



LYNN LAKE GOLD PROJECT

ENVIRONMENTAL ACT PROPOSAL REPORT

MAY 2020

Gordon Site



ALAMOS GOLD INC.





ALAMOS GOLD INC.

**Lynn Lake Gold Project
Environment Act Proposal Report
– Gordon Site**



Prepared by:

Stantec Consulting Ltd.

May 25, 2020

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Environment Act Proposal Form



Executive Summary

Alamos Gold Inc. (Alamos) is seeking an Environment Act Licence for the redevelopment of two historical gold mines near Lynn Lake, Manitoba. The Project consists of two primary deposit sites, which are both located near Lynn Lake, Manitoba: the 'Gordon' site and the 'MacLellan' site. Alamos intends to construct (redevelop), operate and eventually close/reclaim open pit gold mines at both these historical mine sites. The total mineralized material to be mined from the open pits at both sites is estimated to be approximately 26.1 Mt (17.5 Mt from the MacLellan site and 8.6 Mt from the Gordon site) with ore transported for processing to the MacLellan site.

This Environment Act Proposal (EAP) document presents the Environmental Assessment Report for the Gordon site based on the Provincial Environment Act Proposal Report Guidelines pursuant to the provincial Environmental Assessment (EA) process under *The Environment Act* (Manitoba). This EAP documents the proposed facility operations at the Gordon site, potential environmental effects, and implemented mitigation measures associated with operations. The EAP summary report is submitted as supporting information to the Environment Act Proposal Form for licensing consideration by Manitoba Conservation and Climate (MCC). A similar document has been prepared corresponding to the MacLellan site development under separate cover. The assessment of both sites is documented in detail in the federally filed EIS (May 25, 2020) to the Impact Assessment Agency of Canada (IAAC) for the entire project.

Project residual effects were determined for 14 Valued Components (VCs) including: atmospheric environment, acoustic environment, groundwater, surface water, fish and fish habitat, vegetation and wetlands, wildlife and wildlife habitat, labour and economy, community services, infrastructure and well-being, land and resource use, heritage resources, current use of lands and resources for traditional purposes, human health, and Indigenous peoples. The federal EIS (Stantec 2020) contains detailed information on the assessment of these and other factors according to the Final Guidelines for the Preparation of an Environmental Impact Statement (EIS), dated November 2017 (CEAA 2017) and an extensive engagement program undertaken by Alamos. This EAP relies substantially on the information provided in the EIS (including the documentation of several years of engagement, field work and technical studies). The EIS has been provided to MCC for review and reference with key results summarized here to reduce redundancy and promote process efficiency.

Based on the results of the environmental assessment, including implementing the identified mitigation measures, the Project as planned is not likely to result in significant adverse residual environmental effects.

Engagement has been ongoing prior to and throughout the EA process, and will continue with agencies, local Indigenous communities, and stakeholders through the life of the Project. The Project will have both environmental and socio-economic benefits, economic development and job creation, and social benefits including potential local and regional Project-related employment, training programs, increased local and regional business revenue, tax revenue, capacity and capabilities, and potential for the supply of goods and services.

Acronyms and Abbreviations

AAQC	Ambient Air Quality Criteria
Alamos	Alamos Gold Inc.
amsl	above mean sea level
ARD	acid rock drainage
Ausenco	Ausenco Limited
CAAQS	Canadian Ambient Air Quality Standards
CAC	criteria air contaminants
CaCO ₃	calcium carbonate
Carlisle	Carlisle Goldfields Limited
CD Regulation	<i>Classes of Development Regulation</i>
CEAA 2012	<i>Canadian Environmental Assessment Act, 2012</i>
CEPA	<i>Canadian Environmental Protection Act, 1999</i>
CO	carbon monoxide
CO _{2e}	carbon dioxide equivalent
COPC	chemicals of potential concern
CR	concentration ratio
dBA	A-weighted decibels
dB	decibels
DFO	Fisheries and Oceans Canada
DIDO	drive-in-drive-out
dm ³	cubic decametres
DPM	diesel particulate matter
EA	environmental assessment
EAP	Environment Act Proposal
ECCC	Environment and Climate Change Canada



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EIS	environmental impact statement
FIFO	fly-in-fly-out
FTE	full time equivalent
g	gram(s)
GDP	gross domestic product
GHG	greenhouse gas
ha	hectares
HA	high annoyance
HCN	hydrogen cyanide
HQ	hazard quotient
IAA	<i>Impact Assessment Act</i>
IAAC	Impact Assessment Agency of Canada
ILCR	incremental lifetime cancer risk
km	kilometer(s)
km ²	square kilometre(s)
kV	kilovolt
kW	kilowatt
L	litre(s)
LAA	local assessment area
m	metre(s)
m ²	square metre(s)
m ³	cubic metre(s)
MBCA	<i>Migratory Birds Convention Act</i>
MCC	Manitoba Conservation and Climate
MDMER	Metal and Diamond Mining Effluent Regulations
ML	metal leaching
MRSA	mine rock storage area



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Mt	million tonne(s)
NO ₂	nitrogen dioxide
NRCan	Natural Resources Canada
oz	ounce(s)
PAG	potentially acid generating
PAH	polycyclic aromatic hydrocarbon
PDA	project development area
PM	particulate matter
PM ₁₀	respirable particulate matter with an aerodynamic diameter less than 10 µm
PM _{2.5}	fine particulate matter with an aerodynamic diameter less than 2.5 µm
POPC	pollutant of potential concern
PR	provincial road
Project, the	Lynn Lake Gold Project
Proponent, the	Alamos Gold Inc.
RAA	regional assessment area
Regulations, the	Regulations Designating Physical Activities
ROM	run of mine
ROW	right of way
s	second(s)
SAR	species at risk
SARA	<i>Species at Risk Act</i>
SO ₂	sulphur dioxide
SOCC	species of conservation concern
t	tonne(s)
TDG Act	<i>Transportation of Dangerous Goods Act, 1992</i>
TMF	tailings management facility
UTM	universal transverse Mercator



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VC	valued component
VOC	volatile organic compound
WHO	World Health Organization



Introduction

1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

The Lynn Lake Gold Project (the Project) is the proposed redevelopment of two historical shaft gold mines near Lynn Lake, Manitoba by Alamos Gold Inc. (Alamos; the Proponent). The Project consists of two primary deposit sites located near Lynn Lake, Manitoba: the ‘Gordon’ site and the ‘MacLellan’ site (Map 1-1). Alamos intends to construct (redevelop), operate and eventually close/reclaim open pit gold mines at both of these historical shaft mine sites. The total mineralized material to be mined from the open pits at both sites is estimated to be approximately 26.1 Mt (17.5 Mt from the MacLellan site and 8.6 Mt from the Gordon site).

Section 11(1) of *The Environment Act* requires a Proponent to file an Environment Act Proposal (EAP) in writing to the Director for Class 2 developments in Manitoba. The proposed Project is considered a Class 2 development under the Classes of Development Regulation (MR 164/88).

This document presents the Environment Act Proposal (EAP) Assessment Report for the Gordon site based on the Provincial Environment Act Proposal Report Guidelines pursuant to the provincial EA process under *The Environment Act* (Manitoba). This EAP documents a summary of the proposed facility operations at the Gordon site, potential environmental effects, and mitigation measures associated with operations. The EAP summary report is submitted as supporting information to the Environment Act Proposal Form for licensing consideration by Manitoba Conservation and Climate (MCC) and is based on the federally filed EIS document (May 25, 2020) to the Impact Assessment Agency of Canada (IAAC).

1.2 PROPONENT INFORMATION

Financial and planning decisions related to the development of the Project are the responsibility of Alamos. Alamos hired Stantec Consulting Ltd. to carry out the environmental assessment of the Project. Alamos maintains control over decisions related to the planning, design, implementation, construction, operation, and closure of the Project. This includes retaining the required staff, contractors, equipment, and other resources necessary to develop the Project, and providing management direction for Project phases. Further proponent information is provided in the MacLellan EAP document.

The Proponent and main Project EA contact information is as follows:

Project Proponent:	Alamos Gold Inc. Address: Brookfield Place, 181 Bay Street, Suite 3910 P.O. Box #823, Toronto, ON M5J 2T3 Website: www.alamosgold.com
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Main Environmental Consultant Contact Regarding Environmental Assessment:	Karen Mathers, P.Ge. PMP Stantec Consulting Ltd., Project Manager Address: 500-311 Portage Avenue Winnipeg, MB R3B 2B9 Phone: (204) 489-5900 Email: Karen.Mathers@stantec.com

The ‘Proponent Team’ for this Project consists of independent third party consultants that have been engaged to assist Alamos throughout the EA process, including environmental planning, assessment, licensing, and permitting support from Stantec Consulting Ltd.; feasibility and design/engineering support from Ausenco Engineering Canada Inc. (Ausenco); geotechnical engineering support from Golder Associates; mine design support from Q’Pit Inc.; power supply support from BBA Engineering; economic modelling support from Price Waterhouse Cooper; accommodation assessment support for the Project from RePlan (an ERM Group Company); and Paraminerals Consulting, development of a 3D visualization of the Project throughout the life of the Project.

1.3 LAND OWNERSHIP AND MINERAL RIGHTS

The Gordon site has not been in operation since 1999. The property was purchased by Carlisle Goldfields Limited (Carlisle) in 2011. In 2014 Carlisle and AuRico Gold Inc. formed a joint venture for the potential redevelopment of this mine site. Alamos subsequently inherited the joint venture when it merged with AuRico Gold Inc. in 2015. Alamos then became the holder of the rights to the existing mining claims and mineral leases through the acquisition of Carlisle in 2016.

1.4 EXISTING LAND USE

The Gordon site, historically referred to as the Farley Lake site, was formerly operated as a two-pit open pit gold mine between 1996 and 1999 under Black Hawk Mining Inc. and was closed in 1999. The mine produced 214,800 ounces (oz) of gold from 1.7 million tonnes (Mt) of ore during its lifespan. After closure,



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the site underwent a reclamation process and currently consists of a 15 kilometre (km) gravel access road, a bridge across the Hughes River, two mine rock storage areas and two overburden storage areas that have been capped, and two water-filled open pits. All buildings and infrastructure have been removed, as shown in a present-day aerial photograph of the Gordon site (Photo 1).



Photo 1 Aerial Photograph of Gordon Site

Existing land uses in and around the Gordon site consist of provincial Crown land, Marcel Colomb First Nation community located on Black Sturgeon Reserve at Hughes Lake (approximately 2.8 km southwest of the nearest point of the access road to the Gordon site), treaty entitlement sites located at Barrington Lake, Brooks Island, and Melvin Lake, and remote cottages (e.g., cabins at Hughes Lake, Simpson Lake).

Land use at the Gordon site and adjoining land is unoccupied provincial Crown land. The Gordon site is subject to Provincial Land Use Policies under the Provincial Planning Regulation (MR 81/2011). Policy Area 8: Mineral Resources (the policy) expresses the provincial interest in mineral resources development.

There are numerous provincial Crown land permits and leases in the vicinity of the Gordon site (see Map 1-2). These consist of general permits and leases for remote cottages (cabins), fish farm/fish camps, trapper cabins, and treaty land entitlement parcels (Crown Lands and Property Agency 2017). There is an additional land development site at Hughes Lake. One existing provincial Crown land subdivision is located in the vicinity within the RAA: the Eden Lake Subdivision at the Eden Lake Wayside southeast of the Gordon site on the west shore of the northwest arm of Eden Lake (Manitoba Sustainable Development [MSD] 2019).

1.5 PURPOSE OF THE PROJECT

The purpose of the Project is to develop the Lynn Lake gold deposits for the purpose of extracting gold (doré bullion) to process and sell.

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A Project Feasibility Study was undertaken confirming the technical feasibility and economic viability of the Project. The Project is not feasible without the development of both the Gordon and MacLellan sites. No issues have been identified to date that are expected to materially affect the ability of Alamos to extract minerals from the Project.

1.6 REGULATORY FRAMEWORK

1.6.1 Environmental Assessment

The Project is subject to provincial and federal environmental regulatory requirements. The Final Environmental Impact Statement is intended to meet the requirements of *The Environment Act* (Manitoba) and the *Canadian Environmental Assessment Act, 2012*.

1.6.1.1 Provincial Requirements

Provincially, the *Classes of Development Regulation* (CD Regulation) under *The Environment Act* (Manitoba) identifies ‘Class 1’, ‘Class 2’ and ‘Class 3’ developments that must undergo a provincial EA and obtain a licence in accordance with the Act prior to construction, alteration, or operation. Section 3(5) of the CD Regulation classifies mines and milling facilities as Class 2 developments. The Project may also involve water development and control activities that are considered Class 2 developments under section 3(9) of the CD Regulation, such as stream channel alterations that affect fish mobility and fish habitat, these activities are described in Section 2.4.2.8. The Project is not expected to involve any of the water development activities listed as Class 3 development triggers under section 4(4) of the CD Regulation.

The Environmental Approvals Branch of Manitoba Conservation and Climate (MCC; formerly Manitoba Sustainable Development; MSD) has advised that it considers the proposed Project activities at the Gordon and MacLellan sites to constitute separate “developments” that will require separate licences under *The Environment Act* (Manitoba). The Environmental Approvals Branch will assess each site under separate EAP’s under the provincial EA process. Documentation related to the provincial environmental assessment process is available on the Environmental Approvals Branch website at:

https://www.gov.mb.ca/sd/permits_licenses_approvals/eal/index.html.

Other provincial agencies have potentially relevant mandates relative environmental aspects of the Project for the environmental assessment process. See Chapter 1, Section 1.4 of the federal EIS for a summary listing of potentially relevant key provincial legislation.

1.6.1.2 Federal Requirements

Under the Canadian Environmental Assessment Act (CEAA) 2012, federal EAs are possibly required for ‘designated projects’ consisting of one or more physical activities specified in the *Regulations Designating Physical Activities* (the Regulations). The Impact Assessment Agency of Canada (IAAC) is responsible for the administration of federal EAs for metal mines under CEAA 2012.



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A Project Description Summary Document and Project Description Report were submitted to the Canadian Environmental Assessment Agency on June 22, 2017, and June 23, 2017, respectively. The Canadian Environmental Assessment Agency confirmed that a federal environmental assessment would be required and released the Environmental Impact Statement Guidelines on November 6, 2017 which specify the nature, scope and extent of the information required in the environmental impact statement. Documentation related to the federal environmental assessment is available on the Canadian Impact Assessment Registry Internet Site at: <https://www.ceaa.gc.ca/050/evaluations/document/exploration/80140?culture=en-CA>.

Other federal agencies are also providing specialized knowledge through the environmental assessment process. See Chapter 1 of the federal EIS for a summary listing of potentially relevant key federal legislation.

It is anticipated that readers of this EAP will reference the federal EIS that was filed with the IAAC for greater detail, as necessary.

1.6.2 Other Environmental Regulatory Requirements and Permits

In addition to the EA requirements described in Section 1.6.1, there are key provincial, federal, and municipal permits and approvals potentially required for the Project. These are listed in Tables 1-3 to Table 1-5 in Section 1.4.2 of Chapter 1 of the federal EIS.

1.7 FUNDING

Alamos will provide funding for all undertakings related to the Project at the Gordon site.



2.0 PROJECT DESCRIPTION

2.1 PROJECT LOCATION

The Gordon site is located 55 km east of Lynn Lake by vehicle (14U 412400E 6307800N). Lynn Lake is located approximately 820 km northwest of Winnipeg. The proposed site layout for the redeveloped Gordon site is shown on Map 2-1.

The proposed Project infrastructure at the Gordon site, excluding a portion of the Gordon access road, will be located within the boundaries of those claims and leasehold lands registered in the name of Carlisle Goldfields Limited, a wholly-owned subsidiary of Alamos (Map 2-2). Alamos has obtained road permits for the Gordon access road, which grant exclusive rights for usage of this road to Alamos.

2.2 PROJECT COMPONENT OVERVIEW

The proposed mine operation at the Gordon site is a conventional open pit with shovel and truck removal of the mine rock and ore produced during blasting. The key activities and components associated with the mine site comprising the proposed Project are as follows:

- Open pit – producing run-of-mine ore or raw/unprocessed ore.
- Ore, overburden, and mine rock stockpiles/storage areas – raw ore from the Gordon site will be used as feedstock at the MacLellan site.
- Transportation of raw/unprocessed ore from the Gordon site to the mill feed storage and crushing plant at the MacLellan site.
- Sewage septic tanks and domestic waste handling.
- Utilities and infrastructure
 - Diesel generators and overhead power supply lines
 - Fuel/fuel storage and propane storage and distribution facilities
 - Fresh water pumps and HDPE pipeline
 - Water tanker truck/central storage facility
 - Existing access roads and upgrades as required (including existing bridge crossing of the Hughes River south of the Gordon site)
 - Proposed buildings and yards (security building, small office, truck shop, parking and laydown areas, lighting).



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- Water development and control
 - Adjustment to an existing built diversion channel, water management structures such as diversion ditches, interceptor wells, and a water management pond.

2.3 PROJECT PLANNING AND MANAGEMENT STRATEGIES

Environmental protection and management measures will be adopted to guide the planning, design, construction, operation, and decommissioning/closure of the Project.

2.3.1 Design Standards and Codes

The Project will:

- Adhere to regulated standards for air and water emissions, for handling, storage or disposal of solid wastes and hazardous materials, and for handling and storage of fuel.
- Adhere to regulated and/or industry design and management standards to address environmental risks such as seismicity, unusual weather events, flooding, and erosion.

2.3.2 In-Design Mitigation

Initial design will incorporate mitigation measures to reduce Project-related interactions, including:

- Siting facilities to avoid sensitive areas such as watercourses, wetlands, important habitat types, areas of high archaeological potential, and areas of importance identified by Indigenous communities; and where unavoidable, the size and number of natural features that may be affected has been reduced (see Maps 2-3).
- Siting facilities within, instead of across, watershed boundaries, where possible, to reduce the number of potentially affected waterbodies.
- Reducing the ‘footprint’ of Project facilities and activities, to the extent practical, to reduce the amount of disturbed land and disturbed water resources.

2.3.3 Environmental Protection, Mitigation and Management

Where avoidance of sensitive areas as described in Section 2.3.2 is not possible, mitigation measures will be developed in liaison with the applicable regulatory authorities and Indigenous communities. Environmental protection, mitigation, and management components include:

- Preparing an Environmental Protection Plan for construction activities that is included in, and enforced through, construction contracts.



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- Preparing and implementing an Environmental Management Plan for ongoing monitoring and management of, for example, land and soil resources, water, air and water quality, noise and vibration, hazardous materials and waste, and occupational and community health and safety.
- Preparing and maintaining an Emergency Response Plan for the Project.
- Planning the mine for closure and having a Conceptual Closure Plan (federal EIS Chapter 23, Appendix 23B), including the provision of security to the provincial Crown for performance of rehabilitation work.
- Planning and financing activities to offset or compensate for unavoidable adverse effects on environmental resources such as aquatic habitats.
- Implementing a public, stakeholder and Indigenous engagement program. Alamos has commenced engagement activities, as summarized in the federal EIS Chapter 3. These efforts have been ongoing throughout Project planning and will continue through the permitting phase and implemented throughout construction, operation, and eventual decommissioning/closure with the objective of:
 - Addressing public, stakeholder, and Indigenous community concerns to the extent possible during the design, construction, operation, and closure of the Project.
 - Promoting local benefits, including employment and business opportunities, to the extent practical.

Further details on environmental protection, mitigation and management is provided in Section 8 of this report.

2.4 PROJECT ACTIVITIES AND COMPONENTS

After closure of the historical Farley Lake mine, the Gordon site underwent a reclamation process. It currently consists of a 15-km gravel access road, a bridge across the Hughes River, two mine rock storage areas (MRSAs) and two overburden storage areas that have been capped, and two water-filled open pits (see Map 2-4). All buildings and infrastructure have been removed.

New infrastructure at the Gordon site will be limited to an open pit, ore and overburden stockpiles, a MRSA, site water management pond, and minor supporting infrastructure for equipment storage and maintenance. There will be no milling or tailings produced at the Gordon site.

The key activities and components associated with the Gordon site are described below.



