: June 2022 Governance Model, Provided by the Proponent[1218]

Key features of this governance model include a mechanism for First Nation participation at all levels of governance and a commitment to annual reporting. The governance model includes the following committees and groups:

- The Faro Oversight Committee provides guidance and oversight and makes non-binding recommendations connected to project governance;[1219]
- The bilateral working groups are composed of the Proponent, affected First Nations, and YG. These are to ensure engagement approaches are working as intended in relation to community-specific issues;
- The technical review committee is composed of the Proponent, First Nations, and YG. The committee provides a mechanism to discuss specific topics, report on project performance, and provide support, assurance, and advice on the Project;
- The independent peer review panel is to provide independent assurance and advice from international mine remediation experts on remediation plan scope changes and technical issues. First Nation representatives attend as observers through their role on the technical review committee; and
- A socio-economic committee will also be developed to provide guidance on and review of the SMMP, develop a socio-economic strategy for the Project, and ensure First Nation socio-economic benefits are maximized during procurement. Terms of reference for this committee will be created between CIRNAC, The Government of Yukon and Affected First Nations.

[1218] YOR 2019-0149-1950
[1219] YOR 2019-0149-1950

36.5.2 Project Funding

The Proponent has indicated that funding for the Faro Project comes from a new northern abandoned mine and reclamation program, which makes $ 2.18 billion available for remediation projects from 2020 to 2035. This funding is specific to eight key sites throughout Canada. Prior to this program, funding timelines were restricted to five years. The timeline for funding was extended to 15 years based on comments, including those from First Nations, who requested greater certainty to allow for longer contracts.

The active remediation of the Faro Mine is anticipated to be completed in 2037, two years after the end of the program funding. The Proponent recognizes this, and the intent is to seek an extension to this program for another five years.

The Proponent is required to report on liabilities twice a year. This reporting will support future funding requests. The Proponent has indicated that funding beyond 15 years is difficult to obtain, as the scope and costs projected today for activities in 15 years will change. The Proponent anticipates that the program described above can be extended to account for long-term monitoring of the site.

The Proponent has also indicated that funds have been set aside to ensure funding for participation in the governance model for the Faro Mine by affected First Nations. These funds are to ensure consistent participation by affected First Nations in the governance model.[1220]

36.5.3 Funding Concerns

The proponent has advised that work and monitoring at the Site will not be complete in 25 years. The Site will need continued monitoring and management past the scope of this assessment, into perpetuity. Comments received expressed concerns regarding GC appropriately funding the required site management activities, including active water treatment and water management, in perpetuity. The lack of a long-term funding plan has and continues to erode public trust in the Project.

36.6 Project Effects Characterization

36.6.1 Project Effect: Reduced public trust caused by past and current oversight and governance

The Faro Mine is one of the most complex and expensive remediation projects in Canada.[1221] Public trust has been eroded from the development, operation, abandonment, and subsequent management of the abandoned site. In 1998 YG and GC jointly shared responsibility for the site,

[1220] YOR 2019-0149-4632
[1221] Canada. Environment and Climate Change Canada. *Federal Contaminated Sites Action Plan (FCSAP) 2019-2020 Annual Action Plan*. Gatineau, 2021. En1-43-2020-eng.pdf (publications.gc.ca)

in 2009 the responsibility was held by YG, and then in 2018 GC assumed sole responsibility.[1222] Because the management of the site has changed several times, the public is unclear as to who is accountable for anything that has gone wrong at the site. The delay in the remediation of the site (20+ years) has led to significant deterioration of the environmental conditions at the site, eroding public trust.

SFN is worried about how the Proponent will govern the site, noting CIRNAC's "resistance to effective shared-decision-making and acceptance of independent monitoring"[1223] SFN highlighted the importance of "good governance" in their comment submissions, correspondence and during SATAC sessions. They also noted that having the people most affected by the Project involved in governance of the site is a mechanism to reduce adverse effects across many VESECs: "observed in environmental conditions […] governance that addresses the issues raised in SFN's submission will reduce the risks of significant adverse effects on almost all VESECs, and it will improve the condition of public trust."[1224]

SFN also discussed accountability mechanisms and examples for ensuring that site governance is adequate:

> Indicators for accountability are the existence of accountability mechanisms, both internal and external/independent (e.g., independent watchdog), as well as the ongoing performance of those mechanisms. Performance of internal accountability mechanisms can be monitored by an independent watchdog agency, and performance of that agency can be monitored by audits of as has been done recently for both the Independent Environmental Monitoring Agency (Ekati Mine) and Giant Mine Oversight Board.[1225]

Comments provided by SFN highlighted the importance of an independent review body for the following reasons:[1226]

- Providing a separate, technically qualified, and a vigilant set of eyes and ears
- Helping Proponent/governments/regulators recognize when things are not performing as expected
- Transparency
- Communicating all aspects of the Project
- Eliminating or reducing conflicts of interest (including perceived), and community mistrust
- Reducing the burden of oversight and governance on small governments and other groups

[1222] Government of Canada, Crown-Indigenous Relations and Northern Affairs Canada, "Faro Mine Remediation Project: Yukon," April 26, 2024, https://www.rcaanc-cirnac.gc.ca/eng/1480019546952/1537554989037
[1223] YOR 2019-0149-8702, p.3
[1224] YOR 2019-0149-9767, p.30
[1225] YOR 2019-0149-9767, p.4
[1226] YOR 2019-0149-2584

Other comments indicated the need for governance structures to support Indigenous self-determination, involve First Nations in the decision-making process, and provide a consistent, ongoing mechanism for transparent, independent oversight and governance.[1227]

Finally, SFN commented on the Faro Mine Remediation Project DSR, further expressing concerns on oversight of the Project and how the Proponent will continue to work with affected First Nations: [1228]

> Despite the prevalence of independent review bodies for projects of the scale of the FMRP, the Proponent has strongly opposed the need for independent review for the FMRP. In its submissions, the Proponent has asserted that its existing governance structures (e.g., Government Oversight Committee, Independent Peer Review Panel) already provide for independent review. As described at SATAC sessions and in written comments (SFN SATAC IV Written Comments, July 12, 2022) SFN does not agree with the Proponent's interpretation and remains convinced that a defined independent review body is needed to mitigate effects on public trust. This is consistent with the EC's assessment findings. If the establishment of the independent review body is assigned to the Proponent, as currently proposed, SFN is concerned that the Proponent will argue that it already has an independent review body that includes nominees from each of the governments – e.g., the Government Oversight Committee, or that it will establish a body that does not meet the intent that is envisioned by the EC in its assessment.