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2.4.1 Resource Extraction, Storage and Transportation

2.4.1.1 Open Pit

The Gordon resource will be developed as an open pit mine operation. During pre-production 2.3 million tonnes (Mt) of mine rock and overburden will be removed, and 29 kilotonnes (kt) of ore will be stockpiled. The run-of-mine (ROM) ore (i.e., raw/unprocessed ore that is intended for immediate processing rather than stockpiling) from the Gordon site will be transported via highway trucks to the mill feed storage area and crushing plant at the MacLellan site for short-term storage and initial crushing before it is used as feedstock for the adjacent ore milling and processing plant. The Gordon open pit overlaps with a portion of a historical MRSA. Mine rock from the historical MRSA will be relocated onsite to the new Gordon MRSA.

The total quantity of material to be mined from the Gordon open pit during Project mine operation is approximately 59 Mt, which includes ore material of 8 Mt. The anticipated ultimate depth of the Gordon open pit is approximately 225 m. The open pit will be developed in a series of benches based on the pit design parameters with drilling and blasting completed on each bench. The pit slopes will be designed based on industry standards and the results of site-specific geotechnical investigations.

The mine operation is a conventional open pit with shovel and truck removal of the mine rock and ore produced during blasting. Ramp widths will be designed to accommodate the deployed type and size of the mine equipment and vehicles.

The Gordon site will provide ore as mill feed starting in Year 1 through to Year 6 of Project operation. Some ore will be stockpiled on site during pre-production years. The mining rate (including ROM, as well as ore, overburden [if applicable and including topsoil, muskeg, etc.], and mine rock to be stockpiled) at the Gordon site is planned to peak at 16.0 Mt/year or approximately 50,000 t/day (rounded for seasonal considerations and to account for downtime) in Year 2. Mine operation at the Gordon site is planned to cease after Year 5. The transfer of Gordon ore will continue into Year 6.

2.4.1.2 Ore, Overburden and Waste Rock Stockpiles/Storage Areas

Ore will be stockpiled at the Gordon site prior to transport for use as feedstock at the MacLellan site ore milling and processing plant. The peak stockpile at the Gordon site will be 1.6 Mt. The ore stockpile area is proposed to be approximately 33,800 m², located south of the open pit at the Gordon site (see Map 2-1). Depletion of this stockpiled material is anticipated in Year 6.

ROM ore from the Gordon site will be transported to a pad directly adjacent to the ore milling and processing plant at the MacLellan site for short-term storage before it is used as feedstock for the plant. The Gordon site will also have stockpile areas for removed overburden and mine rock. These stockpile/storage areas are proposed to be located to the southwest and south of the open pit (see Map 2-1). Table 2-1 provides the estimated maximum volumes of each material for the Gordon site.



Project Description

Table 2-1 Approximate Quantity of Mine Materials for the Gordon Site

Project Site	Ore Stockpiles		Overburden		Mine Rock	
	Tonnage (Mt)	Volume (Mm ³)	Tonnage (Mt)	Volume (Mm ³)	Tonnage (Mt)	Volume (Mm ³)
Gordon	1.6	0.7	0.9	0.5	50.1	22.3

Notes: Mine rock and ore stockpiled densities assumed to be 2.25 t/m³. Overburden stockpile swelled density assumed to be 1.7 t/m³. Mine rock volumes based on a bulking factor of 1.3. Overburden volumes based on a bulking factor of 1.1.

Table 2-2 provides the general characteristics of each stockpile/storage area (i.e., surface area, height, and overall slope).

Table 2-2 Proposed Configurations for Stockpiles/Storage Areas at the Gordon Site

Stockpile	Maximum Surface Area (m ²)	Maximum Total Height (m)	Maximum Overall Slope (H:V)
Ore	33,800	10	1.33H:1V
Overburden	123,300	15	2.5H:1V
Mine Rock	618,100	50	2.5H:1V

The Project may result in the generation of mine rock that could have the potential for acid rock drainage (ARD) and metal leaching (ML). Geochemical testing and water quality modelling are ongoing; however, preliminary sampling results indicate that mine rock from the Gordon site contains potentially acid generating (PAG) materials and shows a leaching potential for arsenic and other trace elements (see Chapter 5 in the EIS, Section 5.2.6). Blending of PAG and non-PAG material and/or dry and/or wet covers will be used to control ARD/ML from mine rock. Final required mitigation measures will be determined during detailed engineering and outlined in the Environmental Management Plan. By contrast, ore stockpiles are not expected to generate ARD and have moderate leaching potentials for aluminum, fluoride, silver, and copper. Overburden has a low risk of ARD/ML and is not expected to require special management or mitigation measures.

Seepage/runoff collection ditches will be constructed around the perimeter of each stockpile/ storage area and directed to a series of sumps and/or small ponds at topographic lows. Water collected in the sumps and/or small ponds will be pumped to a site water management pond for management and/or treatment (if required) prior to discharge (see Map 2-1).

2.4.1.3 Transportation of Ore

Ore mined at the Gordon site will be transported to the MacLellan site for processing. Based on a conservative assumed haulage rate of 4,100 t/d, the Project is estimated to require seven truckloads per hour between the Gordon and MacLellan sites during the first six years of mining operations.



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2.4.2 Utilities and Infrastructure

2.4.2.1 Water Supply and Distribution System

Raw water at the Gordon site is required for dust and fire suppression, safety showers, and for the truck shop and truck wash. Normal freshwater requirements are expected to be 10 m³/hour. Freshwater will be pumped from Farley Lake to a pumphouse located on the south shore of Farley Lake, and then to a freshwater tank located at the Gordon site. The suction pipe will be buried and heat-traced to prevent freezing (Ausenco 2019). The storage tank will have a live storage volume of 700 m³. A portion of the storage volume will be used for fire and dust suppression and the remaining portion will be used to feed the freshwater pumps for other purposes.

Potable water for the Gordon site will be obtained from the fresh-water treatment plant located at the MacLellan site. The water will be trucked to a central storage facility that will be set up on the Gordon site (see Map 2-1).

2.4.2.2 Power Distribution System

Power for the Gordon site will be supplied on-site via two 300 kW diesel generators (Ausenco 2019). Power distribution will be via 4.16 kV overhead lines, cable tray and underground conduits, with local outdoor type e-houses for transformers and load centres at each point of utilization.

2.4.2.3 Fuel Storage and Distribution System

Tanker trucks will deliver diesel and gasoline fuels to the site on an as-needed basis for use by heavy equipment and Project vehicles, as well as for the site generators. Propane will be considered for space heating. Fuels will be stored in approved above-ground storage tanks equipped with secondary containment. Fuel storage and distribution infrastructure will be constructed in accordance with applicable legislation requirements (e.g., the Storage and Handling of Petroleum Products and Allied Products Regulation under *The Dangerous Goods Handling and Transportation Act* of Manitoba). Stationary and mobile mine equipment will be fueled with a fuel-dispensing truck.

2.4.2.4 Roads

The main access to the Gordon site will be via the existing Provincial Road (PR) 391, which is under the authority of Manitoba Infrastructure. PR 391 is an all-weather road connecting Thompson, Manitoba, and Lynn Lake. PR 391 will be used by personnel, material deliveries, and haulage trucks transporting material from the Gordon site to the ore milling and processing plant at the MacLellan site.

The existing 15-km site access road from PR 391 is expected to be upgraded to safely accommodate Project-related traffic, including the bridge crossing of the Hughes River. PR 391, which is under the authority of Manitoba Infrastructure, will be used by personnel, material deliveries, and haulage trucks transporting material to the ore milling and processing plant from the Gordon site. The potential need for upgrades to PR 391 and/or weight exception requirements to support the Project are being discussed with Manitoba Infrastructure. Based on a conservative assumed haulage rate of 4,100 t/d, the Project is



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estimated to require seven truckloads per hour (20 hours per day) between the Gordon and MacLellan sites during the first six years of mining operations. Project-related truck traffic between the Gordon and MacLellan sites is included in the scope of the Project to be assessed. The access road from PR 391 to the Gordon site will be under Alamos care and control during operation. Alamos will own and maintain internal site roads at the Gordon site, which will allow movement of Project personnel, equipment, and materials on the site. Large haul truck traffic and other site vehicular traffic will be separated where appropriate. For example, large mine haul trucks being used at the Gordon site will have dedicated roads from the open pit to the various dump points and to the central maintenance and shift changeover area.

2.4.2.5 Buildings, Yards, and Parking Areas

Only a few buildings are proposed to be constructed at the Gordon site, including a security building to control access to the Gordon site and a small office. The Gordon site will have a truck shop with sufficient bays to service open pit trucks and other surface equipment, as well as general maintenance facilities. It will be equipped with overhead cranes and will provide adequate space for the storage of tool cabinets and other items required for maintaining the mobile fleet. The truck shop will also support truck wash and fueling activities and provide personnel services and office facilities for daily management issues.

Three parking areas, including a central parking facility, will be developed to accommodate Project personnel, site visitors, and Project vehicles including the mobile mine fleet and road haul trucks. Laydown areas will also be required for the outdoor storage of equipment, maintenance, and construction equipment, as well as facilities for the construction and operation.

2.4.2.6 Site Lighting and Security

General site lighting will be a combination of power line pole-mounted fixtures and building-mounted fixtures at the offices, shop, and other miscellaneous buildings. Lighting will be designed to reduce spill-over light (i.e., unwanted outdoor light shining further than anticipated).

2.4.2.7 Explosives Storage

Emulsion explosives with non-electric detonators will be used during mine operations at the Gordon site (Ausenco 2019). Explosives storage will be located at the MacLellan site and explosives will be transported to the Gordon site on an as-needed basis. Transportation of explosives will be the responsibility of an explosives contractor.

2.4.2.8 Water Development and Control

Alterations to stream channels which affect fish mobility and fish habitat are considered Class 2 developments under section 3(9) of the CD Regulations pursuant to *The Environment Act* of Manitoba and are therefore subject to provincial EA and licensing requirements. The Project will not require natural watercourse re-alignments to accommodate Project components.

As part of the proposed development at the Gordon site, the existing, previously constructed diversion channel flowing from Gordon Lake to Farley Lake will require adjustment to the north (see Map 2-1). The

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channel will be designed to safely pass a 1 in 100-year return period storm and will take long-term fish passage and habitat between Gordon and Farley lakes through a tributary into consideration. Water management structures such as diversion ditches and interceptor wells will be constructed to collect, divert, and release non-contact water to the environment.

A series of groundwater interceptor wells located between the ultimate footprint of the open pit and Gordon and Farley lakes will be used to mitigate a reduction in groundwater discharge to Gordon and Farley lakes as a result of open pit dewatering during mine operations and pit filling during mine closure. At this time, the interceptor wells are anticipated to be sited approximately 40 m from the boundary of the ultimate open pit limit. Groundwater extracted from the interceptor wells (originating from the adjacent lakes) will be pumped to a water management pond prior to being recirculated to Gordon and/or Farley lakes. If required, the water will be treated to meet applicable federal and provincial regulatory requirements prior to discharge to the environment. The engineering design for these wells will be finalized during the detailed design phase for the Project.

As described in Chapter 1 of the federal EIS (Section 1.4.2), no amendment(s) to Schedule 2 of the MDMER are anticipated to be required for the Project. The MRSAs at the Gordon Site have been sited outside of and away from fish-bearing watercourses.

Alamos will request a paragraph 34.4(2)(b) and 35(2)(b) *Fisheries Act* authorization from Fisheries and Oceans Canada (DFO) for the HADD of fish habitat that may occur as a result of Project activities, including in the existing diversion channel at the Gordon site. Any *Fisheries Act* authorization will not be issued by DFO until after the Impact Assessment Agency of Canada (formerly Canadian Environmental Assessment Agency) decision on the Project.

Details regarding other liquid discharges associated with Project operation are discussed in Chapter 2, Section 2.8.2 of the EIS.

2.4.3 Other Waste Storage and Management

2.4.3.1 Sewage Handling

Sewage will be conveyed by gravity to two septic tanks at the truck shop and administration building. It will then be trucked to MacLellan for processing at a 60 m³/day sewage treatment plant.

2.4.3.2 Domestic Solid Waste Handling Facility

Waste disposal will follow a Waste Management Plan for the Project, which will be developed in accordance with applicable regulations (e.g., *The Waste Reduction and Prevention Act* of Manitoba and the provincial Collection and Disposal of Wastes Regulation under *The Public Health Act*) and best practices. Solid waste will be collected and recycled to the extent practical. Where feasible, paper and cardboard will be recycled, waste steel will be sold as scrap, and wood and plastic will be salvaged and recycled. Non-hazardous domestic solid waste will be deposited at the landfill in Lynn Lake which has three to five years of space left and potentially another 20 years of capacity. A Waste Management Plan will be developed for the Project as there will be demand for landfill capacity for construction and non-hazardous domestic solid



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waste during operation. Alamos will liaise with planners in Lynn Lake regarding these needs and potential requirements for landfill expansion. Waste oils, fuels, and hazardous wastes (if any) will be safely handled and transported as recommended by the suppliers and/or manufacturers and in compliance with applicable federal, provincial, or municipal regulations (e.g., the Hazardous Waste Regulation under *The Dangerous Goods Handling and Transportation Act* of Manitoba, *Canadian Environmental Protection Act* and associated regulations, and the *Transportation of Dangerous Goods Act* and associated regulations).

2.5 ANCILLARY FACILITIES AND INFRASTRUCTURE

2.5.1 Borrow Sources

Borrow sources for construction are uncertain at this time and are therefore not included in the scope of the EIS. Preliminary investigation details on borrow sources for the Project are presented in Chapter 5 of the EIS. Detailed project planning to identify the location and scope of borrow pit operation will be undertaken in consideration of environmental constraints to avoid or reduce interactions with sensitive features such as watercourses and wetlands or known areas of habitat for rare species and archeological resources. It is assumed that quarries and other borrow sources owned and operated by third parties will be operated in accordance with permit requirements and best practices stipulated by the applicable regulatory authorities.

2.6 WORKFORCE

The total Project labour force, as well as full time equivalents (FTEs), expected to be on-site over a given time based on fly-in, fly-out rotations is 1,591 or 827 FTE on-site. The total labour force and FTEs is based on pre-production peak, operation peak, and operation TMF lift. It is anticipated that workers will be transported from the worker accommodations camp at the MacLellan site to the Gordon site via passenger vehicle (e.g., buses).

2.7 PROJECT SCHEDULE

The tentative Project schedule and approximate duration of the key Project phases are as follows:

- Construction (i.e., site preparation, physical construction/equipment installation, pre-production, and commissioning) is expected to take approximately 2 years to complete (Year -2, Year -1). Some limited pre-production may occur during this period. Project construction will be carried out concurrently at both the MacLellan and Gordon mine sites.
- Operation (i.e., ore and mine rock extraction, processing, and waste management) is expected to start in Year 1.
 - Mining at the Gordon site will be undertaken for six years (i.e., Years 1 to 6).
 - The ore stockpiled during mine operations will provide additional feedstock to the ore milling and processing plant located at the MacLellan site during the Project.



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- Decommissioning/active closure is scheduled to begin in Year 6 at the Gordon site, and is expected to take approximately five to six years to complete. Active closure can be described as the anticipated rehabilitation efforts that will be completed at the Gordon site. Active closure will be followed by approximately 10 years of post-closure, which is the time period during which active reclamation measures are complete, but monitoring is still required. Pit filling is expected to take 11 years at the Gordon site under average conditions. Permanent closure will occur when the site is stable, and monitoring is no longer required.

2.8 PROJECT PHASES

Working with Paraminerals Consulting, Alamos has developed a 3D visualization of what the Project will look like throughout the life of the Project. Visualizations for the Gordon site are provided in the federal EIS in Chapter 2, Appendix 2B.

2.8.1 Construction

Construction (i.e., site preparation, physical construction and equipment installation, pre-production, and commissioning) will begin once all regulatory approvals and associated permits are in place and is expected to take approximately two years to complete. The timeframe to complete the required site preparation and surface infrastructure to start open pit activities is approximately nine months. Ore will be stored in stockpiles until the facility is operational.

Construction will begin with clearing the areas for the Project components (i.e., open pits, stockpiles, internal access roads, and ancillary facilities). Cleared merchantable timber will be sold, and any remaining cleared vegetation will be mulched and stored on-site for future use in active closure activities.

Water will be applied for dust suppression to haul roads and access roads and water management will be employed during the earthworks program to mitigate the potential environmental effects of fugitive dust on the surrounding area and mitigate surface erosion.

An access road connecting the site to PR 391 (i.e., upgrades to the existing 15-km access road at the Gordon site) is proposed to be developed in conjunction with site preparation activities. Any watercourse re-alignment works that may be required at the Gordon site will be initiated early.

The ore stockpile and MRSAs will be grubbed and graded to promote drainage control. The foundations will be prepared in accordance with environmental and engineering standards dependent upon the anticipated drainage chemistry, and drainage collection works will be installed.

Services, including the power supply, waste handling and fresh water supply systems, will be installed. The power supply will be provided at the Gordon site by Alamos.

Pre-packaged and field-erected ancillary facilities, including the buildings, fueling, and tanks, will be delivered to the site and installed. Other equipment will be set up in their appropriate locations, and electrical and mechanical connections will be completed.



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Removal of overburden for the open pit areas will occur in preparation for mining activities. Suitable overburden and excavated soil will be used on-site during construction with excess stored on-site for future use in active closure activities.

The amount and frequency of blasting required during the construction phase of the Project will be determined during detailed mine engineering.

The mechanical and electrical systems associated with the Project will be commissioned as construction is completed. Commissioning activities for the Project will include commissioning of the power distribution system and control, contact water collection systems, open pit dewatering system, and on-site fueling system. Following commissioning, the Project will start commercial operation.

2.8.2 Operation

The operating life of the Project at the Gordon site is estimated to be six years (excluding the pre-production period estimated at two years). As operations continue, the open pits will become progressively deeper, and related overburden, ore stockpiles, and MRSA's will increase in size. Solid and liquid wastes will be managed in compliance with applicable federal and provincial regulatory requirements (federal EIS Chapter 2, Sections 2.8.2 and 2.8.3). Ore from the Gordon site will be transported via highway trucks to the ore milling and processing plant at the MacLellan site for the first six years of mining operation. Based on a conservative haulage rate of 4,100 t/d, the Project is estimated to require seven truckloads per hour between the Gordon and MacLellan sites during this period.

The amount and frequency of blasting and drilling required during the operation phase of the Project will be determined during detailed mine engineering. Blasting is anticipated to occur approximately two to three times per week, or approximately every third day, on average. Blasting is anticipated to be scheduled to coincide with shift change (i.e., approximately 7:00 pm). Ammonium nitrate and fuel oil emulsion is planned to be used for blasting at both sites. The ammonium nitrate and fuel oil emulsion will be manufactured at the MacLellan site. Drilling is anticipated to occur 24 hours a day. Production drilling is anticipated to consist of 165 mm drill holes and pre-splitting. Void collapse and delineation drilling is anticipated to consist of 114 mm drill holes, both using down-the-hole hammers. Grade control drilling is anticipated to consist of 114 mm diameter drill holes using reverse circulation drilling.

2.8.3 Decommissioning/Closure

A Conceptual Closure Plan has been developed (EIS Chapter 23, Appendix 23B) and will be implemented in accordance with the *Mine Closure Regulation* under *The Mines and Minerals Act* of Manitoba and associated *General Closure Plan Guidelines* (MARD n.d.), to remove unneeded facilities and restore the Gordon site following the completion of mining activities. The primary objective of reclamation and closure activities will be to establish physical, chemical, and biological stability of the site, and to meet desired end land functions and uses. The Conceptual Closure Plan will be updated throughout the Project lifetime as necessary to reflect the environmental requirements in place at the time of closure.



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At the end of the operation phase of the Project, the main features will include the open pits, offices, storage areas, and MRSAs. Reclamation measures expected during decommissioning/ closure for each of the main components are described in detail in federal EIS Chapter 23, Appendix 23B. Active closure activities will take place once mining has been completed (Year 6 at the Gordon site). As outlined in federal EIS Chapter 2 (Section 2.6), active closure is anticipated to take five to six years to complete and will be followed by 10 years of post-closure monitoring and 11 years of pit filling (federal EIS Chapter 9, Section 9.4.1). Alamos will be responsible for monitoring and maintaining the integrity of the remaining structures. This responsibility will be outlined in the Closure Plan.

Alamos will surrender the lease and the site will be returned to the provincial Crown upon permanent closure once all fees, rents, royalties, and other liabilities applicable are paid. The site is expected to remain open indefinitely post closure for recreational activities such as hunting and trapping.

The main elements of decommissioning/active closure are:

- Removal of buildings, equipment, and facilities (i.e., permanent structures) from the Gordon site, together with aboveground concrete structures.
- Reclamation of mine access roads not needed for post-mining land access, with contouring to restore natural drainages and roadways revegetated.
- Recontouring of disturbed areas to blend in with surrounding topography and to re-establish natural drainage patterns.
- Removal of water management features that are no longer required, such as water treatment systems, ponds, and ditches. This will include: recontouring/spreading of pond berms; backfilling of ponds and ditches; and re-establishing natural drainage patterns.
- Management of site runoff from developed areas, including from the MRSAs and open pits, to meet federal and provincial regulatory requirements for downstream water quality.
- Implementation of public safety measures around the pits (e.g., re-sloping, fencing or rock berms).
- Allowing the open pits to fill with water to form pit lakes and directing the overflows to established drainages.
- Reclamation of MRSAs with suitable covers as needed, revegetation, and establishment of stable drainage conditions.
- Revegetation of disturbed areas with plant species that are suitable for reclamation and the end land uses of the area. The goals of reclamation vegetation will be to: avoid erosion and sedimentation to protect aquatic resources; avoid invasive plant establishment; and re-establish a land use that is of value for wildlife and/or humans and mitigates the residual environmental effects of the Project on the environment.



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2.9 EMISSIONS, DISCHARGES AND WASTES

2.9.1 Atmospheric Emissions

2.9.1.1 Air Contaminants

Air contaminant emissions during construction and operation will consist mainly of diesel combustion exhaust emissions from construction and mining equipment on-site (including the power generator), heavy-duty trucks transporting ore from the Gordon site to the MacLellan site, and highway trucks delivering fuel, explosives and processing plant consumables, as well as fugitive dust emissions from construction and mining operation activities. The primary mining equipment will operate for 15 hours per day on average and the supporting equipment will operate for 8 hours per day.

The off-road equipment and vehicles consume diesel fuel and the resulting products of combustion are released to the atmosphere including oxides of nitrogen (NO_x), sulphur dioxide (SO₂), carbon monoxide (CO), hydrocarbons, diesel particulate matter (DPM), polycyclic aromatic hydrocarbons (PAHs) and metals. DPM is respirable particulate matter that has an aerodynamic diameter less than 10 µm (PM₁₀). It is assumed that 97% of DPM is PM_{2.5} or fine particulate matter that has an aerodynamic diameter less than 2.5 µm.

Fugitive dust emissions from drilling and blasting, surface disturbance activities, loading and unloading of material, truck traffic along haul roads and access roads, and wind erosion of exposed surfaces result in particulate matter (PM) emissions of various size ranges (e.g., total suspended particulate, PM₁₀ and PM_{2.5}) that can also be deposited to off-site ground and water surfaces (i.e., dustfall).

Water will be applied to haul roads and access roads during construction and operation to mitigate the potential environmental effects of fugitive dust on surrounding properties. Chemical dust suppressants may be applied to haul roads on an as-needed basis during high wind conditions or if an increase of watering is determined ineffective or unfeasible at the time. Environmental effects of the Project on air quality will be considered and mitigated, where appropriate.

2.9.1.2 Greenhouse Gases

Project construction (estimated 24-month duration) will result in short-term greenhouse gas (GHG) emissions from the combustion of fuel in mobile construction equipment, stationary heaters, and power generators. GHGs will also be released from blasting activities and land-use changes (e.g., land clearing). The total annual construction emissions are estimated at approximately 80,617 tonnes of carbon dioxide equivalent (CO_{2e}) per year. Approximately 16,000 tonnes of CO_{2e} are estimated to be released during the worst-case year of construction (Q2 Year -2 to Q1 Year -1) (federal EIS Volume 5, Appendix A, Attachment F).

Project operations will result in GHG emissions from the combustion of fuel from transportation, in mobile and stationary equipment and releases from blasting activities. Assuming typical operations with the MacLellan mine (except mobile equipment) powered using the existing Manitoba Hydro power grid (i.e., the available back-up diesel generation is not required) and the Gordon mine operations using on-site diesel-



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power generation, GHG emissions for the Project during operation are estimated to be 104,885 tonnes CO_{2e} per year. Approximately 36,500 tonnes of CO_{2e} are estimated to be released during the worst-case year of operation and corresponding ore haulage on PR 391 (Year 2) at the Gordon site. (federal EIS Volume 5, Appendix A, Attachment F).

2.9.1.3 Noise and Vibration

Noise and vibration will be generated during construction and will be typical of that associated with construction projects involving the movement of heavy mobile equipment such as haul trucks and stationary equipment such as power generators, compressors, and pumps.

Mining and surface crushing activities, including blasting of rock, and movement of material will be a source of noise and vibration throughout the Project operation phase.

2.9.1.4 Light

Site lighting will be provided by a combination of power line pole-mounted fixtures and building-mounted fixtures at the offices, shop, and other miscellaneous buildings. Lighting will be designed to reduce spill-over light and will be typical of that associated with other industrial mine projects. Further information on light and visibility of the site from various viewpoints is provided in the Ambient Lighting Baseline Technical Data Report and Light Emissions Impact Assessment – Technical Modelling Report (federal EIS Volume 4, Appendix B and Volume 5, Appendix G).

2.9.2 Liquid Discharges and Management

Multiple sources of liquid discharges during the construction and operations will be managed on-site including, site runoff arising from precipitation; dewatering for foundation preparation; and dewatering of the existing open pits and underground workings. Liquid discharges at the Gordon site can be classified as being either 'contact' or 'non-contact' water. Contact water is water, surface water or groundwater, that contacts mine workings or interacts with mine rock material. Contact water may also include dewatering associated with the Project. Non-contact water is water that does not contact mine workings and/or interact with mine rock material. The Gordon site has been designed, as much as practical, to reduce the generation of contact water.

At closure, the water management related infrastructure will be sustained or re-configured to meet the requirements of the approved Closure Plan.

Contact Water

Collection ditches will be constructed around Project infrastructure to manage contact water. Water collected in the sumps and/or small ponds and during open pit dewatering will be pumped to water management ponds located at the site and discharged directly to the environment.

At the Gordon site's water management pond, water quality will be monitored. If necessary, the water will be treated to meet applicable federal and provincial regulatory requirements prior to discharge to the



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environment, including the authorized limits of deleterious substances specified in Schedule 4 of the MDMER. The water management pond has been sized in consideration of the retention time for the settling of suspended solids. Identification of the discharge locations for the Gordon site will be confirmed during detailed engineering. Discharge from the site water management pond is anticipated to be to Farley Lake at the Gordon site.

Operational open pit dewatering will be carried out with in-pit pumps and/or using perimeter dewatering wells to intercept groundwater before it enters the pit.

Non-Contact Water

Where practical, collection ditches will be constructed to divert non-contact water around Project facilities to natural drainages. Consideration will be given to designing the channels to support fish habitat, where appropriate and practical. It will be determined during development of the Closure Plan whether the channels will remain or be re-configured following decommissioning/closure of the mine.

Sewage

For the Gordon site, sewage will be conveyed by gravity to two holding tanks at the truck shop and administration building. It will then be trucked to MacLellan for processing at the MacLellan sewage treatment plant.

2.9.3 Solid Wastes and Management

Solid wastes include domestic waste and waste oils, fuels, and hazardous wastes. Waste disposal will follow a Waste Management Plan for the Project, which will be developed in accordance with applicable regulations (e.g., *The Waste Reduction and Prevention Act* of Manitoba and the provincial Collection and Disposal of Wastes Regulation under *The Public Health Act*) and best practices.

Non-hazardous domestic solid waste will be deposited at the landfill in Lynn Lake which has three to five years of space left and potentially another 20 years of capacity.

Waste oils, fuels, and hazardous wastes (if any) will be safely handled and transported as recommended by the suppliers and/or manufacturers and in compliance with applicable federal, provincial, or municipal regulations.

2.10 ALTERNATIVES

Consideration of alternatives is stipulated in the provincial environmental assessment process under The Environment Act Proposal Report Guidelines. The provincial Environment Act Proposal guidelines state that alternatives may consider one or more of the following: products to be provided, process technologies to be used, as well as feasibility and project siting.

2.10.1 Evaluation of Alternatives

The evaluation of alternatives for the Gordon site focused on the following:



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- Ore transportation
- Access to the Project site
- Location of key Project infrastructure
- Fuel storage and distribution
- Power supply
- Water supply and wastewater management
- Water management and location of effluent discharge points
- Diversion channel adjustments
- Mine waste disposal and final effluent discharge (considering methods and sites)
- Workforce accommodations and transportation

Each option for the alternatives identified is described and summarized for the Gordon site. Further details on the alternatives analysis is provided in the federal EIS Chapter 2 (Section 2.9.3). The preferred alternative forms the basis for the Project to be assessed.



Engagement

3.0 ENGAGEMENT

3.1 REGULATORY ENGAGEMENT

The regulatory authorities that are expected to have an interest in the Project are identified in Table 3-1.

Table 3-1 Relevant Regulatory Authorities and Jurisdictions

Federal Government	Provincial Government	Municipal Government
<ul style="list-style-type: none"> • Canadian Environmental Assessment Agency (now IAAC) • Environment and Climate Change Canada • Fisheries and Oceans Canada • Health Canada • Natural Resources Canada • Indigenous Services Canada 	<ul style="list-style-type: none"> • Manitoba Growth, Enterprise, and Trade (now Manitoba Agriculture and Resource Development) • Manitoba Indigenous and Northern Relations • Historic Resources Branch of Manitoba Sport, Culture, and Heritage • Manitoba Sustainable Development (now MCC) • Workplace Safety and Health of Manitoba Finance 	<ul style="list-style-type: none"> • Town of Lynn Lake

Regulatory engagement activities undertaken to date by Alamos have included telephone calls, email communications, in-person meetings, and presentations. Key issues identified and discussed during the regulatory engagement activities undertaken to date have been presented in the MacLellan EAP and are not reproduced here.

3.2 STAKEHOLDER AND PUBLIC ENGAGEMENT

Alamos has conducted various stakeholder and community engagement activities with the groups identified above, including meetings, telephone interviews and presentations at career fairs. Additional stakeholders are expected to be identified as the Project progresses. Questions, comments, and concerns identified during the stakeholder and public engagement activities have been presented in the MacLellan EAP and are not reproduced here. Engagement activities were conducted for the entire Project and not a specific mine site location.

Further details on aspects of stakeholder and public engagement (i.e., objectives and approach, identification of potentially affected and interested stakeholders, engagement methods and results, ongoing and proposed engagement) can be found in the federal EIS Chapter 3, Section 3.4.



Engagement

3.3 ENGAGEMENT WITH INDIGENOUS PEOPLES

Engagement has been ongoing prior to and throughout the EA process, and will continue through the life of the Project. Alamos has been engaging with Indigenous nations in the Project area to introduce the Project, receive feedback, and document potential issues and concerns. Alamos has used several engagement methods to present the Project information, facilitate discussion, and solicit feedback on the Project from Indigenous nations as presented in the MacLellan EAP and are not reproduced here. Engagement activities were conducted for the entire Project and not a specific mine site location. Information provided herein is current to May 22, 2020. Information or feedback provided through engagement after May 22, 2020 will be shared with regulators in supplemental filings to the Environmental Impact Statement in January 2021. Alamos will continue, throughout the life of the mine to incorporate information shared from Indigenous communities and groups wherever appropriate, including changes to outcomes of mitigation and monitoring. Further details on aspects of engagement with Indigenous communities (i.e., objectives and approach, identification of potentially interested Indigenous communities, engagement methods and results, ongoing and proposed engagement) can be found in the federal EIS Chapter 3, Section 3.3



4.0 ENVIRONMENTAL SETTING

4.1 OVERVIEW

An overview of the general environmental setting for the Project is provided in the MacLellan site EAP. Readers looking for further details on the biophysical environment (i.e., climate, air quality and greenhouse gas emissions, ambient sound and light, physiography, geology and soils, geochemistry, surface water and groundwater resources, fish and fish habitat, vegetation and wetlands, wildlife and wildlife habitat, and species of conservation of concern/species at risk) are directed to the federal EIS Chapter 5. Readers looking for further details on the socio-economic environment (i.e., socio-economic context, labour and economy, education, health care, emergency and social services, transportation and utilities, land and resource use, historical land and resource use, current use of lands and resources for traditional purposes, and heritage resources) are also directed to federal EIS Chapter 5.



5.0 ENVIRONMENTAL ASSESSMENT APPROACH

5.1 OVERVIEW

The assessment of environment effects focuses on valued components (VCs), which are the elements of the environment that could be affected by the Project and are of importance or interest to regulators, Indigenous communities and other potentially affected members of the public or interested parties.

The following VCs have been assessed as part of the EIS:

- Atmospheric Environment
- Noise and Vibration
- Groundwater
- Surface Water
- Fish and Fish Habitat
- Vegetation and Wetlands
- Wildlife and Wildlife Habitat
- Labour and Economy
- Community Services, Infrastructure and Wellbeing
- Land and Resource Use
- Heritage Resources
- Current Use of Lands and Resources for Traditional Purposes
- Human Health
- Indigenous Peoples

For further details on the environmental assessment scope and methods, readers are directed to the MacLellan EAP and the federal EIS Chapter 4.



5.2 ASSESSMENT BOUNDARIES

5.2.1 Spatial Boundaries

Spatial and temporal boundaries are identified for the assessment and assist in quantifying effects. Spatial boundaries set the geographic areas over which the assessment will be conducted. Temporal boundaries set the timeframe to be considered.

Spatial boundaries for the assessment were selected based on the geographic extent over which Project activities and their effects on VCs are likely to occur, as well as other ecological, technical, and social considerations. Three geographic areas were defined for VC assessment purposes – the Project Development Area (PDA), Local Assessment Area (LAA) and Regional Assessment Area (RAA).

- The PDA encompasses the immediate area in which Project activities and components occur plus a 30-m buffer and is the anticipated area of direct physical disturbance associated with the construction and operation of the Project (i.e., the Project footprint; see Map 2-1).
- The LAA encompasses the area in which Project-related environmental effects (direct or indirect) can be predicted or measured for assessment. The LAA, which is specific to each VC, encompasses the PDA and is selected in consideration of the geographic extent of effects.
- The RAA is the area established for context for the determination of significance of project-specific effects. The RAA encompasses both the PDA and LAA and is VC-specific.

5.2.2 Temporal Boundaries

Temporal boundaries for the assessment address the potential effects during the Project's construction, operation, and decommissioning/closure phases over relevant timescales. The temporal boundaries for the Project are the same as the Project schedule described in Section 2.7, above.



6.0 ASSESSMENT OF POTENTIAL ENVIRONMENTAL EFFECTS

6.1 ATMOSPHERIC ENVIRONMENT

6.1.1 Existing Environment

Three distinct subcomponents were described to characterize the atmospheric environment baseline conditions: climate and meteorology, ambient air quality and greenhouse gases (GHGs). The Project's regional climate (i.e., temperature, precipitation) and existing air quality is described further in the MacLellan site EAP.

6.1.2 Environmental Effects

6.1.2.1 Change to the Environment

The potential environmental effects of the Project on atmosphere, prior to mitigation, include:

- change in air quality
- change in GHGs

Emissions of air contaminants and GHGs to the atmospheric environment may result in a change in air quality or a change in atmospheric GHGs.

Emissions during construction and pre-production at the Gordon site are associated with the operation of the off-road construction and mining equipment, and movement of construction material for the construction of the major components of the Project such as internal haul roads and stockpile pads. Emissions during operation at the Gordon site are associated with diesel combustion exhaust from the mining equipment and fugitive dust emissions generated from mining activities and wind erosion. The Gordon site emissions include emissions associated with ROM ore haulage on PR 391.

Construction, operation, and closure activities will result in GHG releases from the combustion of diesel fuel, detonation of explosives and land clearing.

The effects of the environment on the Project with respect to the potential effects of climate and extreme weather is discussed in the federal EIS Chapter 21.

6.1.2.2 Mitigation Measures

The mitigation measures presented below are proposed to avoid or reduce Project-related effects on air quality and GHG emissions at the Gordon site:



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- Optimization of haul roads and infrastructure to reduce transportation and haul distances.
- Engines and exhaust systems will be properly maintained to keep construction and mining equipment in good working condition.
- The concentration of sulphur in diesel fuel shall not exceed 15 mg/kg, as per the Sulphur in Diesel Fuel Regulations (ECCC 2002) that came into effect in 2006 for on-road vehicles and in 2010 for off-road equipment. This sulphur concentration is used in the emissions quantification for the Project.
- Haul trucks and vehicle idling times will be reduced to the extent possible.
- Cold starts will be limited to the extent possible.
- On-site haul roads and access roads will be maintained in good condition, with regular inspections to monitor loose dust on the roads to reduce dust “track out” onto public roads.
- During dry periods, water will be applied to haul roads and access roads to reduce dust emissions. The application of water will be limited to non-freezing temperatures to avoid icing that can present a safety hazard. Watering is most effective immediately after application, and repeated watering several times a day might be required, depending on surface and meteorological conditions. A 75% control efficiency due to watering is applied to the quantified PM emissions from haul roads and access roads for the Project based on the Western Regional Air Partnership Fugitive Dust Handbook (WRAP 2006).
- Chemical dust suppressants will be applied to haul roads as an alternative option to watering. While chemical dust suppressants can be more effective at controlling fugitive dust than watering, they are also more expensive and can have adverse effects. Therefore, chemical dust suppression will be applied on an as-needed basis during high wind conditions or if measured ambient PM concentrations are in exceedance of the Manitoba Ambient Air Quality Criteria (AAQC) and if an increase of watering is determined ineffective or unfeasible at the time. Examples of suppressants include chlorides, petroleum products, liquid polymer emulsions, and agglomerating chemicals. These suppressants, if required, will be applied, as per the manufacturer’s recommendations, to preclude unintended environmental effects.
- Haul truck speed on the on-site haul roads will be limited to 35 km/h (loaded) and 40 km/h (empty). Vehicle speed on the access roads will be limited to 40 km/h.
- Track-out of material to PR 391 will be reduced by dust sweeping and truck wheel washing stations prior to entering onto PR 391.
- Surfaces of topsoil and overburden stockpiles will be stabilized during extended periods between usage, by means of vegetating or covering the exposed surfaces.

6.1.2.3 Residual Effects

Project construction and operation will result in the release of contaminants that will change ambient air quality. The air quality assessment focuses on Project operation because the operation phase has the



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greatest potential for adverse effects to air quality. The quantities of air contaminants released during the worst-case year of construction (Q2 Year -2 to Q1 Year -1) are substantively less than the worst-case year of operation (Year 2 for the Gordon site). The quantities of air contaminants released during decommissioning/closure are typically much less than construction and operation, are short-term in duration during active reclamation, and can be managed to negligible or acceptable levels through the application of standard operating procedures and best management practices. Therefore, the effects on air quality in the construction and decommissioning/closure phases will be less than during operation.

Maximum ambient concentrations and dustfall for the substances of interest are predicted for the worst-case year of operation at the Gordon site and ore haul on PR 391 (Year 2). The model results indicate that the maximum predicted 1-hour average NO₂, CO and SO₂ concentrations and 24-hour average TSP and PM₁₀ concentrations are greater than the respective AAQC (Manitoba Sustainable Development 2005). The maximum predicted 1-hour average NO₂ and SO₂ concentrations are greater than the Canadian Ambient Air Quality Standards (CAAQS; CCME 2017). For the other gaseous and particulate criteria air contaminants, dustfall and metals, the maximum predicted values are less than the applicable AAQC for the Gordon site.

During the construction phase, construction and mining equipment exhausts, blasting using an ammonium nitrate fuel oil emulsion, and land clearing are anticipated sources of GHG emissions. These GHG emissions consist primarily of carbon dioxide (CO₂), with smaller amounts of methane and N₂O. GHG emissions estimated to be released from the Gordon site during the worst-case year of construction are approximately 16.0 kt carbon dioxide equivalent (CO₂e) and are conservatively estimated to contribute to approximately 0.074% and 0.002% to annual provincial and national GHG emission totals, respectively.

During the operation phase, GHG emission sources include emissions from heavy off-road equipment, on-highway trucks and vehicles, the stationary generator, and blasting. GHG emissions estimated to be released from the Gordon site during the worst-case year of operation are approximately 36.5 kt CO₂e and are conservatively estimated to contribute approximately 0.17% and 0.005% annually to the provincial and national GHG emission totals, respectively.