The importance of establishing the governance model in collaboration with First Nations is highlighted in LFN's comment below:

[…] to date, we have had governance structures imposed on us and our input, both inside and outside the EA process, largely ignored. The current oversight and governance planning has not been satisfactory to LFN and therefore cannot positively impact public trust. Oversight and governance measures should be tied to specific Indigenous government consent and adoption. This work needs to be developed jointly with us and to accord with principles presented by LFN and set out in a negotiated agreement - and not imposed by a group of mining engineers or manipulated to seek decisions from uniformed and busy representatives.[1229]Concerns regarding enforcement and compliance were also raised in comments:

> LFN is also deeply concerned about the VESEC adequately addressing the Government of Yukon's role in ongoing compliance. Again, public trust is grounded significantly in past behavior and the Government of Yukon has not demonstrated the inclination or capacity to engage in compliance enforcement in timely or sufficient ways. Again, this issue goes in part to the necessity of getting governance right and enabling the

[1227] YOR 2019-0149-9767
[1228] YOR 2019-0149-5943
[1229] YOR 2019-0149-0428

> jurisdiction and capacity of Indigenous governments to exercise compliance and enforcement.[1230]

RRDC supported the proposed governance model and objected to any changes to it:

> In our view, Governance of the Project should be achieved through deep consultation with Ross River Dena Council as it impacts our unceded Traditional Territory. Others are advocating greater influence on a 'Remediation Project' that disproportionately impacts Ross River Dena Council. We have stated our view regarding the proposal by others to create a 'New Governance Model' in my comments at the last SATAC Meeting. We stand firmly by our objections to change the Governance Model and the potential for negative impacts on our Public Trust and Harm that a change to the Governance Model would impose on our community.[1231]

The EC acknowledges that SFN and LFN do not support the current governance model, while RRDC does support it. The addition of an independent review body will provide additional certainty and accountability without a change to the current governance model.

Assurance from the Proponent that compliance requirements will be adhered to, the site will be monitored, and exceedances or non-compliance will be enforced plays a key role in rebuilding and maintaining public trust. Without such assurance, public trust will deteriorate. This concern is supported through historical exceedances, delays in remediation and continued environmental degradation, and the perceived conflicting role of the Proponent that has been described through comments. As such, it is recommended that an annual report of compliance and enforcement matters be developed and provided to an independent review body for review.

36.6.1.1 Significance Determination

Based on the information provided above, concerns remain over oversight of the Project. It has been made clear by participants that there is a need for a transparent independent review body There is a lack of confidence in the Proponent's ability to manage the site, based on past experiences, and this has reduced public trust. There is a lack of confidence that concerns raised over the temporal scope will be addressed or managed properly. Based on the comments provided, the likelihood of reduced public trust is high. The governance structure, as proposed, is not likely to reduce impacts to public trust, particularly among the communities within the LAA and RAA, without an appropriate mechanism to gather, manage, and address concerns and comments from the public and participants.

An independent review body will play a key role in reducing, controlling or eliminating adverse effects on public trust. The review body would communicate on aspects of the Project, ultimately improving the public's confidence in accurate reporting and the Proponent.

[1230] YOR 2019-0149-0428, pp.6-7
[1231] YOR 2019-0149-2584, pp.0-1

The EC determines that the Project will result in significant adverse effects to public trust because of lack of confidence in the governance model and lack of transparency for the public. As such, the EC recommends the following to reduce, control, or eliminate the significant adverse effects to public trust:

24. The Proponent shall establish and adequately fund an independent review body within three years of the issuance of the Decision Document by the Decision Body:

    a. The independent review body shall, within one year, establish terms of reference to guide operations; and
    b. The independent review body composition shall include members nominated by each affected First Nation, as identified in the Devolution Transfer Agreement, the Government of Canada, and the Government of Yukon.
    c. The independent review body shall be an independent, transparent observer, reviewer and promoter of public awareness for the Project but will not have any decision-making, regulatory or compliance/enforcement authority; and
    d. The independent review body shall promote public awareness of the Project and disseminate information about the Project.

25. The independent review body shall be established to:

    a. Document remediation, monitoring activities, the Greenhouse Gas Reduction Plan and the Carbon Offsetting Plan and their results;
    b. Conduct an audit, every three years, to examine the effectiveness of greenhouse gas emission reductions and offset planning and implementation by the Proponent;
    c. Evaluate and provide commentary about adequacy of funding allocated to the Project, engagement, and ongoing studies;
    d. Based on information provided, provide recommendations to the Proponent to prevent risks and mitigate potential impacts at the Project;
    e. Review the annual compliance document provided by the Proponent and report to the public on any issues related to compliance and enforcement at the Project;
    f. Establish a complaints tracking record informed by the Proponent's complaint management system and informed by any other complaints received by the independent review body. Track how complaints have been resolved and what actions have been taken;
    g. Provide an independent report to the public regarding items a, b, c, d, e and f above, annually; and
    h. Establish a mechanism for members of the public to provide feedback on the report required in item f and any other concerns that arise.

First Nation involvement and decision-making are an important part of building trust in the Project. Ensuring that proper oversight and governance is established in a way that is supported by the public will address concerns related to the legacy that will remain for future generations as well as any perceived conflicts of interest.

The establishment of an independent review body will increase accountability to the public by making information available, increase the transparency of project decisions to the public, and support the actions and decision made by providing feedback to the Proponent. Figure 263326 and Figure 27 further illustrate the recommendation for the independent review body created by this term and condition.

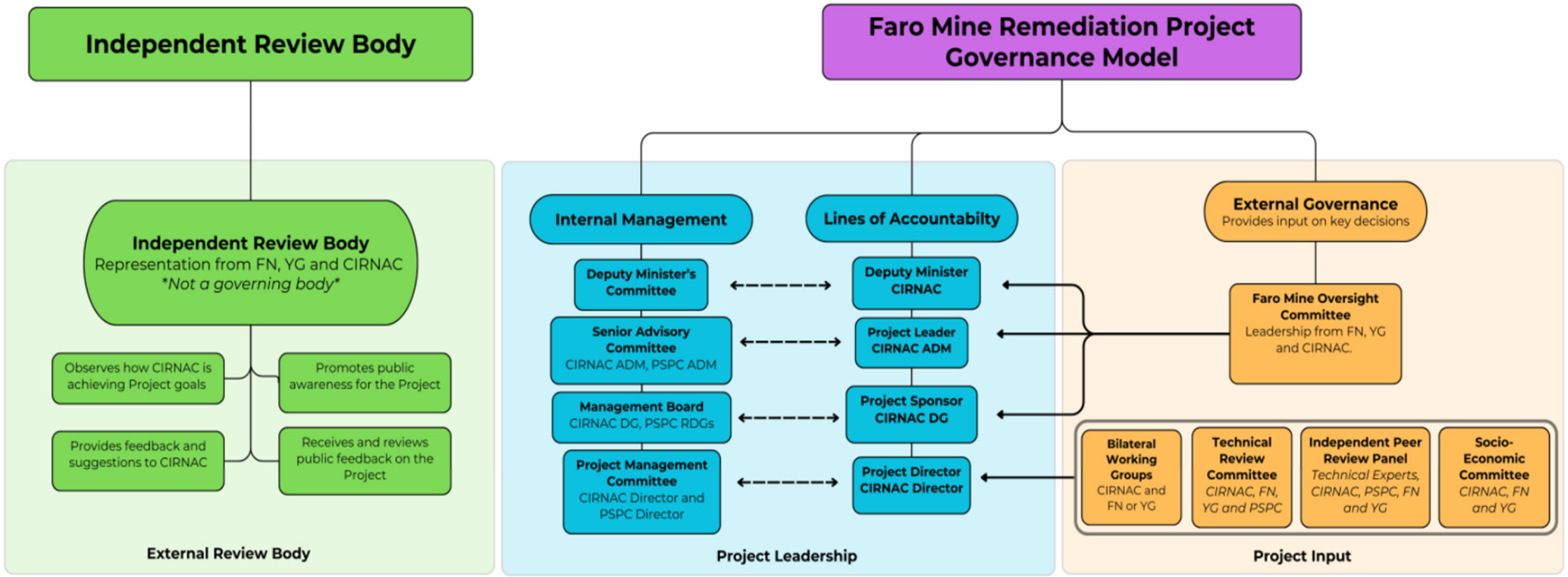

Figure 26: A Graphic Illustrating Primary Functions of the Independent Review Body. This graphic also illustrates how the independent review body is intended to work outside the current Governance model proposed by the Proponent.