Significance of Residual Effects

With planned mitigation and environmental protection measures, the residual environmental effects on air quality and GHGs are predicted to be not significant. Results of the assessment, including characterization and significance determination of residual effects are presented in Appendix A; Table A-1.

6.2 NOISE AND VIBRATION

6.2.1 Existing Environment

6.2.1.1 Noise

A description of noise levels in the RAA and Black Sturgeon Reserve (Marcel Colomb First Nation) is provided in the MacLellan site EAP. Baseline sound levels in the community of Lynn Lake are also described in the MacLellan site EAP.



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6.2.1.2 Vibration

A description of background environmental ground-borne vibration levels in an outdoor rural area is provided in the MacLellan site EAP.

6.2.2 Environmental Effects

6.2.2.1 Change to the Environment

The potential environmental effects of the Project on the acoustic environment, prior to mitigation, include:

- change in noise levels
- change in vibration levels

During construction, noise emissions from activities such as site preparation, utility and infrastructure development, and processing facility construction will result in a change in noise levels. During operation, noise emitted from the processing facility and mobile equipment (i.e., haul trucks) will result in a change in noise levels. In the decommissioning/closure phase, noise emissions from excavation and reclamation activities will result in a change in noise levels.

In the construction phase, activities such as site preparation, utility and infrastructure development, and processing facility construction will result in a change in vibration levels. Project construction activities such as earthworks, piling, and drilling were considered to cause potential vibration effects. During the operation phase, blasting activities at the site will result in ground-borne vibration and air overpressure. The vibration effects from ground vibration and air overpressure on human receptors were considered. In the decommissioning/closure phase, excavation and reclamation activities will result in a change in vibration levels.

6.2.2.2 Mitigation Measures

The mitigation measures presented below are proposed to avoid or reduce Project-related effects on noise and vibration levels during construction and operation:

- Where possible, large stationary machinery (i.e., crushers) will be located inside buildings.
- Large transportation trucks will be used to reduce the number of trips.
- Mobile equipment will have exhaust mufflers.
- Reduce heavy fleet idling when not operating, where practical.

Vibration mitigation will be achieved by blast design related to quantities of explosives, blast hole locations and time delays between blasts. The mitigation measures are summarized as follows:

- Highest explosive per time delay that do not exceed 207.9 kg.



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- Only one hole/delay will be fired in the blast.
- Minimum time delay between holes in blasts will not be less than 8 milliseconds (ms).

The specific mitigation measures for receptor ID 76 and ID 73, as noted in federal EIS Chapter 7 (potential Indigenous receptors), near the Gordon site are as follows:

- The reduced blast charge of 43 kg can be increased if the distance between the blast and closest receptor ID 76 and ID 73 is more than 1,430 m and 2,170 m (distance based on receptor location to pit boundary), respectively.
- The reduced blast charge of 43 kg can be increased if monitoring results indicate air overpressure level below 120 dBL at ID 76 and ID 73.
- Engagement with Marcel Colomb First Nation to discuss the potential of a seasonal mitigation approach, which relaxes the reduced blast charge of 43 kg during off-season period when trapping activities at receptors (ID 76 and ID 73) is not expected.

6.2.2.3 Residual Effects

High annoyance (HA) is a measure used to estimate a community response to noise levels. Health Canada uses the change in %HA as an appropriate indicator of noise-induced human health effects. Project-related changes in %HA at receptors are predicted to be below the 6.5% target for the construction phase and therefore in compliance with the Health Canada Noise Guidance (Health Canada 2017). Similarly, low frequency noise effects are not expected at receptors because the predicted sound levels are below the Health Canada Noise Guidance targets (Health Canada 2017).

The closest receptors to potential construction activities at the Gordon site are located far enough away (i.e., over 1 km) that structural damage due to construction equipment (e.g., pile driver, compactor) vibration is unlikely. The blasting plan will consider distance to receptors and will size the charges to avoid exceeding regulatory targets at receptors (i.e., 120 dBL).

Significance of Residual Effects

With mitigation and environmental protection measures, the residual environmental effects on noise levels and vibration levels are predicted to be not significant. Results of the assessment, including characterization and significance determination of residual effects are presented in Appendix A; Table A-1.

6.3 GROUNDWATER

6.3.1 Existing Environment

There are no known groundwater users located within the LAA/RAA for the Gordon site. Information on groundwater flow, groundwater quality in the Project area is presented in the MacLellan site EAP.



6.3.2 Environmental Effects

6.3.2.1 Change to the Environment

The potential environmental effects of the Project on groundwater, prior to mitigation, include:

- change in groundwater quantity and/or flow
- change in groundwater quality

At the Gordon site, groundwater quantity and/or flow and subsequently the mass loading of parameters from groundwater to surface water will primarily be affected by the lowering of groundwater levels through initial dewatering of the historical East and Wendy pits and local dewatering for the installation of foundations. The initial development of the ore stockpile, overburden stockpile, and MRSA (and the alteration of the historical south MRSA) also have the potential to affect groundwater recharge and consequently groundwater quantity and/or flow at the Gordon site. Groundwater quantity may also be affected during construction through changes in infiltration rates through compaction of ground surfaces, stripping of topsoil, timber harvesting, and removal of vegetation in the PDA. During operation at the Gordon site, dewatering of the open pit will result in a change in groundwater flow patterns and redirect groundwater recharge originating from the historical MRSA and the new MRSA to the open pit, where it will be collected and pumped to a settling pond prior to discharge to the environment. Groundwater recharge from the historical MRSAs and new MRSA may affect the quality of groundwater discharging to lakes and wetlands. Drawdown resulting from open pit dewatering at the Gordon site may affect local groundwater users, if users were to be located within the predicted zone of influence.

Following completion of operation, dewatering of the open pits will cease, and the open pits will fill with water. As the open pits fill, groundwater levels will slowly recover, and the groundwater flow patterns, will return to near baseline conditions

6.3.2.2 Mitigation Measures

The mitigation measures presented below are proposed to avoid or reduce Project-related effects on groundwater quality and quantity:

- Limit construction footprint (i.e., PDA) to the extent possible to reduce the potential for reductions in groundwater recharge and limit the number of watersheds overprinted by the PDA.
- Use standard management practices throughout the Project, including drainage control and excavation and open pit dewatering.
- Intercept groundwater flowing into the open pit prior to discharge at the pit wall and return water generated from pumping groundwater interceptor wells to Gordon and Farley lakes to offset a reduction in groundwater discharge. The groundwater interceptor wells are an integral part of the open pit dewatering strategy and are therefore included in the effects assessment as mitigation.



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- Design of the MRSA to increase the amount of runoff and reduce the amount of infiltration through the MRSA, thereby reducing the recharge and loading to groundwater.
- Install contact water collection ditches around the overburden storage area, ore stockpile, and MRSA to collect toe seepage and groundwater recharge from these Project components.

6.3.2.3 Residual Effects

During the construction phase, changes to groundwater infiltration are considered to have a minor effect on groundwater resources. Residual effects from temporary dewatering and contact water collection are anticipated to be low, as the groundwater pumping will be short-term on an as-needed basis. The residual effects from the initial dewatering of the historical Wendy and East pits will be most notable during the construction and operation phases. The predicted change in the groundwater table and resulting drawdown at the end of the construction period in the area of the Wendy and East pits, is a reduction of approximately 1.0 m or more within 800 m of the pits. With respect to groundwater discharge to surface water, discharge to Marie Lake is predicted to be 227 m³/day less at the end of construction compared to baseline conditions. Farley and Gordon lakes are also predicted to change from receiving groundwater to become groundwater recharge features at the end of construction. The loss of groundwater discharge to Farley and Gordon lakes will be mitigated by the return of pumped water from the groundwater interceptor wells. Changes to the groundwater discharge rates for remaining lakes and watercourses are expected to be relatively small (generally less than 86 m³/d) compared to baseline conditions.

During operation, dewatering of the open pit will lower the water table by up to 1 m that extends approximately 1,200 m from the open pit, increasing to more than 10 m within 600 m of the open pit. There are no known groundwater users located within the LAA/RAA and therefore, no water supply wells or groundwater takings that supply potable water within the extent of drawdown. Groundwater drawdowns of greater than 10 m are predicted to occur beneath a small portion of wetlands located north to northwest of the open pit and PDA at the Gordon site. Changes in groundwater flow and discharge to surface water features due to dewatering are predicted for Gordon, Farley, and Marie lakes where the lakes will shift from receiving groundwater under baseline conditions to become groundwater recharge features at the end of the operation phase. For Marie Lake, a reduction in groundwater levels of up to 1 m to the north of the lake compared to baseline condition is predicted, resulting in a reduction in groundwater discharge to the lake by 246 m³/d compared to baseline conditions. The loss of groundwater discharge to Farley and Gordon lakes will be mitigated by the return of pumped water from the groundwater interceptor wells.

Following completion of operation, dewatering of the open pit will cease and water levels will begin to rise within the open pit to a maximum water elevation of 315 m above mean sea level, at the Gordon site which reflects the local groundwater table at closure. The water table is predicted to return to near baseline conditions, except for a small area at the Gordon site between the pit lake and Farley Lake where groundwater levels are predicted to be about 0.5 m lower than baseline. The rate of groundwater discharge to surface water are predicted to return to near baseline rates once the open pits are full and a pit lake has formed.

Residual effects on groundwater quality are predicted as a result of recharge through the historical MRSA and new MRSA with elevated concentrations of parameters above background. Dewatering of the historical



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East and Wendy pits and the open pits will influence groundwater flow patterns during construction and operation and redirect groundwater recharge originating from the historical MRSA to the historical pits and open pits where it will be pumped to a settling pond prior to discharge to the environment. During dewatering of the historical pits and open pit treatment will be implemented, if required, to meet regulatory discharge criteria prior to discharge to the environment. During construction, recharge originating from the historical MRSA are predicted to be redirected from surface water receivers to the open pit.

During operation and closure, groundwater recharge from the MRSA is predicted to be elevated above the drinking water guidelines for nitrate+nitrite, total cyanide, sulphate, aluminum, antimony, arsenic, manganese, sodium, and/or uranium. The predicted groundwater flow pathway of seepage from the MRSA is mainly confined to the PDA with a small portion extending into the LAA until the seepage originating from the MRSA discharges to surface water.

The main surface water receivers of seepage from the MRSA at the Gordon site are Gordon Lake, Farley Lake, and Susan Lake. The effects assessment for groundwater quality was conservative in that attenuation of groundwater quality along the groundwater flow path from the source to the receptor was not considered. No groundwater supply wells are known to be located within the flow pathways of seepage from the MRSA.

Significance of Residual Effects

With mitigation and environmental protection measures, the residual environmental effects on groundwater quantity and quality are predicted to be not significant. Results of the assessment, including characterization and significance determination of residual effects are presented in Appendix A; Table A-1.

6.4 SURFACE WATER

6.4.1 Existing Environment

Most of the lakes within and near the two study areas are shallow (<4 m deep) and do not thermally stratify during the summer. Background water quality generally reflects geochemistry of the Precambrian Shield. Lakes and streams are typically low in dissolved ions (<80 mg/L total dissolved solids), soft (hardness <75 mg/L as calcium carbonate (CaCO₃)), and neutral to slightly acidic. Parameters such as total phosphorus, aluminum, chromium, and iron are naturally elevated (or low in the case of pH) and occasionally do not meet applicable guidelines. Water in the Wendy Pit and East Pit have elevated concentrations of some general parameters relative to background levels, are deep (>70 m), and chemically stratify year-round, suggesting that metal leaching from the exposed pit walls has affected water quality in the pits. Flooding within the region can be triggered by extreme precipitation, rapid snow melt, ice jams, and beaver activity, with peak flows generally occurring during the spring freshet. Beaver activity is extensive within the Gordon site LAA and can produce high water levels in both streams and lakes.

The LAA at the Gordon site is characterized by small lakes and streams, many of which are intermittent and usually flow for short periods in the spring. Muskeg bogs and wetlands are common throughout the LAA at the Gordon site. General flow direction in the Gordon LAA is north to south from Gordon Lake towards Ellystan Lake. Within the LAA, water flows from Gordon Lake to Farley Lake through a constructed



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diversion channel, from Farley Lake to Swede Lake through an approximately 4 km long, beaver dam-impounded stream, and from Swede Lake to Ellystan Lake. Baseline water quality guideline exceedances in the Gordon site LAA include nitrite, fluoride, total phosphorus, total aluminum, total arsenic, total hexavalent chromium, total copper, total iron, and total zinc. These guideline exceedances were generally attributable to local geochemistry and watershed characteristics, including rock outcroppings, beaver impoundments, and muskeg bogs.

6.4.2 Environmental Effects

6.4.2.1 Change to the Environment

The potential environmental effects of the Project on surface water, prior to mitigation, include:

- change in surface water quantity
- change in surface water quality

At the Gordon site, surface water quantity and/or flow may be affected by the following physical activities during construction: site preparation; construction of mine components, and water management facilities; construction of utilities, infrastructure, and other facilities; and construction of water development and control features. Interceptor wells will pump non-contact groundwater from the vicinity of the open pit to Gordon and Farley lakes, and dewatering of the existing pits will also occur in this phase. These changes are anticipated to temporarily increase flows downstream of the PDA. During construction, changes to water quality at the Gordon site are attributed to dewatering of the East and Wendy pits and discharging of groundwater pumped from the groundwater interceptor wells.

During operation, effects on surface water quantity and flow will be from the temporary changes in flows to downstream waterbodies as a result of continued dewatering and the use of interceptor wells for groundwater management, and from temporary and permanent changes in watershed area due to construction within the PDA. At the Gordon Site, flows from the interceptor wells will affect downstream surface water flows in hydraulically connected water bodies by changing historical discharge patterns. Contact water at the site will be gravity-drained towards collection sumps and pumped to the collection pond, changing local drainage patterns, and affecting the quantity and timing of flows in downstream water bodies. Site development and the presence of infrastructure will also affect surface water quantity by reducing infiltration and increasing runoff. During operation, changes to water quality at the Gordon site may result from discharge of groundwater pumped from the groundwater interceptor wells to Gordon and West Farley Lakes and discharge of contact water from the collection pond to West Farley Lake.

During decommissioning, active closure, and post-closure at the Gordon Site, the removal of Project infrastructure and reclamation of associated land will decrease runoff while increasing infiltration. Changes to catchment areas within the PDA are anticipated to remain and surface water runoff will be directed to the open pit. Groundwater interceptor wells will continue to operate throughout this phase until the open pit is filled. Changes to surface water are anticipated before and after the pit is filled and may result in changes to surface water quantity and/or flow in hydraulically connected water bodies. Closure of water management facilities will result in the removal of contact water collection systems and result in changes to surface water



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drainage patterns. The Gordon Lake – Farley Lake diversion channel will remain in place post-closure. Original drainage paths will be restored to the extent possible. During the decommissioning, reclamation, and closure phase, water quality changes may result at the Gordon site from discharge of groundwater pumped from the groundwater interceptor wells, and from overflow from the open pit.

6.4.2.2 Mitigation Measures

The mitigation measures presented below are proposed to avoid or reduce Project-related effects on surface water quantity and flow:

- Limiting construction footprint and disturbed areas (i.e., PDA) to the extent practicable.
- Grading perimeter and access roads of open pits to divert runoff away from the open pits to reduce contact water.
- Maintaining access roads by periodically regrading and ditching to improve water flow.
- Maintaining existing drainage patterns with the use of culverts. Inspection of culverts periodically to remove accumulated material and debris to avoid erosion, flooding, habitat damage, property damage, and mobilization of sediment.
- Collecting runoff and groundwater seepage from underground/open pit dewatering, overburden and ore stockpiles, and MRSA.
- Designing for collection, storage, and reuse of contact water (runoff and seepage), only discharging excess water after reuse and treatment, as necessary.
- Balancing timing of recycling from sources to relieve storage pressures on contact water collection ponds.
- Constructing and using perimeter runoff and contact water collection ditches to collect overland flow and toe seepage, intercept shallow groundwater flow, and divert non-contact water away from the Project components.
- Installing groundwater interceptor wells between the open pit and Gordon and Farley lakes to mitigate groundwater inflow to the pit (thereby reducing volume of contact water) and to reduce the potential dewatering of Gordon and Farley lakes.
- Pumping excess water to collection ponds as needed.
- Designing contact water collection ditches to convey the 1:25-year storm event and with positive gradients to limit standing water and maintain positive flow.
- Designing contact-water collection ponds with active water storage that considers ice thickness during winter.



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- Configuring pond inlet and outlet structures to reduce inlet velocity and scour and meet sedimentation requirements.
- Refilling open pit at closure to return groundwater levels to baseline conditions.
- Implementing Project-specific environmental management and monitoring programs including a Surface Water Monitoring and Management Plan, Groundwater Monitoring Plan, Erosion and Sediment Control Plan, Beaver Dam and Beaver Activity Management Plan, and development of Emergency Response and Spill Prevention and Contingency Plans for implementation in the event of an accident or malfunction.

Additional mitigation measures to avoid or reduce potential effects to surface water quality, beyond those already described to avoid or reduce potential effects on surface water quantity, at the Gordon site are:

- Design of water management facilities to collect and treat (as required) contact water such that effluent meets applicable federal and provincial regulatory requirements, including the authorized limits of deleterious substances specified in Schedule 4 of the MDMER (amended), prior to discharge to the environment.
- Transporting domestic wastewater to the sewage treatment plant at the MacLellan site.
- Aerating East and Wendy pits to encourage precipitation of elements that form oxides (e.g., iron oxide) and to break down thermal stratification prior to dewatering.
- Aerating groundwater from groundwater interceptor wells to encourage precipitation of elements that form oxides (e.g., iron oxide) and to increase dissolved oxygen concentrations prior to discharge to Gordon and Farley lakes.
- Dust suppression measures for exposed ground areas of the PDA, to reduce atmospheric deposition to surface water.
- Sediment and erosion control measures during construction to limit the release of total suspended solids and turbidity.
- Expediting the re-filling of open pits during closure to reduce exposure of pit walls.
- Treating and handling of building material that is used in water to avoid the release or leaching of substances that would reduce water quality.

6.4.2.3 Residual Effects

Surface Water Quantity

At the Gordon site, the mean annual flows at inlets to Gordon Lake and Farley Lake are predicted to decrease by 29% and 27%, respectively, due to changes in catchment areas and runoff due to the Project infrastructure. These changes persist throughout future mine phases into post-closure.



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During construction at the Gordon Site, the mean annual flow at the outlet of Gordon Lake (QF03) is predicted to increase by 7% and is primarily due to the addition of pumped flows from the interceptor wells. Farley Creek (QF05) is anticipated to experience an increase in mean annual flows of 66% due to the addition of dewatering flows from the pits. Conditions downstream of Farley Lake are anticipated to experience similar monthly patterns, but reduced or attenuated effects due to the larger waterbodies with higher flows. During operation, mean annual flow in Farley Creek is anticipated to increase 43%, with similar reduced/attenuated flows downstream of the PDA. During decommissioning and active closure, mean annual flow is anticipated to decrease by 6% and during post-closure by 8%.

Ice regime at the Gordon site is likely to be affected within (and downstream of) Farley Lake due to the additional flows from the dewatering of the pits and the interceptor wells during the construction phase. These additional flows are anticipated to have temperatures that vary from the historical baseline surface water temperatures.

Surface Water Quality

Water quality of each potential source of discharge to the receiving environment at the Gordon site is predicted to be below the short-term applicable water quality guidelines and below Schedule 4 effluent limits of the MDMER for the Expected Case and Upper-Case scenarios.

At the Gordon site, fluoride and phosphorus were identified as POPCs because concentrations are predicted to exceed modelled baseline by more than 20% and applicable long-term water quality guidelines in modelled waterbodies. The maximum fluoride concentrations in the Gordon site LAA are expected to be 0.19 mg/L in West Farley Lake during the construction phase, which is approximately 1.6 times the long-term applicable guidelines and 2.5 times Expected Baseline fluoride concentration. The maximum phosphorus concentration in the Gordon site LAA is expected to be 0.027 mg/L in West Farley Lake for a single month during construction, which is approximately 1.1 times higher than the long-term applicable guideline and 1.2 times higher than the Expected Baseline phosphorus concentration. For the Gordon site, Project residual effects associated with the identification POPCs are predicted to be limited to the LAA and in West Farley Lake (for phosphorus) and Gordon Lake, West Farley Lake, East Farley Lake, and Swede Lake (for fluoride).

Significance of Residual Effects

The Project will result in changes to surface water quantity within the Gordon site LAA. Project-induced changes to surface water quantity have the potential to cause adverse effects to fish through changes in fish habitat. The Project will result in changes to surface water quality within the Gordon site LAA. Project-induced changes to surface water quality have the potential to cause adverse effects to fish and other aquatic biota exposed to elevated concentrations of the identified POPCs.

With mitigation and environmental protection measures, the residual environmental effects on surface water quantity and quality are predicted to be not significant and the predicted changes are not expected to result in community (i.e., species composition and relative abundance) or population-level effects (i.e., survival, growth, or reproduction) to fish and aquatic life. Results of the assessment, including characterization and significance determination of residual effects are presented in Appendix A; Table A-1.



6.5 FISH AND FISH HABITAT

6.5.1 Existing Environment

Most of the lakes near the Gordon site are shallow (less than 4 m deep) and do not stratify during the summer. Background surface water quality generally reflects geochemistry of the Precambrian Shield. Lakes and streams are typically low in dissolved ions, soft, and neutral to slightly acidic in pH. Some parameters (e.g., dissolved oxygen, pH, total phosphorus, aluminum, chromium, and iron) are naturally elevated and occasionally do not meet water quality guidelines. Common large-bodied species include northern pike, walleye, lake whitefish (*Coregonus clupeaformis*), white sucker (*Catostomus commersoni*), yellow perch (*Perca flavescens*), and burbot (*Lota lota*). Common small-bodied fish species include emerald shiner (*Notropis atherinoides*), spottail shiner (*Notropis hudsonius*), brook stickleback and slimy sculpin (*Cottus cognatus*). Northern pike, walleye and lake whitefish are the most commonly angled fish in the area. One aquatic species at risk, the western Hudson Bay populations of lake sturgeon (*Acipenser fulvescens*), is present in the Hughes River. No other species at risk are expected within the LAA. Lake sturgeon is classified as “endangered” by the Committee on the Status of Endangered Wildlife in Canada.

Lakes at the Gordon site are generally shallow, with an average depth of <5 m. Emergent, floating, and submergent vegetation is present and is typically the most abundant cover source for fish in these lakes. Most lakes within the LAA at the Gordon site provide spawning, rearing, and overwintering habitat for large-bodied and small-bodied fish species. Streams at the Gordon site are generally small (1.6 m to 5.2 m wide) with low gradients (<1%) and substrates dominated by fines and organic material. Cover types include aquatic and overhanging vegetation, debris, and boulders.

A total of 17 fish species are known to occur in the lakes and streams near the Project. Small-bodied fish species are most prevalent in streams and small, shallow lakes including: brook stickleback, ninespine stickleback (*Pungitius pungitius*), log perch (*Percina caprodes*), trout perch (*Percopsis omiscomaycus*), emerald shiner, spottail shiner, longnose dace (*Rhinichthys cataractae*), lake chub (*Couesius plumbeus*), and slimy sculpin. Large-bodied fish species are more prevalent in larger, deeper lakes and include northern pike, walleye, yellow perch, lake whitefish, burbot, cisco (*Coregonus artedii*), white sucker, and longnose sucker (*Catostomus catostomus*). Larger lakes, such as Cockeram Lake, typically support a greater diversity of fish and fish habitat than smaller lakes in the Project area. Northern pike are the most widespread large-bodied species in the lakes of the Project area, while brook stickleback are the most widespread small-bodied species in the lakes and streams. Northern pike, brook stickleback, and white sucker were the most widely distributed fish species in lakes at the Gordon site.

Measured levels of metals in fish tissue were generally low and below guideline concentrations for protection of aquatic life and human consumption. Sediments at the sample sites in the LAA at the Gordon site were composed largely of silt and clay with metal concentrations generally below guidelines. Some exceedances were observed at Marnie Lake, Farley Lake/Creek and Susan Lake.



6.5.2 Environmental Effects

6.5.2.1 Change to the Environment

The potential environmental effects of the Project on fish and fish habitat prior to mitigation, include:

- change in fish habitat
- change in fish health, growth, or survival

In the Gordon site LAA, during the construction phase, effects on fish and fish habitat include alteration of surface flows from changes to watershed boundaries and from dewatering, and changes in physical habitat due to Project infrastructure (i.e., diversion channel realignment between Gordon and Farley lakes). During the operation phase, changes in fish habitat will result from changes to groundwater, water withdrawals and discharges. During decommissioning/closure, changes to fish habitat will result from alterations in surface flows when groundwater fills the open pits, and changes in habitat area.

At the Gordon site, changes to fish health, growth, and survival will result from releases of sediment, from dewatering of the East Pit and Wendy Pit during the construction phase, from discharge of groundwater pumped from the groundwater interceptor wells, from discharge of contact water during the construction and operation phase, and from overflow from the open pit to Farley Lake during the post-closure phase.

6.5.2.2 Mitigation Measures

Most of the mitigation measures to reduce Project-related effects on fish habitat are related to avoidance measures and to the mitigation measures proposed to reduce Project-related effects on surface water quantity (Section 6.4.2.2, above). Additional mitigation measures relating to availability of habitat area are:

- Sizing new culverts to convey the 1:100-year flood and using open-bottom structures where practical to maintain fish habitat values and fish passage.
- New road crossings will be sized and installed following Manitoba Infrastructure guidelines (DFO and MNR 1996).
- Designing open pit outlets so they are impassable to fish, to discourage fish from colonizing open pits in post-closure.
- Offsetting unavoidable habitat losses as described in the Fish Habitat Offsetting Plan (federal EIS Chapter 23).

Mitigation measures to avoid or reduce Project-related changes in fish habitat, including those potentially due to changes in groundwater and surface flows, at the Gordon site are:

- Constructing a new diversion channel to convey surface run-off from Gordon Lake to Farley Lake.

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- Trucking potable water to the Gordon site from the MacLellan site to limit the fresh-water withdrawal requirements at the Gordon site to those needed for fire suppression, safety showers, and truck washes.
- Constructing and operating groundwater interceptor wells on either side of the open pit to capture and return groundwater and surface water to Gordon and Farley Lakes that would otherwise flow into the open pit.
- Directing contact water from the collection ditches around the MRSA, overburden stockpile, and mine infrastructure to the open pit during closure to reduce the filling period.
- Continuing to operate the groundwater interceptor wells during closure while the open pit fills with water and progressively reducing their pumping rates until the water level in the open pit reaches the elevation of the surrounding groundwater table.

Additional mitigation measures to reduce potential effects of the Project to fish habitat, including standard mitigation measures identified in DFO's "Measures to Protect Fish and Fish Habitat" (DFO 2019), are:

- Limit disturbance areas around waterbodies to maintain existing riparian vegetation and promote recovery of riparian vegetation by marking buffer zones around sensitive habitats and work areas; using existing access routes; reducing soil compaction by using weight-distributing materials under machinery.
- Maintain fish passage by avoiding obstructing watercourses or otherwise interfering with fish movement.

Most of the mitigation measures to reduce Project-related effects on fish health, growth, or survival are the same as those proposed to reduce Project-related effects on surface water quality (Section 6.4.2.2). Mitigation measures to reduce potential effects of changes in surface water quality on fish health, growth, or survival are:

- Grading perimeter and access roads to divert runoff away from the open pits and fish-bearing waterbodies.
- Maintaining access roads by periodically regrading and ditching to improve water flow and reduce erosion.
- Using dust suppression measures (Section 6.1.2.2) for exposed ground areas within the PDA during dry periods as necessary to reduce dust deposition to surface waters.
- Constructing non-contact water ditches upslope of overburden stockpiles, MRSAs, ore stockpiles, mine infrastructure and the TMF to reduce contact water volumes.
- Constructing contact water collection ditches around the MRSAs, overburden stockpiles, and ore stockpiles to convey the 1:25-year storm event to collection ponds.



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- Constructing contact water collection ponds to contain (without discharge) run-off from a 1:100-year storm event with active storage that considers maximum ice thickness in winter.
- Designing collection pond inlets and outlets to reduce water velocities, scour (erosion of sediment) and pond stratification potential (chemical or thermal).
- Maintaining culverts in access road crossings to remove accumulated material and debris to reduce erosion, flooding, and sediment mobilization.
- Implementing sediment and erosion control measures during construction to limit the release of total suspended solid and turbidity in lakes and streams.
- Implementing Project-specific environmental management and monitoring programs including:
 - Surface Water Monitoring and Management Plan (federal EIS Chapter 23, Section 23.5.5).
 - Groundwater Monitoring Plan (federal EIS Chapter 23, Section 23.5.4).
 - Explosives Management Plan (federal EIS Chapter 23, Section 23.5.10).
 - Erosion and Sediment Control Plan (federal EIS Chapter 23, Section 23.5.13).
 - Wildlife Monitoring and Management Plan (federal EIS Chapter 23, Section 23.5.14).
 - Emergency Response and Spill Prevention and Contingency Plans (federal EIS Chapter 23, Section 23.5.1), which will include the measures listed in Measures to Protect Fish and Fish Habitat (DFO 2019).
- Implementing soil covers and vegetation to reduce infiltration into the MRSA by increasing evapotranspiration capacity at closure.
- Filling the open pits at closure with contact water to reduce the duration of pit wall exposure and to return groundwater levels to baseline conditions.

Mitigation measures to reduce potential effects of changes in surface water quality on fish health, growth, or survival that are specific to the Gordon site are:

- Constructing a new diversion channel prior to the decommissioning of the existing diversion channel between Gordon and Farley lakes to maintain water levels.
- Aerating the East and Wendy pits to encourage precipitation of elements that form oxides (e.g., iron oxide), to break down of thermal and chemical stratification, and to increase dissolved oxygen concentrations prior to dewatering.
- Installing and operating groundwater interceptor wells between the open pit and Gordon Lake and Farley Lake to maintain water levels in Gordon and Farley lakes.



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- Aerating groundwater from the interceptor wells in collection ponds to encourage iron precipitation and increase dissolved oxygen concentrations prior to discharge to Gordon Lake and Farley Lake.
- Transporting domestic wastewater to the sewage treatment plant at the MacLellan site.

Additional mitigation measures to reduce potential effects of the Project to the health, growth, or survival of fish and aquatic biota are:

- Requiring heavy machinery working near water to be kept in good working condition, to be re-fueled no closer than 50 m from any waterbody or watercourse, and to be filled with biodegradable hydraulic fluids.
- Identifying and flagging riparian zones within which heavy machinery is prohibited from entering.
- Limiting in-water works to outside of the northern Manitoba Restricted Activity Timing Windows for the Protection of Fish and Fish Habitat (DFO 2020b) as practical.
- Isolating in-water work areas and conducting fish rescues, including Wendy and East pits, the Diversion Channel, and other locations where instream construction will be required.
- Implementing runoff, erosion, and sediment control measures to reduce the amount of water available to become sediment laden, the amount of sediment that is mobilized through erosion, and the amount of sediment that is conveyed to waterbodies. Additional details are available in Erosion and Sediment Control Plan as described in the EIS (Section 23.5.13, Chapter 23). The final plan will include the measures listed in the Measures to Protect Fish and Fish Habitat (DFO 2019).
- Monitoring the effectiveness of construction management plan mitigation measures during construction activities near water, including total suspended solids and/or turbidity and comparing measured values to MWQSOG (MWS 2011) and CCME guidelines (CCME 2002).
- Using a heat exchanger, where required, to heat or cool water from the East and Wendy pits prior to discharge to Farley Lake during construction and water from the groundwater interceptor wells prior to discharge to Gordon and Farley lakes to maintain the temperature regime in both lakes so as not to negatively affect primary and secondary production rates and alter important behavioral cues for fish (i.e., spawning and overwintering cues).
- Installing screens on the water intakes that are sized using DFO's "Interim Code of Practice: End of Pipe Fish Protection Screens for Small Water Intakes in Freshwater" (DFO 2020a). The screens will be sized based on the weakest swimming fish species in the Keewatin River (burbot, an anguilliform swimming species) and Farley Lake (white sucker and yellow perch, two subcarangiform swimming fish species).
- Limiting the size, timing, and setback distances of blasting charges to avoid percussive injuries to fish or damage to incubating eggs. Blasting protocols tailored to the site and its fish species assemblages will be developed during Project permitting, using guidance outlined in the "Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters" (Wright and Hopky 1998).



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- Establishing and enforcing a worker code-of-conduct for employees brought into work at the LLGP that would limit potential over-fishing of lakes, stream, and rivers in the Project area (e.g., restricting fishing in lakes of streams of a specific size, those used by local Indigenous communities for subsistence or traditional purposes, or determined to contain already depressed populations by MCC).

6.5.2.3 Residual Effects

The main adverse residual environmental effect on fish habitat is direct losses of fish habitat and changes to water quality affecting fish health and survival. For effects to fish habitat, with the development of the Fish Habitat Offsetting Plan, as described in the federal EIS (Chapter 23, Section 23.5.15), no net loss to habitat is expected. The re-alignment of the existing diversion channel at the Gordon site will result in the harmful alteration, disruption, or destruction of fish habitat. Alamos will include a new habitat enhanced diversion channel as part of its application for a paragraph 34.4(2)(b) and 35(2)(b) *Fisheries Act* Authorization from DFO. Dewatering of East and Wendy pits at the Gordon site may result in a harmful alteration, disruption, or destruction of fish habitat due to the presence of fish. However, the pits are artificial habitats and the fish are isolated from other populations. Alamos will continue to discuss the pits with DFO and will include offsetting for the pits in its application for a paragraph 34.4(2)(b) and 35(2)(b) *Fisheries Act* Authorization, if required.

For effects to fish health and survival, modelling was used to predict water quality at various nodes in lakes and streams at the Gordon site. Two parameters of potential concerns (POPCs) were predicted for the “expected case”, fluoride and phosphorus. Water quality modelling results indicated that the short-term (three month) increase in total phosphorus concentrations during construction and two-fold increase in inorganic nitrogen during operation would not be expected to result in eutrophication of West Farley Lake. For fluoride, the maximum predicted concentrations at the Gordon site were more than 2.5 times lower than the proposed toxicity benchmark of 0.5 mg/L for fish and aquatic biota; therefore, adverse effects on fish health, growth, or survival are not expected.

Significance of Residual Effects

With the planned mitigation and environmental protection measures, the residual environmental effects on fish and fish habitat are predicted to be not significant. Results of the assessment, including characterization and significance determination of residual effects are presented in Appendix A; Table A-1.

6.6 VEGETATION AND WETLANDS

6.6.1 Existing Environment

A general description of existing vegetation and wetlands in the Project RAA is provided in the MacLellan site EAP. The description includes plant species of conservation concern documented in the region and those species of interest to Indigenous communities that were recorded in the RAA.



6.6.2 Environmental Effects

6.6.2.1 Change to the Environment

The potential environmental effects of the Project on vegetation and wetlands prior to mitigation, include:

- change in landscape diversity
- change in plant community diversity
- change in plant species diversity
- change in wetland function

During construction, changes to vegetation and wetlands will occur during site preparation, water development and control, and through emissions, discharges, and wastes. During operation, effects to vegetation and wetlands are not anticipated, except from water management and emissions, discharges and wastes since no additional clearing is anticipated in this phase. Decommissioning of the Gordon site will occur within existing disturbance and will not result in greater fragmentation, and thus not negatively interact with vegetation and wetlands. Reclamation at the Gordon site may positively affect landscape, community and species diversity and wetland functions by reclaiming to native upland or native wetland state in some areas.

6.6.2.2 Mitigation Measures

The mitigation measures presented below are proposed to avoid or reduce Project-related effects on vegetation and wetlands at the Gordon site:

- Native areas disturbed by the Project will be covered and reseeded using a native upland seed mix for rehabilitation and to reduce infiltration into the MRSA by increasing evapotranspiration capacity at closure.
- Equipment will arrive at Project site clean and free of soil and vegetative debris. Equipment will be inspected and if deemed to be in appropriate condition, will be approved for use and identified with a suitable marker or tag. Equipment that does not arrive at the Project site in appropriate condition will not be allowed on the construction footprint until it has been cleaned, re-inspected and deemed suitable for use.
- Sensitive areas, such as wetlands, will be buffered by 30 m and clearly marked prior to clearing.
- Silt fencing will be installed and maintained to reduce entry of deleterious substances to wetlands or waterbodies as described in the federal EIS (Chapter 23).
- Vegetation clearing will occur during dry and frozen conditions, when possible.



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- A protective layer such as matting or biodegradable geotextile and clay ramps or other approved materials will be used between wetland root/seed bed and construction equipment if ground conditions are encountered that create potential for rutting, admixing or compaction.
- A native seed mix will be used to assist in reducing invasive plant species spread and establishment as well as for erosion control on exposed soils.
- Topsoil and subsoil piles will be monitored for invasive plant species growth during construction and corrective measures (e.g., spraying, mowing, hand-pulling) will be implemented to avoid growth and establishment.
- Certified No.1 seed will be used to reseed areas, unless Certified No. 1 seed is not available for selected reclamation species (i.e., native species).
- Unless a certificate of weed analysis can be provided, construction material sources used for supplies of sand, gravel, rock, straw, and mulch will be visually inspected to determine whether they are free of invasive species propagules to the extent possible. If sources are suspected as having invasive species propagules, they will be sampled, and lab analyzed to determine whether they meet the requirements of the responsible regulatory agency prior to obtaining or transporting material to the Project site. If sampling cannot be completed, post construction monitoring for invasive species will be completed.
- If pesticide use is required, a permit will be obtained under *The Environment Act* (Manitoba).
- Known occurrences of SOCC will be avoided. If avoidance of plant SOCC is not possible, seed collection or transplant of the plant will be considered.
- Broad-spraying herbicide within 30 m of plant species or ecological communities of conservation concern, wetlands or waterbodies will not be conducted. Spot spraying, wicking, mowing, or hand picking are acceptable measures for control of regulated weeds in these areas.
- Dust suppression, as described in Section 6.1.2.2 above will be applied.
- Sediment fencing and/or other appropriate measures will be used to prevent erosion and siltation into adjacent wetlands as described in the federal EIS (Chapter 23).
- Grading will be directed away from wetlands, where possible.
- The removal of vegetation in wetlands will be reduced to the extent possible.
- Ground level cutting/mowing/mulching of wetland vegetation instead of grubbing, will be conducted where possible.
- Grading within wetland boundaries will be reduced unless required for site specific purposes.
- Cross drainage will be maintained to allow water to move freely from one side of the road to the other in areas of permanent or temporary access roads.



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- Frost packing, snow, ice, geotextile swamp mats or access mat will be used for access through wet areas.

6.6.2.3 Residual Effects

For residual effects on landscape diversity, it was determined that construction of the Gordon site will result in an expansion of the existing developed area, with no new habitat patches anticipated to be created in or around this site, resulting in a temporary adverse reduction in habitat patch area. At closure, there is no loss of large intact patches from the LAA. During reclamation, the Project will result in an increase in patch area and a reduction in patch perimeter.

For residual effects on community diversity, mitigation and reclamation activities will result in an increase in reclaimed native upland of 156.7 ha, an increase in water of 15.5 ha, and a decrease in wetland plant communities of 66.5 ha in the LAA of the Gordon site. Change in plant community diversity will largely occur once during the construction and operation; however, indirect effects to plant communities from dust deposition will occur continuously, resulting in overall adverse effects to community diversity during construction that will last through operation.

For residual effects on species diversity, construction at the Gordon site is anticipated to directly affect one known plant SOCC occurrence, boreal locoweed (*Oxytropis borealis*). Shrubby willow may also be indirectly affected by open pit dewatering during construction and operation. Development of the Gordon site is also predicted to adversely affect species of traditional use during construction and operation.

For residual effects on wetland function, construction is expected to result in a direct loss of 660.0 ha of wetland area as a result of clearing activities and a loss of 66.5 ha of wetland function and services at the Gordon site.

Groundwater drawdown during construction and operation at the Gordon site may alter the class, plant species composition and decomposition rates of wetlands. Dewatering may also result in the thawing of permafrost within the LAA of the Gordon site, reducing carbon sequestration. The results overall indicate a direct and indirect reduction to wetland function; however, loss of a type of wetland function is not expected in the RAA.

Significance of Residual Effects

With mitigation and environmental protection measures, the residual environmental effects on vegetation and wetlands are predicted to be not significant. Results of the assessment, including characterization and significance determination of residual effects are presented in Appendix A; Table A-1.