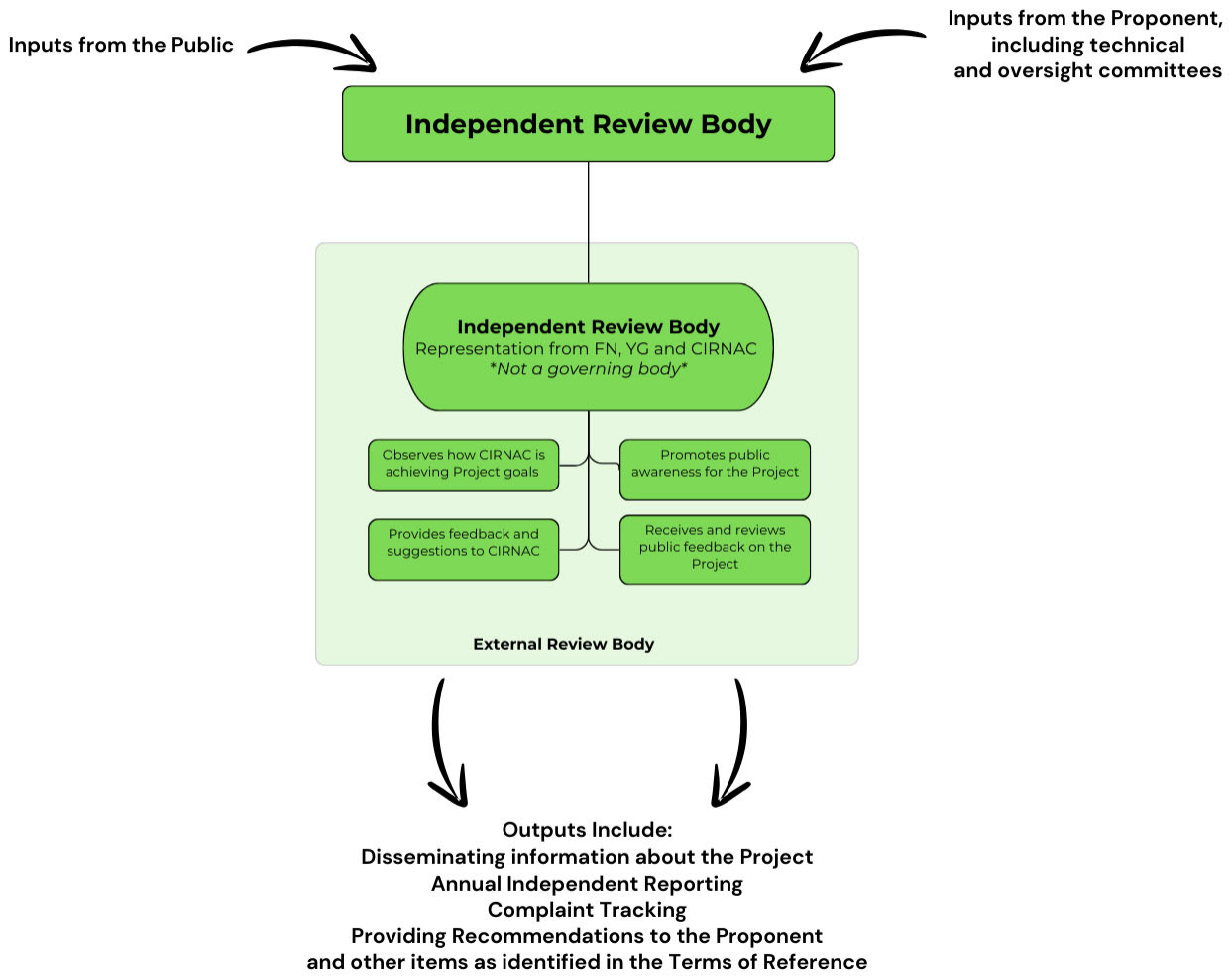

Figure 27: Independent Review Body Generalized Inputs and Outputs.

36.6.2 Project Effect: Reduced public trust due to inappropriate complaint management

The Proponent describes a complaint tracking system within the SMMP.[1232] The document describes the following complaint mechanism:

> Monitoring data will be collected from different sources, including construction manager and subcontractors' reports; data obtained through employee and community grievance mechanisms and through feedback obtained as part of an ongoing engagement strategy with affected parties and other project stakeholders. Data will be analyzed in comparison to existing socio-economic conditions to record changes in these conditions as the Project progresses. Analysis of change from previous conditions will help determine the effectiveness of the proposed mitigation and enhancement measures. It will also be used to address immediate issues and concerns and make the necessary modifications.
>
> Socio-economic monitoring data will be compiled in a Socio-economic Monitoring Annual Report and will be presented to affected parties, stakeholders, and regulatory bodies. The Annual Report will track progress on each monitoring indicator, identify issues and concerns, and present alternative options for achieving intended outcomes. The Report will also include improvements to existing monitoring protocols.[1233]

In the SMMP, four components were identified for monitoring and development of a grievance mechanism: local and traditional land use, human health, economic opportunities, and community wellness. Although this method begins with the ongoing monitoring and management of these components, the description of these components in the SMMP does not include all the components identified in Community Well-being (section 28), First Nations Land Use and Sense of Place (section 31), and Public Trust (section 36). The EC determines that the lack of a comprehensive complaint system and reliance on the construction manager will not inspire public trust in the project and may not inspire trust that the complaints will be addressed in a timely manner. Furthermore, it is unclear how grievances will be gathered, managed, and addressed in a timely manner.

Based on the information available in the SMMP, significant adverse effects to public trust are likely because of an ineffective complaint system. To maintain trust in the Project, it must clearly be outlined how the public can raise concerns and how these will be addressed, managed, and implemented. Ensuring that these concerns are recorded and tracked and shared with the independent review body provides additional assurance that these issues will be addressed. Without such a system in place, effects to public trust are likely, of high magnitude, and not reversible without action, and will continue to occur in perpetuity. Furthermore, a proper complaint system will ensure that concerns are addressed as they arise and not left for future generations to manage.

[1232] YOR 2019-0149-9964
[1233] YOR 2019-0149-9964, p.1

Without proper oversight and complaint management, public trust is likely to erode throughout the lifetime of the Project and likely into perpetuity if not addressed. Effects to public trust are considered irreversible, as this would require a change in the method of managing the site, an action that is not contemplated at this time. Furthermore, good governance and oversight also directly impact the feasibility of achieving the Project's objectives and return of the environmental and socio-economic setting to an acceptable condition.

36.6.2.1 Significance Determination

The EC determines that the Project will likely result in significant adverse effects to public trust because of the past and current oversight and governance of the site as well as an inappropriate complaint mechanism. To maintain public trust in the Project through its governance and funding, the EC recommends that the Proponent develop a mechanism to track, manage, and address concerns that are raised by stakeholders, communities, and First Nations. As such, the following mitigations are recommended to reduce, control, or eliminate significant adverse effects to public trust:

26. The Proponent shall develop a complaint management system to track, manage, and address concerns related to the Project that are raised by the public, communities, and First Nations.
27. The community point of contact for complaints and grievances will be identified by the socio-economic committee.
28. The complaint management system results shall be made available annually to the independent review body.