6.7 WILDLIFE AND WILDLIFE HABITAT

6.7.1 Existing Environment

A general description of wildlife in the Project RAA is provided in the MacLellan site EAP. Information is provided on mammal, bird, and amphibian species as well as species at risk. Types of wildlife habitat are also described in the document.

6.7.2 Environmental Effects

6.7.2.1 Change to the Environment

The potential environmental effects of the Project on wildlife and wildlife habitat prior to mitigation, include:

- change in wildlife habitat
- change in wildlife mortality risk
- change in wildlife health

During the construction phase, effects on wildlife and wildlife habitat are related primarily to site preparation activities causing habitat loss, habitat disturbance, sensory disturbance and health effects from emissions, discharges, and wastes, and mortality risks related to vehicle transportation. Construction related emissions, discharges, and wastes are not anticipated to be at levels that would be lethal to wildlife or that would affect wildlife mortality risk.

During the operation and the decommissioning/closure phases, it is anticipated that activities and infrastructure will be located on cleared, disturbed land and that no wildlife will be present, resulting in no additional effects on wildlife habitat. The increase in traffic due to ore hauling to stockpile sites and the ore processing plant at the MacLellan site during operation will result in a greater potential for wildlife/vehicle collisions and mortality along the access roads and PR 391. Emissions, discharges, and wastes during these phases is also anticipated to be the primary pathway of effects on wildlife health and wildlife habitat; however, exposures to wildlife are not anticipated to be at levels that would be lethal; therefore, no changes are anticipated to wildlife mortality risk during these phases.

6.7.2.2 Mitigation Measures

The mitigation measures presented below are proposed to avoid or reduce Project-related effects on wildlife and wildlife habitat at the Gordon site:

- Design for limitation of construction footprint (i.e., PDA) to the extent possible.
- Design for use of down-lighting, a technique of directing night lighting downward, to reduce light effects on wildlife adjacent to the PDA.



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- Design for maintenance of a 30 m naturally vegetated buffer around wetlands, waterbodies, and watercourses.
- Design for restriction of unauthorized access to habitat adjacent to the PDA.
- Design for provision of low areas in the ploughed snowbanks of access and on-site roads, where practical, to facilitate wildlife movements across and out of road corridors.
- Design for scheduling vegetation clearing and site preparation activities outside the breeding period for migratory birds (Zone C7; May 7 to August 7; ECCC 2019). If activities that could result in risk of harm cannot be avoided, Alamos will develop and implement a Project-specific Wildlife Monitoring and Management Plan that outlines how risk of harm will be managed in accordance with ECCC guidance (federal EIS Chapter 23). This plan would be developed in liaison with ECCC and federal agencies.
- Flag environmentally sensitive areas (e.g., seeps and springs, mineral licks, dens, roosts, stick nests, hibernacula) prior to clearing and construction, and evaluation of the features for additional mitigation measures (e.g., setbacks).
- Retain actual or potential habitat trees where safe and technically feasible to do so. If removal is required, removal activities will be scheduled, to the extent practical, outside the core maternity roosting season for bats (May 1 to August 31; Fenton and Barclay 1980; Barclay 1982, 1984) and breeding season for birds (Zone C7; May 7 to August 7; ECCC 2019). If habitat tree removal or general tree clearing is required during the maternity roosting period, a qualified biologist will review the trees to make a determination on occupancy before removal. This measure will also reduce the risk to other species that use trees for denning or shelter (e.g., American marten).
- Maintain vegetation cover along the boundaries of high activity areas (e.g., access roads) to reduce sensory (noise and visual) disturbance.
- Report the discovery of nests or other animal dwellings (e.g., lodges, dens) to Alamos, and appropriate action or follow-up will be guided by the Wildlife Monitoring and Management Plan (federal EIS Chapter 23). Report to the Wildlife and Fisheries Branch of the Department of Agriculture and Resource Development for direction on follow-up actions in necessary.

The mitigation measures presented below are proposed to avoid or reduce Project-related effects on wildlife and mortality at the Gordon site:

- Design for scheduling vegetation clearing and site preparation activities outside the breeding period for migratory birds (Zone C7; May 7 to August 7; ECCC 2019). If activities that could result in risk of harm cannot be avoided, Alamos will develop and implement a Project-specific Wildlife Monitoring and Management Plan that outlines how risk of harm will be managed in accordance with ECCC guidance (federal EIS Chapter 23). This plan would be developed in liaison with ECCC.
- Flag environmentally sensitive areas (e.g., amphibian breeding ponds, dens, roosts, stick nests, hibernacula) prior to clearing and construction, and evaluation of the features for additional mitigation measures (e.g., setbacks).

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- Report the discovery of nests or other animal dwellings (e.g., lodges, dens) to Alamos, and appropriate action or follow-up will be guided by the Wildlife Monitoring and Management Plan (federal EIS Chapter 23, Section 23.5.15). Report to the Wildlife and Fisheries Branch of the Department of Agriculture and Resource Development for direction on follow-up actions, as necessary.
- Retain actual or potential habitat trees where safe and technically feasible to do so. If removal is required, removal activities will be scheduled, to the extent practical, outside the core maternity roosting season for bats (May 1 to August 31; Fenton and Barclay 1980; Barclay 1982, 1984) and breeding season for birds (Zone C7; May 7 to August 7; ECCC 2019). If habitat tree removal or general tree clearing is required during the maternity roosting period, a qualified biologist will review the trees to make a determination on occupancy before removal. This measure will also reduce the risk to other species that use trees for denning or shelter (e.g., American marten).
- Implement road safety measures such as speed limits and signage to reduce the chance for wildlife collisions both on-site and between sites.
- Report wildlife encounters and problem wildlife concerns or sightings to Alamos and appropriate action or follow-up will be guided by the Wildlife Monitoring and Management Plan.
- Follow best management practices for general site housekeeping to reduce wildlife attraction (e.g. food and chemical storage, prompt removal of roadkill).
- Include wildlife awareness training during site orientation to reduce the risk of human-wildlife conflict.
- Control site access by resource users during post-closure.

The mitigation measures presented below are proposed to avoid or reduce Project-related effects on wildlife health at the Gordon site:

- Project infrastructure and facilities designed to avoid sensitive areas (e.g., watercourses, important habitat types) to the extent possible, within watershed boundaries, and PDA reduced to the extent practical.
- Design and maintenance for control of fugitive dust emissions from roads, material handling, and storage areas/stockpiles and from equipment emissions as described Section 6.1.2.2.
- Design for administrative controls, including a no idling policy to reduce emissions from vehicles and mobile equipment.
- Design for adherence to applicable Transport Canada emission requirements for new mobile equipment on-site.
- Design for use of perimeter berms and runoff and contact-water collection ditches as described in the federal EIS (Chapter 9, Section 9.4.1.3 and Chapter 8, Section 8.4.3.2).
- Design for fuel storage in approved above ground storage tanks equipped with secondary containment systems in accordance with federal and provincial regulation and standards.



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- Design of sewage treatment and water management facilities to treat effluent to levels that will meet applicable federal and provincial guidelines of toxicity.
- Dispose and handle waste oils, fuels, and hazardous waste as recommended by the suppliers and/or manufacturers in compliance with federal, provincial, and municipal regulations.
- Bird deterrents, if required, to keep migratory birds from using the collection pond during construction and operation and/or the open pit during closure.

6.7.2.3 Residual Effects

Wildlife Habitat

Residual effects on wildlife habitat during the construction phase are related to the direct loss or alteration of habitat within the LAA. Species that occupy disturbed and rocky habitats, such as common nighthawk, are most likely to be affected by the alteration of developed land, whereas birds, furbearers and moose are most likely to be affected following the loss of the terrestrial and wetland habitats. An indirect loss or alteration of wildlife habitat is also expected through sensory disturbance, edge effects, and altered wetland function that can result in habitat avoidance and reduced habitat effectiveness for wildlife, including migratory birds, SAR and SOCC, moose, and furbearers, in areas adjacent to the PDA.

During the operation phase, residual effects on wildlife habitat are related to the indirect loss or alteration of wildlife habitat through sensory disturbance resulting in habitat avoidance and reduced habitat effectiveness for wildlife in areas adjacent to the PDA, as described above during the construction phase. Chronic sensory disturbance during mining operation will terminate following completion of operation phase. Increased traffic volumes associated with the Project may increase the existing level of indirect effects to wildlife (i.e., avoidance) along PR 391 and the Gordon site access road, but effects are not expected to extend far beyond the PDA. The effects to wildlife resulting from sensory disturbance are expected to be similar to those described above during the construction phase. Wildlife occupying the LAA are already subject to some degree of altered habitat effectiveness and it is expected that sensory disturbance from the Project will temporarily increase the degree of altered habitat effectiveness causing some wildlife species to potentially avoid the portions of the LAA or relocate to undisturbed areas.

During the decommissioning/closure phase, potential Project-related environmental effects for a change in habitat, both direct and indirect, are largely positive, with the exception of the removal of mine infrastructure which may adversely affect species such as barn swallow that rely on anthropogenic structures for nesting. There will be a long-term benefit to wildlife and wildlife habitat compared to baseline conditions following reclamation and closure of the MacLellan site.

With the implementation of the proposed mitigation measures, the overall effect on wildlife habitat is anticipated to be low in the construction and operation phases, resulting in a <10% and <5% change in wildlife habitat and SAR and SOCC habitat in the LAA, respectively.



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Wildlife Mortality Risk

Residual effects on wildlife mortality are largely related to site preparation activities during the construction phase, including vegetation clearing and earthworks. During construction, there is potential for increased mortality risk to small mammals and amphibians due to their limited mobility, risks to overwintering amphibians and mammals, as well as increased risk of vehicle-related wildlife mortality.

During operation, effects to wildlife mortality risk are largely related transportation of ore to on-site stockpiles and to the mill at the MacLellan site and other Project-related traffic. Increased mortality risk due to traffic is anticipated to be short-term as the Gordon site will only be operational for six years. An increase in mortality risk is also possible where the trapping of problem beavers at water control structures is required, potential for bird collisions with towers and guy wires, and human-wildlife conflicts from animals attracted to wastes generated at the site (e.g., bears).

During the decommissioning/closure phase of the Project, activities are expected to have similar residual effects as those described above for the construction phase. The closure phase and post-closure activities are expected to have more enduring effects, primarily as it relates to the indirect mortality of wildlife resulting from increased access by predators to the site such as wolves and humans to gain access to prey species. Given that the Project will not result in increased linear features or create new access to sites, residual incremental effects are deemed to be low.

SAR and SOCC are not uniquely susceptible to a change in mortality risk during all project phases in comparison to other species.

Wildlife Health

Residual effects on wildlife health during the construction phase are associated with air emissions (i.e., combustion products, rock dust) from Project activities (e.g., vehicular traffic). With the implementation of the proposed mitigation measures, the residual effect on wildlife health resulting from fugitive dust escaping into the environment is expected to be low. During operation, residual effects on wildlife health are expected to increase with the increase in air emissions produced during operation activities. Air emissions will be continuous through operation and some heavy metals contained in rock dust are known to be persistent in the environment, and potentially toxic to wildlife. With the implementation of mitigation measures (e.g., dust control), the residual effects of operation of the Project on wildlife health at the site is expected to be low. Based on results from the ecological risk assessment, the overall residual effect on wildlife health is anticipated to be negligible to low.

During decommissioning/closure, residual effects on wildlife are expected to be similar to those described above during the construction and operation phase. SAR and SOCC and migratory birds are not uniquely susceptible to a change in wildlife health during the project phases in comparison to other species.



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Significance of Residual Effects

With mitigation and environmental protection measures, the residual environmental effects on wildlife and wildlife habitat are predicted to be not significant. Results of the assessment, including characterization and significance determination of residual effects are presented in Appendix A; Table A-1.

6.8 LABOUR AND ECONOMY

6.8.1 Existing Environment

A description of labour and economy within the Project RAA is provided in the MacLellan site EAP. Information is provided on population, industry, gross domestic product (GDP), employment, education, and income in the RAA.

6.8.2 Environmental Effects

6.8.2.1 Change to the Environment

The potential environmental effects of the Project on labour and economy prior to mitigation, include:

- change in regional labour force
- change in regional business
- change in regional economy

Demand for labour and regional expenditures are the primary pathways through which the Project may affect labour and economy. Project demand for labour has the potential to both beneficially and adversely affect local and regional labour forces. Beneficial effects include increases in local employment (direct, indirect, and induced) during all phases. Adverse effects primarily relate to decreased demand for labour as the Project transitions from operation into and through decommissioning/closure, resulting in loss of direct employment. Project spending has potential to both beneficially and adversely affect local and regional businesses. Beneficial effects include increases in business revenue. Potential adverse effects of Project spending on regional businesses primarily relate to increased demand for local labour, goods, and services, which can lead to labour scarcity and increased labour costs. Project spending will result in overall increased economic activity (i.e., GDP) in the LAA and RAA. The Project will also pay property taxes, or provide grants in lieu, to the municipality of Lynn Lake and contribute to provincial and federal government revenues through taxation on labour, goods and services.

6.8.2.2 Mitigation Measures

The mitigation measures presented below are proposed to avoid or reduce adverse Project-related effects and to enhance beneficial effects on labour and economy, to the extent possible:



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- Inform residents and Indigenous communities of job and procurement opportunities during all Project phases and implement a policy of local hire where priority is given to the workers from the LAA, followed by other parts of the RAA, other parts of Manitoba, and other parts of Canada.
- Post job qualifications in advance and identify available training programs and providers so that local and Indigenous residents can acquire the necessary skills and qualify for potential Project-related employment.
- Identify potential shortages of workers with specific skill requirements, and work with training and education facilities, Indigenous communities, and local communities to increase opportunities for local community members to obtain training required for Project participation.
- Require workers (not inclusive of summer students) 19 years and younger to have completed grade 12 or have an appropriate equivalency to prevent young people from leaving school prematurely.
- Workforce education to encourage healthy lifestyle choices, sensitivity training and strict enforcement of Alamos' health and safety policies.
- Develop work packages that consider the capacity and capabilities of local and regional businesses and plan for working with local and Indigenous-owned businesses to enhance their potential for successfully bidding on Project contracts regarding the supply of goods and services.
- Post Project purchasing requirements in advance so that local and regional businesses can position themselves to effectively compete to supply goods and services needed for Project construction and operation.
- Design for completion of timber removal in accordance with *The Forest Act* of Manitoba.
- Work with local communities to develop training programs (e.g., contract opportunities) oriented to Project operational needs.

6.8.2.3 Residual Effects

Labor Force

Residual effects on local and regional labor force relates to direct employment. It is estimated that an annual average direct workforce of 406 full-time equivalents (FTE) will be required over the two-year construction period, a 412 FTE workforce over the 13-year operational period, and an annual 90 FTE workforce during decommissioning/closure. Five percent of direct Project employment is estimated to be sourced from the LAA and the remaining 95% of labour demand satisfied using a fly-in/fly-out (FIFO) or drive-in/drive-out (DIDO) workforce recruited from other parts of the RAA and Manitoba. With the implementation of mitigation and management measures, and in consideration of local employment estimates, the Project is expected to result in positive, low magnitude effects on direct employment within the LAA and RAA. The loss of employment at the closure of the Project is a known effect and will be anticipated by Project workers. Mitigating the magnitude of this loss of employment is the gained labour income, skills and experience workers realize while employed with the Project; therefore, the loss of employment following closure of the



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Project is anticipated to be low. With the implementation of mitigation and management measures, Project residual effects on the local and regional labour force are expected to be positive in direction but low in magnitude during construction and operation.

Businesses

Residual effects on local and regional businesses relates to indirect and induced employment. Alamos estimates that over the life of the Project \$493.1 million in capital expenditure and \$1.9 billion in operational spending (PwC 2020a, 2020b) will occur within Manitoba. The degree to which local businesses will benefit from Project contracting and supply opportunities, and therefore result in indirect employment, depends on several factors, including their size, capability, and capacity to accommodate Project requirements. It is believed that local businesses in the LAA are likely positioned to respond to small- to medium-sized service and supply contracts and highly likely that a greater percentage of Project expenditures on goods and services will occur within other parts of the RAA. In both cases (LAA and RAA), indirect employment effects are anticipated to be positive in direction but low in magnitude.

Based on induced employment estimates for the Northern Region, residual effects on induced employment were determined to be a 9.0% increase (over baseline conditions) in the number of employed persons within the Lynn Lake area during construction, a 13.5% increase during operation, and a 1.9% increase during decommissioning/closure.

Wages paid to the Project's direct workforce are predicted to show a measurable variance from existing conditions in Lynn Lake; therefore, the Project has the potential to contribute to upward pressure on wages though increased competition for labour within the LAA and RAA. To manage the Project's contribution to upward pressure on wages, Alamos will pay its direct workforce wages that are consistent with Manitoba's mining industry. Combined with the small anticipated size of the Project's local direct workforce, adverse effects on local and regional businesses in terms of upward pressure on wages and associated increased difficulty to recruit or retain workers is expected to be low.

Local and Regional Economies

Residual effects on local and regional economy relates to GDP and municipal taxes. Alamos estimates that direct Project contributions to Provincial GDP will total a net present value (5% discount rate) of \$664 million over the life of the Project, composed of \$637 million in direct effects, \$6 million in indirect effects and \$21 million in induced effects. The Project is expected to have a moderate magnitude positive effect on the GDP of the LAA and RAA. As the Project transitions from operation and into and through decommissioning/closure Project contributions to the GDP of the LAA and RAA will cease. Property taxes payable by the Project are inherently beneficial to the municipal government of Lynn Lake. The Project is therefore expected to result in a positive residual effect on municipal government revenues.

Significance of Residual Effects

With mitigation and environmental protection measures, the adverse residual environmental effects on labour and economy are predicted to be not significant. Positive effects on labour force, businesses and



local and regional economies are also anticipated. Results of the assessment, including characterization and significance determination of residual effects are presented in Appendix A; Table A-1.

6.9 COMMUNITY SERVICES, INFRASTRUCTURE, AND WELL-BEING

6.9.1 Existing Environment

A description of the existing environment for community services, infrastructure, and wellbeing within the Project RAA was characterized by analysis of housing and temporary accommodations (including campgrounds), education, recreation, health care, social, and emergency services, transportation, utilities, community wellbeing index scores and self-reported health characteristics. Further details on community services, infrastructure and wellbeing are provided in the MacLellan site EAP.

6.9.2 Environmental Effects

6.9.2.1 Changes to the Environment

The potential environmental effects of the Project on community services, infrastructure, and wellbeing prior to mitigation are as documented in the MacLellan site EAP. Details related to Project effects from construction, operation, and decommissioning/closure are provided in that document.

6.9.2.2 Mitigation Measures

The mitigation measures presented below are proposed to avoid or reduce Project-related effects on community services, infrastructure, and wellbeing at the Gordon site:

- Implementation of a worker housing strategy.
- During construction, first aid facilities will be supplied by the Engineering, Procurement, and Construction Management contractor. First-aid personnel will provide transport to Lynn Lake hospital when required. During operation, first aid facilities will be supplied by a dedicated first aid/mine rescue office in each of the site administration offices. Site security personnel will be trained as Emergency Medical Service first responders, and when required, provide transfer to Lynn Lake hospital.
- Power, water, and wastewater treatment will be provided by Alamos and will not rely on resources within the Town of Lynn Lake.
- Development of a Waste Management Plan because there will be a Project demand for landfill capacity for construction and non-hazardous domestic solid waste during operation. Alamos will liaise with planners in Lynn Lake regarding these needs and potential requirements for landfill expansion.
- Mandatory safety orientations for new employees.
- Control of access to the PDA using a security gate and guard house, and by employing on-site security staff.