36.6.3 Project Effects: Reduced public trust due to a lack of long-term funding mechanisms

The Project is estimated to cost $ 1.2 billion over the 25-year temporal scope: the active remediation phase is estimated to cost $ 1.05 billion and the operations and maintenance phase is estimated to cost $ 166 million. These costs were estimated in 2018 and have increased since.

Comments provided during the assessment process expressed concerns about the availability of a long-term stable funding mechanisms to support perpetual care and monitoring at the project site in perpetuity. The Proponent indicated that the site will be maintained for the duration of the Project but did not commit to identifying long-term funding options. Without a commitment or a plan that ensures funding for perpetual care requirements, participants have expressed a lack of confidence in the Proponent's commitments and ability to manage the site perpetually. The lack of a long-term funding plan has decreased public trust in the Project, particularly as it relates to the legacy that will be left for future generations to manage. For example, water treatment at the project site will require perpetual funding to ensure that downstream aquatic resources are not impacted.

Furthermore, there is a lack of confidence that the remediation plan and long-term maintenance of the site will persist through changes in government and associated changes to funding availability. A lack of assured on-going funding for effective mitigation measures, changes in the environment, or perpetual maintenance will have effects on the environmental and socio-economic values at the site. This is a significant consideration as completion of both active remediation and operations and maintenance affect each VESEC considered in this screening report. Essentially, the impacts of inadequate funding to successful complete all aspects of the Project jeopardizes each of these VESECs and how their mitigations prevent adverse effects.

The RRDC indicated that Elders are particularly concerned about long-term monitoring, funding, and ensuring that clear governance and oversight roles are established.[1234]

The lack of trust in funding the Project in perpetuity, not only for the active remediation activities on-site but also for funding effective participation and contribution from First Nations, is highlighted through LFN's comment submission on the VESEC outline:

> Capacity for input, response, reconciliation and governance roles in perpetuity must start from where LFN is now, and the Proponent has not taken the time or put in the attention and energy necessary to determine what those needs are or are likely to be. The current relationship deficit between LFN and the Proponent must be addressed, and a formal relationship developed in order for the Proponent to understand our current context and future requirements. We agree that long-term funding is an important sub-component, but funding requirements will only be revealed through the development of meaningful reconciliation processes that demonstrate and develop sufficient information to show

[1234] YOR 2019-0149-3323

> what needs are now, based on past impacts, and continued colonial behavior, and addressed future impacts like those arising from new mining adjacent to the project.[1235]

Their comment recommended that a formalized funding agreement committing the Proponent to fully fund First Nations involvement at the project site in perpetuity be established.

Participants identified significant concern regarding the Proponent's ability to manage the site in perpetuity. Comments highlighted the need for a mechanism to ensure that the funds required to complete the Project and maintain the site in perpetuity are available, regardless of the changes that occur in government The lack of certainty about long-term funding has a large impact on public trust. The comments provided indicate the likelihood of reduced public trust is high. Additionally, effects to public trust are not limited geographically to the assessment area but are experienced throughout the Yukon and Canada. Reduced public trust from the Project will likely impact similar projects in the future, like previous perpetual care failures.[1236]

These concerns are further legitimized when considering findings from the 2024 Office of the Auditor General of Canada report on contaminated sites in the North:[1237]

> Contaminated sites in northern Canada have not been managed to reduce the financial liability under the Federal Contaminated Sites Action Plan and the Northern Abandoned Mine Reclamation Program […] we found this was not enough for the program to meet its Canada-wide objectives. For example, the cost for remediating contaminated sites keeps increasing for Canadians.

In a response to concerns regarding funding, the Proponent provided the following information:

> The Faro Remediation Project is part of the Northern Abandoned Mine Reclamation Program, which provides fifteen-year funding for remediating abandoned mines. We know the Project will continue past this timeline. Regardless of political dynamics, this Project is listed on the Canadian Federal Government's liabilities. The liability of the Project site is significant. We are very confident about obtaining funding into the long term.[1238]

In its response to IR No. 2, the Proponent provided a report that was prepared with Deloitte, a firm specializing in audit and assurance, consulting, financial advisory, risk advisory, and tax, on long-term options available to the Giant Mine Remediation Project in 2019. The report explores funding alternatives that are generally applicable to the Project. The Proponent states:

[1235] YOR 2019-0149-0428, p.2
[1236] YOR 2019-0149-2348
[1237] Office of the Auditor General of Canada. *Commissioner of the Environment and Sustainable Development. Report 1-Contaminated Sites in the North*. 2024. https://www.oag-bvg.gc.ca/internet/docs/parl_cesd_202404_01_e.pdf
[1238] YOR 2019-0149-7919, p.3

Discussions on the approach to long-term funding for the Faro Mine Remediation Project will continue with stakeholders. In all potential approaches, Canada will maintain responsibility and continue to meet its obligations for the site to protect the environment and the health and safety of the public.[1239]On the Faro Mine Remediation Project DSR, the Proponent stated the legal constraints of confirming funding past what they have proposed.[1240]

> CIRNAC acknowledges that it is financially responsible for the remediation of the Faro Mine site pursuant to the Devolution Transfer Agreement and that Canada takes its responsibility to fund the remediation and ongoing long-term operations and maintenance seriously. Funding for any public project, including the Faro Mine Remediation Project, is subject to appropriations of parliament. CIRNAC is legally bound to the Financial Administration Act and Treasury Board framework. A review of these to identify potential mechanisms for long-term funding was conducted by an independent party for the Giant Mine Remediation Project in 2019 (provided in IR2-59 c and d, IR2-59-1). This report was conducted as part of an independent review to address a Measure stemming from their Report of Environmental Assessment. In it, the independent party did not find a stable approach or mechanism to provide long-term funding beyond the 15-year period covered by the existing the Northern Abandoned Mine Reclamation Program.

36.6.3.1 Significance Determination

Based on the information above, the EC understands that no current method is in place regarding funding options for the Project (beyond 25 years), nor for care and maintenance of the site in perpetuity. The EC understands that GC will remain liable and responsible for the site into the foreseeable future. Due to the lack of funding options presented and no current methods in place, the public's trust in GC's funding of the Project to completion, let alone in perpetuity, is significantly reduced.

Adequate funding is essential for the long-term maintenance and management of the site and to ensure that the overarching objectives of the remediation plan are met. Without a proper funding plan in place and certainty over funding sources, public trust will continue to erode well beyond the temporal scope of the Project.

The EC determines that the Project will likely result in significant adverse effects to public trust because of a lack of an established long-term funding mechanism. As such, the following mitigations are recommended to reduce, control, or eliminate significant adverse effects to the Public Trust VESEC:

29. The Proponent shall establish a perpetual care plan within three years of the issuance of the Decision Document that includes:

[1239] YOR 2019-0149-7010, p.165
[1240] YOR 2019-0149-9449, p.19

a. Identification of components of the project and indexed future costing of each component that will inform funding requirements into the future.
b. Analysis and costing will incorporate ongoing costs to continue site management and operations, including accounting for adaptive management, and governance of the site.
c. The plan will also include a description of the mechanisms to secure the long-term funding, including how budgets will be set and approved through the Government of Canada.
d. A copy of the completed perpetual care plan will be made available to the public and to the independent review body.

30. The Proponent will provide an annual report on funding of the Project to the public and the independent review body.

These recommended mitigations will ensure that a perpetual care plan that includes long-term funding and site management are established and that the public and participants are informed of funding mechanisms, and the dollar value of funding available. Legacy effects, uncertainty regarding the timing, quality, quantity, and location of future emergent mine-impacted groundwater, and potential effects on surface water quality warrant the implementation of a governance structure and funding mechanisms to ensure accountability and roles for First Nations in decision-making, monitoring, adaptive management, and continued improvement. These mitigations will reduce the likelihood of significant adverse effects to public trust.

37 HOLISTIC APPROACH

37.1.1 Overview

A holistic approach considers how a system changes or is influenced by the interactions of its parts. Rather than looking at a problem linearly, problems are examined within their context of the larger system. For example, a hypothetical declining population of trout may be affected by predation from pike but may also be affected by the current climate conditions, agricultural practices, overharvesting and nutrient content in the water. Although this approach to problem solving is already quite prevalent in Indigenous cultures, it is now becoming more integrated into traditional western academic fields. For example, the One Health field considers how human health relates and is affected by animal and ecosystem health.

Holistic thinking is also changing impact assessment practices. Various frameworks or diagrams by which to better consider holistic thinking has been developed including: the harmonized framework, interrelationship diagraph, holistic web and systems diagram, to name a few. Assessment in the Yukon, through YESAB and EC screenings were born out of holistic thinking. The Yukon was one of the first jurisdictions in Canada that combined western science thinking and TK in the assessment process. YESAB's processes are driven by participation and input from governing bodies, First Nations and the public. The selection of VESECs in the Yukon is therefore tied to how different people, and their respective cultures, place value. The EC considers all information presented, to understand the most whole picture of valued components in the Yukon. The EC also recognizes that the nuances and intricacies of a holistic approach and the Indigenous worldview are layered, complex, and difficult to distill one-dimensionally on paper.

This section is not considered a VESEC in this assessment, nor does it make any significance determinations, rather it is included to illustrate how holistic thinking has influenced the significance determinations in the VESECs above.

37.1.1.1 Environmental VESECs

Ecosystem Health, a concept within life sciences, considers the interconnectedness of natural ecosystems and human health. Ecosystem health is currently threatened by climate change, which is accelerating changes in our natural environment, leading to an increase in erratic and extreme weather events.

Climate change is also increasingly leading to costly and disruptive impacts on human [economic] systems. Indigenous and northern communities have been affected in distinctive ways: climate change has disrupted access to these communities, threatened cultural sites, and

adversely affected people's ability to practice traditional activities such as hunting, fishing, and foraging.[1241]

As YG identified in *Assessing Climate Change: Risk and Resilience in the Yukon*,[1242] an overarching theme identified is "the interconnections of impacts and values – it is hard to separate impacts on one value from the impacts on other values."

The Faro Mine Remediation Project activities will contribute to increases in emissions at the territorial and federal levels. Territorial, federal, and global emissions, driven by small-scale and large-scale human activities, collectively contribute to climate change. Climate change in turn impacts other facets of human and environmental systems.

A marked increase in GHG emissions during the 15-year active remediation phase of the project is led predominantly by major earthworks, which require increased large-scale industrial machines and vehicles, contributing not only to a rise in GHG emissions, but also to changes to air quality (both contaminants and dust) and noise. Modelling demonstrates that noise impacts are limited beyond the MDF and, when accompanied by proponent mitigations, will see limited effects to wildlife behaviours and land-use patterns. Recognition of these linkages builds a stronger understanding of Ecosystem Health

Surface water quality and associated components, such as water quantity, groundwater quality, and groundwater quantity, are intimately linked with one another. RRDC emphasized the equal importance of groundwater and surface water: "Groundwater quality may significantly impact surface water quality, and vice-versa; for instance, a contaminated groundwater plume can discharge to receiving surface water, or a contaminated surface water source can recharge groundwater."[1243]

SFN, throughout many of their comments, highlighted not only the socio-cultural importance of chinook salmon but of all aquatic species and their relationship to ecosystem health. The SFN Traditional Use Study suggests that some linkages between surface water quality and other VESECs (e.g., aquatic life and chinook salmon) are poorly understood in project assessments, especially the effect pathways from direct project proposal impacts on water and land and their knock-on effects that extend to fish and wildlife, subsistence-based economic well-being, food security, cultural wellness, and social cohesion.[1244]

[1241] Council of Canadian Academies, Canada's Top Climate Change Risks, *The Expert Panel on Climate Change Risks and Adaptation Potential*, 2019, https://cca-reports.ca/wp-content/uploads/2019/07/Report-Canada-top-climate-change-risks.pdf.
[1242] Government of Yukon, *Assessing Climate Change Risk and Resilience in the Yukon*, 2022, https://yukon.ca/sites/yukon.ca/files/env/env-assessing-climate-change-risk-resilience-yukon-main-report.pdf.
[1243] YOR 2019-0149-0555, p.34
[1244] YOR 2019-0149-4384

The project activities tied to contact water management, water treatment, and riparian works, coupled with habitat maintenance or enhancements, are expected to not only address water quality issues, but also fish, wildlife, and aquatic ecosystems collectively.

The Project's major earthworks and water treatment and management activities are equally tied to terrain and landscape integrity at and around the project site. Terrain and landscape integrity impacts soil and revegetation, which further affects dust and contaminant management. As flora re-colonize and fauna diversity increase, air quality improves, and carbon is absorbed.

The interrelationships between project activities and the various environmental VESECs are depicted in the Ecosystem Health Systems Diagram (Figure 28). The interconnections presented and discussed here underscore the recommendations put forward by the EC pertaining to the environmental VESECs throughout this assessment.

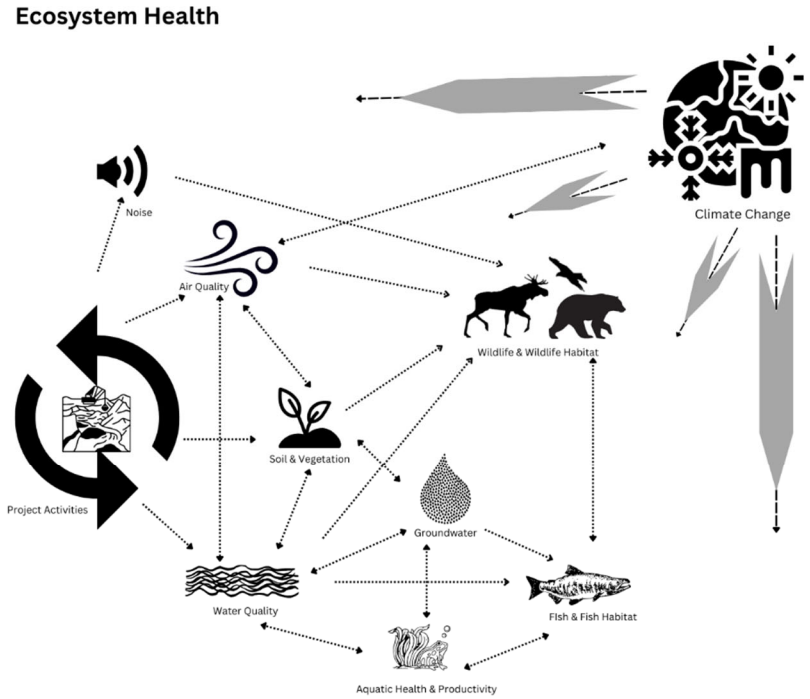

Figure 28: System Diagram - Ecosystem Health

37.1.1.2 Socio-Economic VESECs

The communities interacting with, relying on, and/or living near/in the environments downstream of the site are intrinsically affected by environmental health. For example, the U.S. Global Climate Research Program articulates clear examples and interrelationships amongst various factors resulting from climate change: "Indigenous peoples have historical and cultural relationships with ancestral lands, ecosystems, and culturally important species that are

threatened by climate change."[1245] And further, "climate change is expected to compound existing physical health issues in Indigenous communities, in part due to the loss of traditional foods and practices, and in some cases, the mental stress…"[1246]

There is a large focus by the Proponent and commenters throughout the assessment process on water and aquatic resources, including fish and fish habitat. Understandably, there is a substantial effort to remediate the site to address fundamental issues surrounding these values. However, if we consider effects to aquatic resources, without considering how it relates to people, wildlife or the climate, we are missing key information in the assessment process. For example, changing climate is and will continue to affects aquatic resources through numerous pathways.