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- Site security services to help limit demands on the local police system.
- Careful control of flammable material (such as fuels and explosives) on-site.
- Training of Project personnel in fuel handling, equipment maintenance, and fire prevention and response measures.
- Implementation of work schedules for Project workers (e.g., 12 hours per day, seven days per week) that deter FIFO/DIDO workers from spending time off shift in local communities and accessing community recreation services and facilities outside of working hours.
- Scheduling of alternating work shifts so that all workers do not arrive in and leave the area at the same time will limit Project-related demands on both traffic and air services and infrastructure.
- Liaise with local emergency providers so that roles and responsibilities are understood, and that the necessary resources required to respond are in place.
- Maintenance of fire prevention and suppression systems onsite, including water supplies, sprinklers, fire extinguishers and other firefighting equipment.
- Workforce education to encourage healthy lifestyle choices, sensitivity training and strict enforcement of Alamos' health and safety policies. For example, sensitivity training would raise the level of awareness about the potential effects that workers can have on the community and their families through drug and alcohol use or other social concerns.
- Access to Employee Assistance Program for Project personnel, and requirement for pre-employment physicals.
- Development of cooperative protocols with responsible agencies to deal with access of Project personnel to emergency and other medical services.
- Development and implementation of Project-specific environmental management plans and monitoring programs, including a Waste Management Plan that sets out procedures for reducing Project-related waste and limiting demands on local landfills.
- Development and implementation of Project-specific Emergency Response and Spill Prevention and Contingency Plans will reduce the likelihood and severity of accidents and potential fires.
- Scheduling of alternating work shifts so that workers do not arrive in and leave the area at the same time will limit Project-related demands on both traffic and air services and infrastructure.
- Upgrading and resurfacing the existing access roads to the Gordon site.
- Implement standard construction procedures, including traffic control, to reduce traffic delays during construction. The procedures will be developed during ongoing planning and engineering design to address traffic staging to reduce delays.



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- Providing bussing services between the temporary camp and Gordon site.
- Encouraging carpooling among locally resident construction and operation workers.
- Scheduling arrivals/departures of employee traffic to occur earlier than the existing observed a.m. peak hour for local traffic and later than the existing observed p.m. peak hour if needed.

6.9.2.3 Residual Effects

Residual effects related to housing and temporary accommodations, local services and infrastructure, and community wellbeing are similar for the Gordon site as documented in the MacLellan site EAP.

Residual effects on transportation services and infrastructure are largely related to the increased use of roadways in the LAA and RAA during the construction, operation, and decommissioning/closure phases. The existing road surface of the Gordon site access road will require increased maintenance activity, and at least one 6-km section of PR 391 will likely require resurfacing. The existing 15-km site access road from PR 391 to the Gordon site will also be upgraded and resurfaced prior to the start of the Project construction. With the implementation of mitigation measures, the residual adverse effect of the Project on transportation services and infrastructure is predicted to be low.

Significance of Residual Effects

With mitigation and environmental protection measures, the residual environmental effects on community services, infrastructure, and wellbeing are predicted to be not significant. Results of the assessment, including characterization and significance determination of residual effects are presented in Appendix A; Table A-1.

6.10 LAND AND RESOURCE USE

6.10.1 Existing Environment

A description of the existing environment for land and resource use within the Project RAA was characterized by analysis of land use, parks and recreation, and resource use activities (i.e., hunting, fishing, trapping, mining, and limited forestry). Further details on land and resource use are provided in the MacLellan site EAP.

6.10.2 Environmental Effects

6.10.2.1 Change to the Environment

The potential environmental effects of the Project on land and resource use prior to mitigation for the Gordon site are as documented in the MacLellan site EAP. Details related to Project effects from construction, operation, and decommissioning/closure are provided in that document.



6.10.2.2 Mitigation Measures

The mitigation measures presented below are proposed to avoid or reduce Project-related effects on land and resource use at the Gordon site:

- Signage will be installed around the perimeter of the PDA to alert local land and resource users of the presence of the Project and its facilities.
- Project lighting will be limited to that which is necessary for safe and efficient Project activities. Directional lighting will be used to limit the transmission of light outside of the PDA. Portable lighting equipment will be positioned to limit visibility at nearby receptors, to the extent feasible.
- Noise mitigation measures will be selected and installed as described in Section 6.2.2.2.
- Workers will be prohibited from bringing firearms and fishing gear to the sites while working to limit competition for wildlife and fish species of value to resource users.
- Alamos will post warning signs on the access roads and distribution line ROW to discourage unauthorized access and snowmobiling due to safety concerns.
- Alamos will implement traffic control measures which may include gating approaches to Project access roads, placing large boulders and/or gated fencing to restrict public access to the PDA.
- Alamos will engage local land and resource users (e.g., recreational harvesters) and the Town of Lynn Lake to address, to the extent possible, issues related to the removal and inaccessibility of lands and resources within the PDA at Project sites, including the restriction in use of the Gordon site access road, and with local boaters to address navigation issues as well as access and safety issues related to navigation along watercourses affected by the Project, including engagement regarding the need to provide marked portages to circumvent obstructions.
- Desired end land and resource uses will be considered in the preparation of the conceptual Closure Plan as part of Project rehabilitation.
- The Project footprint will be limited to the extent possible (i.e., PDA) including site clearing and disturbance associated access routes and distribution line ROW.
- Existing access roads and trails will be used to the extent possible; renewed access routes will be developed in compliance with provisions of *The Mines and Minerals Act* (in the case of the Gordon site).
- Work schedules will be implemented for Project construction workers (subject to FIFO employment) to deter workers from hunting locally outside of working hours during a shift.
- Alamos will communicate the schedule of Project activities throughout the construction, operation, and decommissioning phases to potentially affected local resource users and MCC Regional Officials.



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- Alamos will engage with local resource users (hunters, outfitters, trappers, anglers) and MCC Regional Officials to address to the extent possible the potential conflict, disturbance, or access restrictions to hunting, trapping, and fishing areas in the PDA, and availability of wildlife and fish resources.
- Timber removal will be completed in accordance with *The Forest Act* (Manitoba).
- Merchantable timber may be salvaged and used, if feasible, to enhance carbon storage, or it will be made available to local communities for fuelwood.

6.10.2.3 Residual Effects

Land Use

For the Gordon site, the PDA intersects with approximately 269 ha of provincial Crown land. The Gordon site is located within the Marcel Colomb First Nation community interest zone. Given the small area of provincial Crown land affected by the PDA, Project disturbance is predicted to be of low magnitude. There are two remote cabins within the Gordon site LAA (occupancy unknown). During construction, low frequency noise and vibration effects are not expected at receptors because predicted levels are below applicable targets. Overall, the residual effects for the Gordon site are anticipated to be low (low to moderate for noise). For the Gordon site, some access restrictions are anticipated to be in place for the period of construction; however, with the implementation of the mitigation measures, the residual effects on land use are anticipated to be low.

Recreation

During construction, operation and decommissioning/closure activities, residual effects on recreation for the Gordon site are as documented in the MacLellan site EAP. With the implementation of mitigation measures, residual effects from the Project on recreation are anticipated to be low in magnitude for each Project phase.

Resource Use

During construction, including clearing activities, operation, and decommissioning/closure, Project residual effects on resource use for the Gordon site are as documented in the MacLellan site EAP.

Significance of Residual Effects

With mitigation and environmental protection measures, the residual environmental effects land and resource use are predicted to be not significant. Results of the assessment, including characterization and significance determination of residual effects are presented in Appendix A; Table A-1.



6.11 HERITAGE RESOURCES

6.11.1 Existing Environment

A heritage resources impact assessment for the Project was conducted at the Gordon and MacLellan sites in August 2015. No heritage resource sites were recorded in the Gordon site PDA and there is a low potential for such resources to be present based on predictive modelling and assessment results. For the RAA (covering a relatively large area owing to the historical and precontact mobility of Indigenous peoples), records indicated that ancestors of the Swampy Cree, Rock Cree, Dene, and Métis lived and harvested resources throughout the RAA for the past 200 years (Provincial Archives of Manitoba, n.d.). There are 781 heritage resource sites recorded in the RAA, most of which date to the Precontact Period.

6.11.2 Environmental Effects

6.11.2.1 Change to the Environment

During construction and operation, changes to heritage resources could result from removal of vegetation, causing soil movement and displacing shallowly buried artifacts. Grading and compaction of the site during construction could also potentially disturb or destroy heritage resources. During operation, heritage resources could be disturbed through brushing of previously undisturbed areas, subsoil removal and regrading of access roads, soil removal for Project infrastructure, grading, and compaction.

There are no potential effects pathways for Project decommissioning/closure as heritage resources concerns will have been addressed during construction or operation, and decommissioning/closure will not result in ground disturbance to areas not previously disturbed during the Project.

6.11.2.2 Mitigation Measures

The mitigation measures presented below are proposed to avoid Project-related effects on heritage resources:

- Implementation of the Heritage and Cultural Resources Protection Plan when heritage or cultural resources, or objects thought to be heritage or cultural objects, are exposed.
- Protective barriers placed around heritage resource sites that are inadvertently found during construction so that the area can be protected while work proceeds.
- Evaluation by a professional archaeologist of PDA changes or added development components.
- Education of construction contractors for the appropriate protocols if heritage or cultural resources, or objects thought to be heritage or cultural resources, are discovered.
- Controlled surface collection or salvage excavation of discovered heritage resource sites, or a portion thereof, that cannot be avoided.



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- Construction monitoring by a professional archaeologist in areas that are heritage sensitive such as sites identified as being culturally sensitive by Indigenous engagement.
- Education of construction contractors for the appropriate protocol if heritage or cultural resources, or objects thought to be heritage or cultural resources, are discovered.

6.11.2.3 Residual Effects

None of the Project components currently interact with known heritage resources; therefore, there is a low potential for a change to the number of heritage resource sites because of the Project. There are no previously recorded heritage resource sites within the Gordon site PDA and LAA and the potential for heritage resources is low at the Gordon site. Baseline information from Indigenous community members indicate that there are no known burial sites; cultural landscapes; sacred, ceremonial, or culturally important places, objects, or things; nor is there archaeological potential and/or artifact places at the site; therefore, there are no anticipated residual effects on heritage resources.

Significance of Residual Effects

There are no anticipated residual effects on heritage resource at the Gordon site; therefore, there is no significant adverse residual effect. Results of the assessment are presented in Appendix A; Table A-1.

6.12 CURRENT USE OF LANDS AND RESOURCES FOR TRADITIONAL PURPOSES

6.12.1 Existing Environment

Information provided herein is current to May 22, 2020. Indigenous nations who have expressed traditional interests in the RAA include Marcel Colomb First Nation, Mathias Colomb Cree Nation/Granville Lake Community, Peter Ballantyne Cree Nation, Manitoba Metis Federation, and the Métis Nation – Saskatchewan Eastern Region 1. Indigenous nations who have indicated through engagement they do not undertake traditional practices in the RAA include O-Pipon-Na-Piwin Cree Nation, Nisichawayasihk Cree Nation, Barren Lands First Nation, Hatchet Lake First Nation, Northlands Denesuline First Nation, Sayisi Dene First Nation and the Métis Nation – Saskatchewan Northern Region 1. The results of the information gathering process indicated that current use for traditional purposes occurs in the PDA, LAA, and RAA. A summary of traditional land and resource use for each community is presented in the federal EIS (Volume 2, Section 7.2.13).

6.12.2 Environmental Effects

6.12.2.1 Change to the Environment

The potential environmental effects of the Project on traditional land and resource use prior to mitigation, include:

- changes to availability of traditionally used resources



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- changes in access to traditionally used resources or areas
- changes to current use sites or areas
- changes to experience of current use and cultural values associated with traditionally used resources

Availability of resources currently used for traditional purposes can be affected by a change in the landscape that removes habitat for species relied upon for traditional use, or by a change in mortality or health of these species in such a way that their numbers are affected.

During the construction phase, habitat will be lost in the PDA. During site preparation, direct and indirect loss of habitat will result from vegetation clearing, dewatering, and sensory disturbances that can fragment habitats and reduce ecological function. Noise from construction activities may also disturb wildlife and contribute to avoidance of the area by traditional harvesters. Changes to mortality risk can also affect availability of traditional resources through increased vehicular traffic, human-wildlife interactions, effects on predator-prey interactions and indirectly on health of harvested species by soil compaction or dust on plants.

During the operation phase, transportation within the LAA is the primary activity with potential to cause wildlife mortality and change the availability of traditionally harvested resources. The presence of utilities, site infrastructure, facilities, and fluctuating water levels may also increase wildlife mortality, or alter wildlife habitat. Noise, light, and vibration is also expected to be a primary pathway that could potentially change the availability of traditional resources through wildlife avoidance.

During the decommissioning/closure phase, the Project is anticipated to increase availability of traditional resources through a lessening in sensory disturbances, vehicular collisions, and reclamation of habitat.

Access to resources currently used for traditional purposes can be affected by restrictions to access of lands. During construction, access to sites may be restricted for safety reasons. During operation, changes to access may also result from operation of utilities, infrastructure, and other facilities. During the decommissioning/closure phase, access is anticipated to improve compared with active mining.

During construction, changes in traditional cultural and spiritual sites and areas can be affected directly through the physical removal of the resource itself by land clearing and infrastructure development, or indirectly through sensory disturbances, noise, light, and other emissions. During operation, sensory disturbance as well as the physical presence of utilities, site infrastructure, and facilities or water management activities may disturb a site or render a site or area inaccessible. During the decommissioning/closure phase, the level of sensory disturbance due to wastes and emissions activities will be reduced in comparison to operation, with a return to baseline conditions during post-closure.

Changes to the environment resulting from the Project that have the potential to affect cultural values associated with traditional land and resource use include changes in access or sensory disturbances such as noise, light, and dust that may directly or indirectly interfere with cultural transmission by shared experience of traditional practices.



6.12.2.2 Mitigation Measures

The mitigation measures presented below are proposed to avoid or reduce Project-related effects on traditional land and resource use. Mitigation measures that are relevant to availability of traditionally harvested resources at the Gordon site will include the following:

- Wetland buffering, silt fencing, and timing of vegetation clearing as described in Section 6.6.2.2 will reduce habitat loss or loss of traditionally important species.
- Dust suppression, as described in Section 6.1.2.2 will reduce sensory disturbance, effects to habitat or traditionally harvested species.
- Erosion and sediment control measures during construction and timing works outside of sensitive periods will reduce alteration or loss of fish habitat.
- Workers will be prohibited from bringing firearms and fishing gear to the sites while working to limit competition for wildlife and fish species as described in Section 6.10.2.2.
- Mitigation as described in Section 6.10.2.2 will reduce effects on traditionally important fish species and habitat.
- Offsetting lost habitat area where harmful alteration, disruption, or destruction of fish habitat will occur as described in the federal EIS (Chapter 23, Section 23.5.15).
- Relevant mitigation for groundwater as described in Section 6.3.2.2 to reduce effects on traditionally important species and resources.
- Relevant mitigation for wildlife and wildlife habitat as described in Section 6.7.2.2 to reduce effects on traditionally important species and resources.
- Relevant actions in the Wildlife Monitoring and Management Plan as described in the federal EIS (Chapter 23, Section 23.5.15) to reduce effects on traditionally important species and resources.

Mitigation measures that are relevant to changes in access to resources currently used for traditional purposes will include the following:

- Site access by traditional harvesters will be controlled post-closure as per the Closure Plan described in the federal EIS (Chapter 23, Section 23.5.18). Alamos' ongoing engagement may result in developing alternative access to resource harvesting areas.
- Existing access roads and trails will be used to the extent possible; access routes will be developed in compliance with provisions of *The Crown Lands Act* and *The Mines and Minerals Act*.

Mitigation measures that are relevant to changes in cultural and spiritual sites will include the following:



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- Although no known cultural and spiritual sites or areas are in the PDA, Alamos' ongoing engagement program will facilitate development of mitigation measures if these are reported or discovered during construction and operation phases.
- Design for limitation of Project footprint (i.e., PDA) to the extent possible.
- Design for use of down-lighting, a technique of directing night lighting downward, to reduce light effects adjacent to the PDA.
- Buffers around wetlands, waterbodies, and watercourses as described Section 6.6.2.2 will be maintained to reduce effects to cultural and spiritual sites or areas.
- Design for restriction of unauthorized access adjacent to the PDA.
- Maintain vegetation cover along the boundaries of high activity areas (e.g., access roads) to reduce sensory (noise and visual) disturbance.
- The Heritage and Cultural Resources Protection Plan as described in the federal EIS (Chapter 23, Section 23.5.11) will be implemented when previously unidentified heritage or cultural resources, or objects thought to be heritage or cultural objects, are exposed. Additional mitigation measures for heritage resources are addressed in Section 6.11.2.2.

6.12.2.3 Residual Effects

The residual effects on availability of lands and resources for traditional use during the construction phase is largely related to site preparation. Site preparation will require removal of habitat in the PDA. Once cleared, the PDA will provide no suitable wildlife habitat, except for a few species that prefer developed sites. Site preparation and water development will also negatively affect fishing, hunting, and trapping activities that currently occur. The residual effect of construction traffic on wildlife mortality is expected to be minor in the LAA. Overall, the residual effects on change in resource availability during the construction phases of the Project is low. During operation, wildlife will avoid the PDA and LAA due to continuous disturbance caused by emissions such as noise, light, and traffic throughout the duration of operation. Increased dust and POPCs could affect vegetation and fish distribution and health. Residual effects on mortality risk during this phase due to trapping of nuisance animals, conflicts with infrastructure, and vehicle collisions, is limited in area and numbers of individuals, and not expected to have population level effects. Decommissioning/closure activities are expected to reverse the residual effects to resource availability and therefore are generally positive compared with active mining.

The residual effects on access to lands and resources for traditional use are related to clearing of natural vegetation or earthworks activities during construction and operation. This will affect several travelways that cross the Gordon Lake access road, altering patterns of access to travel routes harvesting areas in the LAA. Overall, the residual effect on change in access during the construction and operation of the Project is low. Residual effects on access in the closure phase are anticipated to be positive compared to active mining with access ultimately being restored to some areas.



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The residual effects on cultural and spiritual sites are largely related to site preparation activities and sensory disturbance. The Project will require the disturbance of landscape in the PDA. No traditional or cultural sites or areas are known to exist within the PDA; however, some sites may experience sensory disturbances due to light, dust, and noise. These sites may also experience effects due to the removal of visual buffers. Overall, the residual effect is low.

The experience of Indigenous peoples on the land, cultural identity, opportunities for intergenerational knowledge transmission, and spiritual connections represent intangible values, which are largely subjective and conditional, reflecting beliefs, perceptions, values, and qualitative experience. As such, for changes to the environment that affect cultural values or importance associated with traditional land and resource use, it is not possible to establish meaningful and applicable measurable parameters or assess these values to current assessment conventions. Therefore, potential effects on cultural values have not been subject to an effects assessment using the same methodology. Rather, when an Indigenous nation has identified a related concern, the subjective and experiential components of current use that cannot be measured are considered qualitatively. Residual effects on cultural values using this assessment methodology include transmission of cultural practices and teachings between generations, the sacredness of lands and waters as a whole, changes to experiences on the land, and a responsibility to protect and care for the land.

Significance of Residual Effects

With mitigation and environmental protection measures, the residual environmental effects on traditional land and resource use are predicted to be not significant. Results of the assessment, including characterization and significance determination of residual effects are presented in Appendix A; Table A-1.

6.13 HUMAN HEALTH

6.13.1 Existing Environment

Existing conditions for human health are characterized by the calculated Baseline Case concentration ratios (CRs), hazard quotients (HQs), and incremental lifetime cancer risks (ILCRs) of contaminants currently existing in the environment. The CR applies to non-cancer health risks associated with the inhalation of criteria air contaminants such as NO₂, SO₂, and PM_{2.5}. The HQ applies to non-cancer health risks associated with ingestion exposures of metals in drinking water and food. The ILCR applies to carcinogenic health risks associated with exposure to carcinogenic chemicals of potential concern (COPC).

Exposure pathways include direct contact with soil (ingestion and dermal contact), ingestion of wild meat, fish, plants and surface water and inhalation (air emissions) of contaminants. At the Gordon site, baseline CRs for NO₂, SO₂ and PM_{2.5} were below the benchmark CR of 1.0, representing a negligible human health risk. The Baseline Case HQs for metal exposures through ingestion were generally below the risk acceptability benchmark of 0.2, with some exceedances for methylmercury, primarily due to consumption of fish, and manganese and thallium, primarily due to consumption of wild meat, traditional plants and/or backyard garden produce. Baseline Case CRs could not be calculated for inhalation risk associated with diesel particulate matter (DPM), HCN, volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and metals because air concentration data were not available in this remote region.



6.13.2 Environmental Effects

6.13.2.1 Change to the Environment

Changes to human health as a result of the Project are measured based on predicted human exposure to a contaminant through ingestion, inhalation, and dermal contact. Atmospheric emissions (vehicle exhaust, and rock and ore dust) and water discharges (e.g., effluent and seepage) from the Gordon site project activities could increase COPC concentrations in ambient air, soil, water, and sediment. This can lead to increases of these chemicals in secondary environmental media including vegetation, wild meat, and fish tissue. In the absence of mitigation measures, potential changes in air, water, and country food quality may affect the health of human receptors who live in the region and who may engage in hunting, trapping, traditional, and recreational activities.