SFN, RRDC, and LFN, throughout the assessment process, provided comments that articulated the strong and foundational connections amongst the environment, individuals, and community health. SFN described the interrelationships among VESECs in their comment submission:

> [T]he direct project impacts on fish and fish habitat have knock-on effects for SFN traditional use and, in turn, material well-being (wildlife food as an economic substitute for cash-based store-bought food), food security (wild food as nutritionally superior alternative locally sourced), cultural vitality through participation in land-based cultural activities, and social cohesion through household participation in traditional use activities and inter-household sharing of traditional foods.[1247]

As noted previously, historical activity at and around the Project has heavily influenced traditional and contemporary Indigenous land use. This history has left traditional users reluctant to consume plants and animals harvested within and downstream of the region. These changes in turn can lead to impacts to First Nations land use and sense of place, community well-being, and public trust.

Changes to CAC emission levels during active and long-term remediation may result in a change in hunt camp usage. Additionally, hunting and trapping may further be compromised where availability of game and furbearers diminishes, and wildlife-use patterns may be altered not only due to changes in air quality, but other factors such as water quality, noise, and reductions or changes to habitat requirements. Changes such as these can have impacts on cultural continuity, such as a reduction in the transmission of knowledge and practices. While emission levels may be identified as being below established standards, renewed fears upon commencement of the Project may lead to both short-term and/or long-term changes to land uses in the LAA and RAA.

[1245] Reidmiller, et al., *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*, Chapter 2, 2018.
[1246] Reidmiller, et al., *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*, Chapter 2.
[1247] YOR 2019-0149-5662, p.3

The Centre for Indigenous Environmental Resources issued a report[1248] in 2008 that identified impacts resulting from climate change. This report identified the top five priority climate change impacts:[1249]

- Changes in water quality and quantity
- Increase in frequency and severity of extreme weather events
- Increase in frequency and severity of forest fires
- Changes in animal behaviour/loss of keystone species
- Changes in snow and ice due to warmer weather

The Council of Canadian Academies issued a report in 2019[1250] identifying an extensive list of climate change risks, ranging from ecosystems, fisheries, governance, and capacity to human health and wellness, Indigenous ways of life, water and northern communities.

The above outlines the many ways in which effects from climate change impact human and natural systems. Water and ecosystem health are inextricably linked, which further connects to First Nations' way of life, individual and community wellness, health, and well-being.

The world we live in is a web of natural, built, and social systems — from global and regional climate; to the electric grid; to water management systems such as dams, rivers, and canals; to managed and unmanaged forests; and to financial and economic systems. Climate affects many of these systems individually, but they also affect one another, and often in ways that are hard to predict.[1251]

SFN raised the importance of how socio-economic and cultural factors affect and are affected by traditional use, such as strength of social support networks, employment, proficiency of TK and customs, and influence and control over lands and resources.[1252] Further, SFN noted during SATAC IV that the Faro Mine project and its operation and care and maintenance have had long-standing negative effects on citizens' uses of land and water, as well as avoidance and displacement from traditional harvesting and use of the area.[1253]

SFN provided the Minto Mine SMMP 2015 Annual Report,[1254] which outlines predicted impacts to valued conditions according to a comprehensive study. These include community stability and well-being, health, housing, income, employment, business, traditional economy, employment and workforce development, education and training, and cultural vitality.

[1248] Centre for Indigenous Environmental Resources; *Climate Change and First Nations South of 60*: *Impacts, Adaptation, and Priorities*, 2008, https://caid.ca/CliChaImp2008.pdf.
[1249] Centre for Indigenous Environmental Resources; *Climate Change and First Nations South of 60: Impacts, Adaptation, and Priorities*.
[1250] Council of Canadian Academies, *Canada's Top Climate Change Risks, The Expert on Climate Change Risks and Adaptation Potential.*
[1251] Reidmiller, et al., *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II*, Chapter 2.
[1252] YOR 2019-0149-2584
[1253] YOR 2019-0149-2584
[1254] YOR 2019-0149-3447

RRDC raised the connection to wildlife and wildlife monitoring in relation to discussions on public trust during SATAC II, noting that people either don't have access to hunting areas because of the mine or overhunting, or because they don't trust that the animals are healthy to eat.[1255]

In the submitted project proposal, the Proponent noted that the historic development has resulted in a significant reduction in useful harvesting lands, particularly given the area's productivity and accessibility.[1256]Observations regarding animal harvesting, recorded in the Weinstein reports from 1992[1257] and 1993,[1258] include the following: *"…*The Faro area has largely been abandoned as a serious subsistence harvesting area…" and "…The areas affected by the mine development have been abandoned as a serious hunting or fishing location by people who consider the area as part of their homelands..." and "…The salmon fishery site furthest downstream [Fish Hook] is no longer in use due primarily to its remoteness." And "…Few people use the salmon camps at the mouth of Blind Creek anymore."

Additionally, the Weinstein reports indicate that for the Ross River Dena, animal harvesting was a central and integrative part of the economic mix and social life.[1259,1260] The harvest, therefore, provided both a source of food and the social structure supporting satisfaction and meaning in life.

Within the project proposal, it has been identified by SFN advisors that, during socio-economic existing conditions data collection interviews, the area around the community of Pelly Crossing, extending up the Pelly River and into the Faro Mine region, has been historically used as an important hunting, fishing, and trapping area for the Northern Tutchone people.[1261] Within their territory, SFN citizens continue to be active users of the salmon fishery on the Pelly River, as detailed in traditional fishing and hunting information produced by SFN.

Socio-economic health is comprised of both individual and community health, well-being, and security. Relational safety considers Indigenous peoples' worldviews. Fundamental to many Indigenous worldviews is a focus on the collective, the importance of context, and the relationship with land in a full ecological sense, which includes deep connection to all things, including non-human entities. Relational safety, therefore, focuses on the broader relationships between an individual and their community, land/ecology, and other people. Relational safety captures how Indigenous and non-Indigenous women and girls and 2SLGBTQIA+ people experience safe or unsafe situations in relation to their identity, other people, the land, their community, their culture, and the societal systems in which we all live. Relational safety refers to

[1255] YOR 2019-0149-3563
[1256] YOR 2019-0149-0756
[1257] Weinstein, *Just Like People Get Lost: A Retrospective Assessment of the Impacts of the Faro Mining Development on the Land Use of the Ross River Indian People*.
[1258] Weinstein, *The Ross River Dena: A Yukon Aboriginal Economy*.
[1259] Weinstein, *Just Like People Get Lost: A Retrospective Assessment of the Impacts of the Faro Mining Development on the Land Use of the Ross River Indian People*.
[1260] Weinstein, *The Ross River Dena: A Yukon Aboriginal Economy*.
[1261] YOR 2019-0149-0026

the ways in which a person's identity can expose them to different forms of discrimination, violence, harassment, or other harms, as well as impact their relationship with the land, their family, and their community.

The varied and complex interactions between the natural environment and social and economic components are depicted in Figure 29, capturing an outline of socio-economic health. The interconnections presented and discussed here support recommendations made by the EC related to the VESECs throughout the assessment.

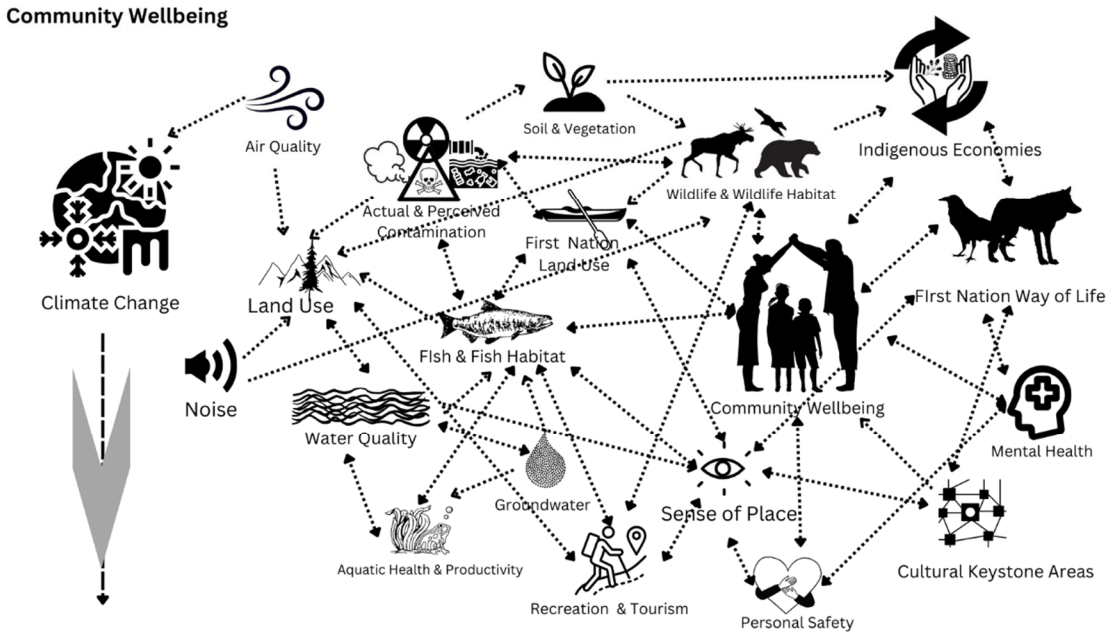

Figure 29: System Diagram – Socio-Economic Health: Community Well-Being

37.1.1.3 Public Trust

Gaps in public trust are driven by the history of mining in the Yukon, the long-standing legacy of industrial activity at the Faro Mine, and the associated history of mismanagement and uncertainty regarding the project site. Security for the individual and the community is also tied, in the case of this project, to the Project's legacy.

The delays in reclamation of the site have diminished the trust for many affected First Nations that the site will ever be reclaimed. Effects to public trust are linked to the timely completion of this project in an effective manner with effective governance and oversight. The lack of trust in GC and YG is based on the history of the Project's deterioration of environmental conditions and the impact to traditional practices and well-being.

Based on past experiences, the project needs to be completed in a way that does not further erode public trust. Protection of surface water quality requires prompt and effective adaptive management to minimize effects of controlled or uncontrolled water discharges on downstream

environments. For example, after "substantial" discharge of contact water into North Fork Rose Creek in spring 2022 failed zinc toxicity tests after full-mixing into a stream, SFN expressed that the planned project mitigations were not as effective as needed and that:

> Canada is supposed to be the external accountability on Faro right now…. But Canada was not panicking. Yes, they were observing but we saw it go into the stream. This example highlights why we need people to watch the project. The accountability burden is high and represents the largest current individual hazard to environmental integrity in SFN's traditional territory.[1262]

The funding in perpetuity required for project protection of surface water quality is also linked to public trust: there is financial risk associated with the Project's water management strategy if additional mitigations are required. Some examples of additional financial liabilities associated with surface water quality could include, but may not be limited to, the Project requiring (1) additional volume capacity or water treatment circuits (i.e., changes to the PWTP or new facilities), (2) additional storage capacity at the site for contaminated water, and/or (3) additional lime amendments for the PWTP.

In their comment submissions, LFN noted that the Kaska perspective on the Project is much broader than that of the Proponent. In essence, the Proponent views this project as a remediation project only, which is not how Kaska people experience it:

> The Faro Mine has affected the Kaska people since the development and operation of the mine through both environmental and social harms. These harms are compounded by the historical impacts of colonization and acculturation, a strong sense of cultural shame and grief rooted in the inability to protect traditional lands, and multiple current and projected mine and infrastructure projects in traditional Kaska territory. Remediation work itself interferes with important exercises of Kaska rights. A holistic, reconciliation-based approach is necessary in this assessment that considers past and ongoing harms from the construction, operation, and remediation of the mine.[1263]

Comments from LFN also highlighted the importance of a holistic approach:

> We want to look beyond the "protection goals" as a maximum allowable negative effect, and focus also on the remediation goals of the project as a whole: restoring the environment, returning the mine site to an acceptable state of use that reflects pre-mining land use, providing for the effective resumption of Kaska rights exercises by Kaska members, and protecting and improving VESECs that incorporate Indigenous health and cultural, social, and economic well-being.[1264]

[1262] YOR 2019-0149-2584
[1263] YOR-2019-0149-9801, p.2
[1264] YOR 2019-0149-6483, p.2

Since the submission of the project proposal in 2019, additional resources and guidance on remediation and tailings management have become available (e.g., Interstate Technology and Regulatory Council guidance for sustainable resilient remediation,[1265] the Global Industry Standard on Tailings Management[1266]). As technology, best practices in remediation and mine waste management, and the site evolve, better alternatives and/or potentially beneficial augmentations to the proposed water management strategy may become feasible. Operations and monitoring, along with adaptive management and the implementation of new technologies and best practices will further lead towards not only achieving the overarching goals but also building a stronger foundation of public trust.

Proper governance and oversight of the Project is also linked to other valued components identified in this report. Specifically, good governance will ensure that the Project achieves its overarching goals of:

1. Protecting human health and safety;
2. Protecting and, to the extent practicable, restoring the environment including land, air, water, fish, and wildlife;
3. Returning the mine site to an acceptable state of use that reflects pre-mining land use, where practicable;
4. Maximizing local and Yukon socio-economic benefits; and
5. Managing long-term site risk in a cost-effective manner.

Comments from SFN also highlighted the interconnection between public trust, governance, and the environment:

> The issue of governance can affect a whole raft of valued components beyond public trust. The performance of governance affects environmental values - decisions about reclamation measures and which ones you are going to take - decisions about adaptive management responses, the adequacy of monitoring. Furthermore, the lack of funding for effective mitigation measures might influence environmental values. All these things come about in part as a result of governance... we can also have effects then on community wellbeing and First Nation cultural values. I mentioned earlier, the continuing effects that lead to mistrust about the environment downstream and how that impacts SFN's use of resources in its traditional territory.[1267]

Public trust is also linked to perceived contamination, removal of Indigenous land use, alienation of land, and the changes to the social systems surrounding the mine. Given these interconnections, restoring and maintaining public trust throughout the life of the Project is

[1265] Interstate Technology and Regulatory Council (ITRC), *Interstate Technology and Regulatory Council, Creating innovative solutions for a sustainable environment*, 2023, https://itrcweb.org/home.
[1266] Global Tailings Review, *Global Tailings Review*, n.d., https://globaltailingsreview.org/.
[1267] YOR 2019-0149-9767, p.17

extremely important. Even small reductions in public trust can have substantial implications. Figure 30 captures the interconnected and varied aspects tied to public trust associated with this project. Given these interconnections, restoring and maintaining public trust throughout the life of the Project is extremely important; even small reductions in public trust are considerable. The interconnectedness of the public trust VESEC with all other components of the Project, both socio-culturally and environmentally, further supports the recommendations made by the EC in section 36 of this report, Public Trust.

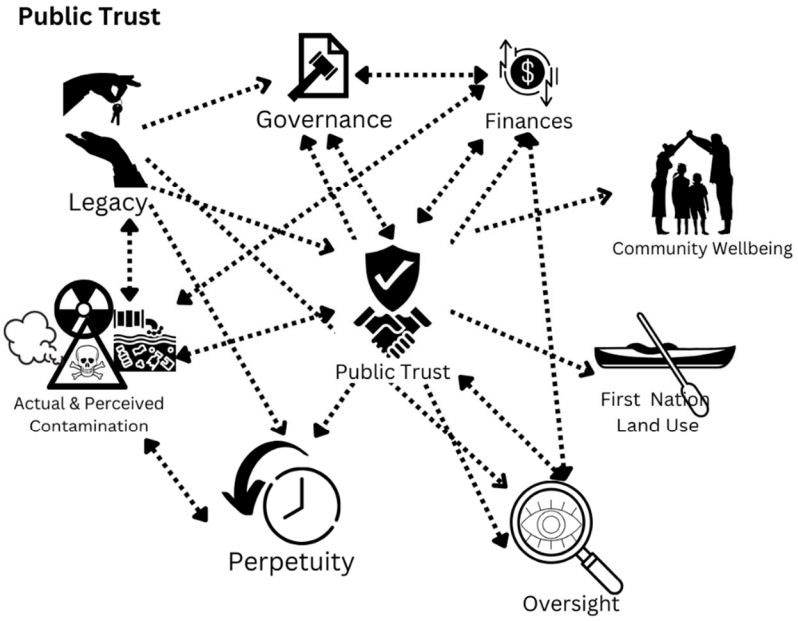

Figure 30: System Diagram – Public Trust

The systems diagrams and discussions here regarding relationships among ecosystem and socio-economic health and public trust underscore the importance of deeper reflections on the impacts of project activities:

A system's properties come from the way its parts interact. This cannot be understood by looking at the parts separately, because when the system is taken apart, it loses its essential properties, and so do its parts.[1268]The illustrations provided are simple visual representations of larger, more complex relationships. As identified in comments from LFN, "Interactions may be nonlinear, involve complex feedback loops, result in cascading effects and result in emergent properties."[1269] These prove difficult to depict and articulate within YESAB's values-based assessment methodology. However, the EC is of the opinion that delving further into these

[1268] Ehrlich, "Collective Impacts: Using Systems Thinking in Project-level Assessment," *Impact Assessment and Project Appraisal* 40 no. 2, (2022), doi:10.1080/14615517.2021.1996901.
[1269] YOR 2019-0149-2183, p.3

complex interconnections by way of a standalone holistic approach discussion begins to capture and integrate this thinking into elements of the assessment.

37.1.2 Conclusion

In this assessment, a holistic approach has supported the EC's recommended terms and conditions, particularly with respect to water and aquatic resources, atmospheric greenhouse gasses and wildlife VESECs. One condition for the water and aquatic resources VESEC requires the Proponent use adaptive management to respond to climate change. One condition for the atmospheric greenhouse gases VESEC requires the Proponent to develop a GHG emission reduction plan and a carbon offsetting plan. Conditions for the wildlife VESEC requires the Proponent create habitat plans that support ecosystem restoration, in collaboration with First Nations. The conditions above incorporate adaptive management, ecosystem health and differing cultural perspectives, all of which are holistic approaches to mitigating adverse effects. Even stronger examples of how the EC has taken a holistic approach are found in the public trust VESEC.

The public trust VESEC considers the context of legacy effects, as well as the numerous changes in responsibility and management of the site. How a site is governed, and its leadership drives the effectiveness of mitigations for all VESECs. Therefore, the public trust VESEC has taken a top-down approach, in order to examine how the Proponent will manage, monitor and review ongoing activities. The recommendation for an independent review body provides transparency to the public, which adds pressure to the publicly elected Canadian Government, when the site is not being governed properly. The review body will examine all aspects of the Project and consider input from the public. Recommendations made by the review body provides space for holistic thinking far into the future of the Project.

38 YESAA SECTION 110 MONITORING REQUIREMENTS

The EC recognizes that the absence of a monitoring framework creates uncertainty in predictions made on project effects to community well-being.

YG HSS and LFN identified monitoring and assessment tools in their comment submissions. Regarding the community well-being VESEC outline, LFN notably stated:

> Multiple, relevant public health sector frameworks have been adopted by the Government of Canada that can be employed to assess some of the VESEC sub-components… Examples include Public Health Agency of Canada's (PHAC) Social Determinants of Health (SDH) framework and (SE) frameworks (which includes Indigenous health models); the Department of Finance Canada's Quality of Life (QOL) Framework; and Canada's National Security Policy.[1270]
>
> SDHs are mentioned in the outline but not fully used in providing a foundation for monitoring and mitigation planning. Moving into a more comprehensive view by including the Indigenous Determinants of Health would provide a more robust base from which to build a measurable Socio-Economic Management and Monitoring Plan (SMMP).[1271]

In another comment, LFN explained that in the context of their worldview and this particular project, some monitoring and assessment frameworks are more appropriate to utilize than others:

> The concept of Social Determinants of Health is not broad enough to fully encompass the environmental, ecological, political, economic, cultural and other determinants of health beyond the SDH framework. LFN made a presentation to SATAC II that described and referenced a broader view of Social Determinants of Aboriginal Health that includes the Socio-Political Context; Holistic Perspective of Health; and stages of life or Life Course (Child, Youth, Adult and Elder).[1272]

The tools identified by LFN and YG HSS can improve understanding of project effects.

The EC recommends, under s. 110 of YESAA, that the Proponent, with affected First Nations, affected communities, YG, and GC, develop a monitoring framework for socio-economic and cultural project effects.

In this way, affected First Nations, the Proponent, and other participants can collaborate to develop a monitoring structure to monitor potential uncertainty of project effects.

Pursuant to s. 110 of YESAA the Proponent shall:

[1270] YOR 2019-0149-1279, p.3
[1271] YOR 2019-0149-1279, p.4
[1272] YOR 2019-0149-1279, p.6

1. Establish a monitoring and management framework for social, cultural, and economic effects of the Project. This framework will:

    a. Be developed by representatives from affected First Nations, affected communities, YG, GC, and the Proponent;
    b. Be administered by the Proponent in collaboration with affected First Nations.
    c. Be funded entirely by the Proponent for the duration of the Project;
    d. Be developed within 2 years from the issuance of the Decision Document for the Project;
    e. Identify timelines for monitoring that reflect not only the project timeline, but future monitoring requirements;
    f. Include input from experts on the subject matter;
    g. Provide publicly available annual reports; and
    h. Develop methods for the collection, storage, and sharing of monitoring information.

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