6.13.2.2 Mitigation Measures

A number of mitigation measures have already been incorporated for both sites as detailed in previous sections. A summary of these mitigation measures as they pertain to human health is outlined below:

- The use of dust suppressants (e.g., water and chemical) and dust enclosures at storage areas as described in Section 6.1.2.2.
- An Air Quality Management Plan as described in the federal EIS (Chapter 23).
- Water management as described in Section 6.3.2.2 and Section 6.4.2.2 above, including surface water runoff control practices, diversion of freshwater away from the Project by designing culverts and ditches, management of contact water (by construction of collection pits, ponds, ditches and culverts), installation of groundwater interceptor wells, dewatering ditches, and implementing soil covers and vegetation to reduce infiltration into the MRSA by increasing evapotranspiration capacity.

6.13.2.3 Residual Effects

Inhalation Exposure

For the Gordon site, the assessment of potential human health risks associated with inhalation exposures to NO₂ found that predicted annual average NO₂ concentrations were below the 2025 annual average NO₂ CAAQS. Three special receptor locations at the Gordon site had a maximum predicted 1-hour NO₂ concentration in exceedance of the 2025 1-hour NO₂ CAAQS. Maximum exceedances were found to occur 0.38% of the time over the 5-year period at the Gordon site. Based on the analysis it was determined that occasional exceedances of the 2025 1-hour NO₂ CAAQS represent a negligible human health risk for people who may be in the area. The CRs associated with inhalation to carcinogenic compounds are below 1.0, meaning that the incremental lifetime cancer risk associated with emissions from the Project is below cancer risk acceptability benchmark established by Health Canada (2012).



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Ingestion Exposure

In general, the risks associated with total ingestion exposures to metals are below the non-cancer risk acceptability benchmark of $HQ < 0.2$ established by Health Canada. For several compounds, the total ingestion non-cancer risks exceed the acceptability benchmark; however, changes in non-carcinogenic and carcinogenic health risks due to Project-related chemicals are less than the applicable benchmarks and therefore, negligible and not significant. Risks related to sediment contact were evaluated and considered minor in the region. The average of the predicted future concentrations of metals in the lakes in the Gordon region are less than the applicable Canadian drinking water guidelines; therefore, health risks related to metal exposures are considered negligible.

Noise and Vibration

Noise levels predicted at each of the human health special receptor locations in the Gordon region were below the Health Canada 6.5% high annoyance target and were also below the WHO sleep disturbance noise guideline of 40 dBA. Based on these results, noise and vibration represent negligible human health risks.

Significance of Residual Effects

With mitigation and environmental protection measures, the residual environmental effects on human health are predicted to be not significant. Results of the assessment, including characterization and significance determination of residual effects are presented in Appendix A; Table A-1.

6.14 INDIGENOUS PEOPLES

6.14.1 Existing Environment

Existing conditions for Indigenous peoples are described based on the conditions for Indigenous health, Indigenous socio-economics, current use of lands and resources, Indigenous physical and cultural heritage, and Indigenous or Treaty rights. The Indigenous communities engaged on the project have Indigenous or Treaty rights which are recognized and affirmed in Section 35(1) of the *Constitution Act, 1982* and as such have constitutional protection to these rights in Canada. Further details on Indigenous peoples are provided in the MacLellan site EAP.

6.14.2 Environmental Effects

6.14.2.1 Change to the Environment

Changes to effects on Indigenous peoples (i.e., changes to Indigenous health conditions, socio-economic conditions, physical and cultural heritage, and current use and Indigenous or Treaty Rights) are characterized as noted in the MacLellan site EAP. Details related to Project effects from construction, operation, and decommissioning/closure are provided in that document.



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6.14.2.2 Mitigation Measures

The mitigation measures presented below are proposed to avoid or reduce Project-related effects on Indigenous Peoples.

Key mitigation measures that will be implemented to reduce changes in Indigenous health include:

- Avoidance of plant harvesting sites and access to lands and resources currently used for traditional purposes through Project design.
- Avoidance of plant harvesting sites and access to lands and resources currently used for traditional purposes through timing of Project activities and potential scheduling of construction during periods of lower sensitivity or least effect.
- Incorporation of plant species of interest to Indigenous communities into rehabilitation plans where appropriate and technically feasible.
- Signage.
- Ongoing engagement with Indigenous communities regarding their concerns, mitigation of potential Project effects on TLRU, and potential monitoring opportunities.
- Design for implementation of work schedules for Project construction workers (12 hours per day, seven days per week) will deter workers from hunting and fishing locally outside of working hours during a shift.
- Development and implementation of Project-specific environmental management and monitoring plans, and discussion with Indigenous communities regarding these plans.
- Implementation of the additional mitigation measures outlined in Sections 6.5.2.2, 6.6.2.2, 6.7.2.2, and 6.10.2.2 above.

Mitigation measures that will be implemented to reduce adverse changes in Indigenous socio-economic conditions include:

- Engagement of local land and resource users (e.g., Indigenous guides), affected tenure holders (trappers), and the Town of Lynn Lake to address, to the extent possible, issues related to the removal and inaccessibility of lands and resources within the PDA at Project sites, including the restriction in use of the Gordon site access road.
- Engagement of with local resource users (hunters, outfitters, trappers, anglers) and MCC Regional Officials as described in 6.10.2.2 above.
- Continued collaboration with Indigenous communities and continued work towards potential training and education partnerships with Manitoba Keewatinowi Okimakanak Inc, the Northern Manitoba Sector Council, and Atoskiwin Training and Employment Centre to provide opportunities for Indigenous people to obtain skills and training required for Project participation.



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- Continued support by Alamos to Marcel Colomb First Nation to facilitate activities intended to increase Indigenous cultural awareness for Project employees. Alamos will continue to engage with Marcel Colomb First Nation in supporting development and presentation of these activities and events.
- Workers will be prohibited from bringing firearms and fishing gear to the sites while working as described in Section 6.10.2.2 above.
- Communicating the schedule of Project activities throughout the construction, operation, and decommissioning/closure phases to affected Indigenous communities.
- Development and implementation of Project-specific environmental management and monitoring plans, and discussion with Indigenous communities regarding these plans.
- Implementation of the mitigation measures for site security, worker transportation, and work scheduling as described in 6.9.2.2 above.
- Implementation of standard construction procedures and a Traffic Management Plan to reduce traffic delays during construction. The Traffic Management Plan will be developed during ongoing planning and engineering design to address traffic staging to reduce delays.
- Collaboration with the Town of Lynn Lake and surrounding Indigenous communities to discuss appropriate monitoring or management plans to address draws on services if, during operation, workers and their families relocate to Lynn Lake.
- Participation in discussions with Manitoba Infrastructure regarding the need for upgrades to PR 391 and/or weight exception requirements to support the Project.
- Design to enhance potential positive effects as described in Section 6.8.2.2 above.

Key mitigation measures that will be implemented to reduce changes to Indigenous physical and cultural heritage include:

- Consideration of mitigation measures proposed by Indigenous communities.
- Ongoing engagement with Indigenous communities regarding their concerns, mitigation of potential Project effects on traditional land and resource use, and potential monitoring.
- Development and implementation of Project-specific environmental management and monitoring plans, and discussion with Indigenous communities regarding these plans.
- Implementation of the mitigation measures for heritage resources as described in Section 6.11.2.2 above.
- Training of staff in the recognition of archaeological features and objects such as precontact Indigenous material culture, and 19th and 20th century Euro-Canadian material culture.
- Reviewing the potential and documented historical use and occupation of the PDA and LAA with staff.



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- Potentially hiring of Indigenous field support staff as part of an environmental monitoring team.

6.14.2.3 Residual Effects

Indigenous health conditions may be affected by changes in the availability of country foods and value or perceived quality of country foods. The availability of country foods within the PDA is currently limited by the former mine sites. The Project will result in approximately 1,210 ha of upland and wetland disturbance in the PDA and is expected to increase wildlife mortality and habitat loss for wildlife, fish, and plants within the PDA. Although vehicular collisions and human-wildlife conflicts may result in mortality for a few individual animals, the health of harvested resources at a population level is not anticipated to change within the RAA. The health risks associated with inhalation and ingestion exposures to COPCs and noise levels are below applicable guidelines and are not expected to cause human health effects.

Residual effects to Indigenous socio-economic conditions are anticipated to Indigenous peoples living and working within the LAA and RAA. Project construction may affect, restrict, or change the land base available for recreational activities, including hunting and fishing. Project construction and operation may change Indigenous socio-economic conditions through the loss of land area, restriction of access to designated lands and competition with additional recreational land users, thereby affecting commercial trapping, and guiding hunters that Indigenous peoples engage in. A portion of Pukatawagan Registered Traplines 32 will be removed through development of the PDA and Registered Traplines adjacent to the PDA may also be affected by Project related dust and noise. Construction activities and equipment can also affect recreational and cabin users in the LAA through sensory disturbance affecting the quality of the recreation experience. Visual disturbance will be limited to the surrounding environments at the crossing of the Hughes River in the LAA and the Gordon site will be barely visible from Black Sturgeon Reserve and likely visible from the north portion of Hughes Lake. The Project will not place additional demands on power, water, and wastewater services and infrastructure; however, traffic volumes are expected to increase as a result of the Project, particularly along PR 391 between the Gordon and MacLellan sites, resulting in residual effects on traffic volumes for Marcel Colomb First Nation members who reside in Black Sturgeon Reserve. Bussing of workers to and from the job sites is anticipated to reduce overall vehicle traffic on PR 391. Recognizing that the Indigenous population represents 40% of Lynn Lake's labour force and just over 37% of the RAA labour force, Indigenous people may experience financial effects as a result of the Project, including increased income during construction and operation and loss of employment at closure, resulting in both positive and adverse effects related to wellbeing and social cohesion.

Residual effects to Current Use and Indigenous physical and cultural heritage are described in Sections 6.11.2.3 and 6.12.2.3 above. The Project is expected to affect the availability of lands and resources for traditional use, access to lands and resources for traditional use, cultural and spiritual sites and the cultural values or importance associated with traditional land and resource use. The Project is expected to directly interact with physical and cultural heritage sites and areas through the physical removal of, or changes to, features and indirectly through Project-generated emissions.

Impacts to Indigenous or Treaty rights are related to changes to the availability of resources, changes in access to resources, changes to areas of cultural importance, and changes to the conditions that support the exercise of Indigenous rights. Where the Project has a residual effect on Current Use, as described in



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Section 6.12.2.3, it has been considered as a residual effect on Indigenous or Treaty rights. Residual effects on fish, wildlife, and plant species health are anticipated as described in Sections 6.5.2.3, 6.6.2.3, and 6.7.2.3, potentially affecting Indigenous and Treaty rights related to consumption of those resources; however, effects are not anticipated at population levels for these species. Residual effects on Indigenous socio-economic conditions are anticipated such as impacts to fishing, trapping, and recreation as described in Section 6.8.2.3, potentially affecting the ability to exercise Indigenous or Treaty Rights; however, it is anticipated that the exercise of these rights will be able to continue at similar levels as under baseline conditions. Residual effects to Indigenous physical and cultural heritage are also anticipated as described in Section 6.11.2.3 and 6.12.2.3. Visual quality within the LAA is expected to change overall with the Project, and sensory disturbances are also likely, potentially affecting the exercise of Indigenous or Treaty Rights.

Significance of Residual Effects

With mitigation and environmental protection measures, the residual environmental effects on Indigenous peoples with respect to health, socio-economic conditions, and physical and cultural heritage are predicted to be not significant. A significance determination for residual effects on Indigenous or Treaty Rights has not been undertaken as part of the EIS however the severity of impacts are characterized in keeping with IAAC's *Interim Guidance: Assessment of Potential Impacts on the Rights of Indigenous Peoples*. Results of the assessment, including characterization and significance determination of residual effects are presented in Appendix A; Table A-1.



7.0 SUMMARY OF RESIDUAL EFFECTS FROM PLANNED ACTIVITIES

Project residual effects for the Gordon site were determined for 14 VCs including: atmospheric environment, acoustic environment, groundwater, surface water, fish and fish habitat, vegetation and wetlands, wildlife and wildlife habitat, labour and economy, community services, infrastructure and well-being, land and resource use, heritage resources, current use of lands and resources for traditional purposes, human health, and Indigenous peoples. The summary of this assessment is included in Appendix A; Table A-1.

Based on the results of the environmental assessment, including implementing the identified mitigation measures, the Project as planned (i.e., routine activities) will not result in significant adverse residual environmental effects.



8.0 ENVIRONMENTAL MONITORING AND MANAGEMENT

8.1 OVERVIEW

Proposed mitigation and environmental management measures have been developed for all VCs based on preliminary Project planning and design. These mitigation measures will be refined as Project design and engineering progress and will be informed by the outcomes of the EA process (including the results of EA-related modelling, as well as the results of public and Indigenous engagement carried out in support of the EA).

Opportunities for the reduction of potential adverse environmental effects will continue to be incorporated in the design and engineering of Project components and the planning, scheduling, and carrying out of activities during all phases of the Project. Currently proposed mitigation measures are anticipated to result in compliance with applicable environmental legislation and regulatory requirements, including the *Fisheries Act* and *Migratory Bird Convention Act*.

Proposed mitigation and environmental management measures include development and implementation of the following Project-specific environmental management and monitoring plans and consultation with applicable federal and provincial regulators and engagement with potentially affected Indigenous communities regarding these plans.

8.2 ENVIRONMENTAL MANAGEMENT PLANS

The following environmental management plans have been identified:

- Emergency Response and Spill Prevention and Contingency Plans
- Soil Management and Rehabilitation Plan
- Mine Rock Management Plan
- Groundwater Monitoring Plan
- Surface Water Monitoring and Management Plan
- Waste Management Plan
- Air Quality Management Plan
- Noise Monitoring Plan
- Greenhouse Gas Management Plan
- Explosives Management Plan



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- Heritage and Cultural Resources Protection Plan
- Vegetation and Weed Management Plan
- Erosion and Sediment Control Plan
- Wildlife Monitoring and Management Plan
- Fish Habitat Offsetting Plan and Fish Salvage Plan
- Environmental Effects Monitoring Plan
- Closure Plan.

For a discussion of follow-up and monitoring programs by VC, see federal EIS Chapter 20, Appendix 20B, Table 20B-1.

Alamos will plan for communication of Project activities, locations and timing throughout construction, operation, and closure to affected Indigenous communities, land and resource users, interest groups, the provincial government, and local authorities leading up to construction and throughout the life of the Project. In addition, as part of the Adaptive Management Framework, the environmental management and monitoring program and associated plans will be assessed regularly to verify implementation and the continued suitability, adequacy, and effectiveness as part of Alamos' commitment to continual improvement. The review of the program will identify elements and associated plans in need of revision and will evaluate performance against established performance objectives.



9.0 EFFECTS OF THE ENVIRONMENT ON THE PROJECT

The Project has been designed and will be carried out to withstand potential environmental forces, events, and conditions such as events related to climate (including weather and its variables), climate change, geologic hazards (such as seismic activity and landslides), and forest fires which can affect the project components and infrastructure, construction schedule, and operational performance. Further details on the effects of the environment on the Project and management of these effects are presented in the federal EIS Chapter 21.

10.0 EFFECTS OF POTENTIAL ACCIDENTS AND MALFUNCTIONS

The Project is inherently designed to prevent accidents and malfunctions primarily through adherence to accepted design codes and standards. Most accidental events that could be expected to occur at the Gordon site are small spills that are easily cleaned up on site with little or no environmental consequences. Emergency response and contingency plans will be advanced and implemented to effectively respond to accidents and malfunctions to reduce the magnitude and duration of adverse environmental and social effects. Details on the effects of potential accidents and malfunctions and management of these effects are presented in the federal EIS Chapter 22 and documented in the MacLellan site EAP.

Conclusion

11.0 CONCLUSION

This Environment Act Proposal (EAP) documents the results of the environmental assessment (EA) for the Lynn Lake Gold Project (the Project) proposed by Alamos Gold Inc. (Alamos) with reference to the Gordon site. An environmental assessment of the Project (Gordon site) is required under *The Environment Act* (Manitoba). The Project has been assessed to meet the requirements of the provincial Environment Act Proposal (EAP) Guidelines.

Engagement has been ongoing prior to and throughout the EA process, and will continue with agencies, local Indigenous communities, and stakeholders through the life of the Project. As part of the information sharing through the engagement process, Project-related information was provided by Indigenous communities and groups in the form of traditional knowledge and traditional land and resource use studies and other forms of information sharing. Government, Indigenous community and groups, and stakeholder engagement input and Project-related studies have been considered throughout the EA including baseline data collection, mitigation, residual effects assessment, and follow-up and monitoring, where appropriate. Alamos will continue, throughout the life of the mine to incorporate information shared from Indigenous communities and groups wherever appropriate, including changes to outcomes of mitigation and monitoring. Information provided herein is current to May 22, 2020. Information or feedback provided through engagement after May 22, 2020 will be shared with regulators in supplemental filings to the Environmental Impact Statement in January 2021.

Fourteen valued components (VCs) were identified as relevant and important to the environmental assessment based on regulatory requirements and engagement. They included the atmospheric environment; noise and vibration; groundwater; surface water; fish and fish habitat; vegetation and wetlands; wildlife and wildlife habitat; labour and economy; community services, infrastructure and well-being; land and resource use; heritage resources; current use of lands and resources for traditional purposes; human health; and Indigenous Peoples.

The assessment followed standard EA methods for describing Project interactions with each of the VCs and determining the potential environmental effects associated with the Project for the construction, operation, and decommissioning/closure phases. It presents mitigation and environmental protection measures to reduce or eliminate adverse effects, characterizes the residual environmental effects that remain after mitigation has been applied, and determines the significance of the effects. The Gordon site EAP is based on the federally filed EIS document (May 2020) submitted to the Impact Assessment Agency of Canada (IAAC). The MacLellan site is addressed in a separate EAP document.

Based on the results of the environmental assessment, including implementing the identified mitigation measures, the Project is not likely to cause significant adverse environmental effects. A number of monitoring and reporting commitments have been proposed as part of environmental management, follow-up and monitoring programs to verify the accuracy of the residual effects assessment, determine the effectiveness of mitigation measures, and monitor compliance with regulatory approvals, permits and authorizations.



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12.2 PERSONAL COMMUNICATIONS

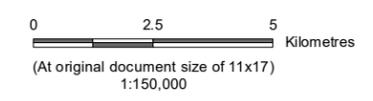
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2019. Senior Environmental and Community Relations Coordinator, Alamos Gold Inc. Telephone call with Principal, Environmental Services, Stantec Consulting Ltd., Winnipeg, Manitoba, October 3, 2019.



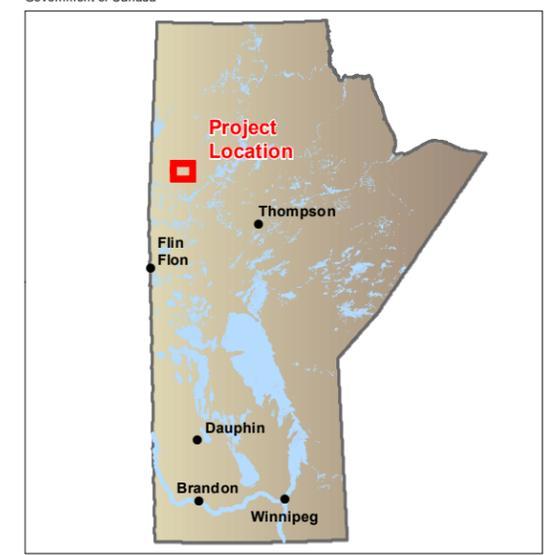
Landbase

-  Existing Access Road
-  Highway
-  Watercourse
-  Waterbody
-  First Nation Reserve



Notes

1. Coordinate System: NAD 1983 UTM Zone 14N
2. Base Data Sources: Government of Manitoba and Government of Canada



Project Location
Lynn Lake, Manitoba

Prepared by ACampigotto on 2020-04-02
Technical Review by ASomers on 2020-04-02
Senior GIS Review by GKroupa on 2020-04-02

Client/Project
ALAMOS GOLD INC.
Lynn Lake Gold Project

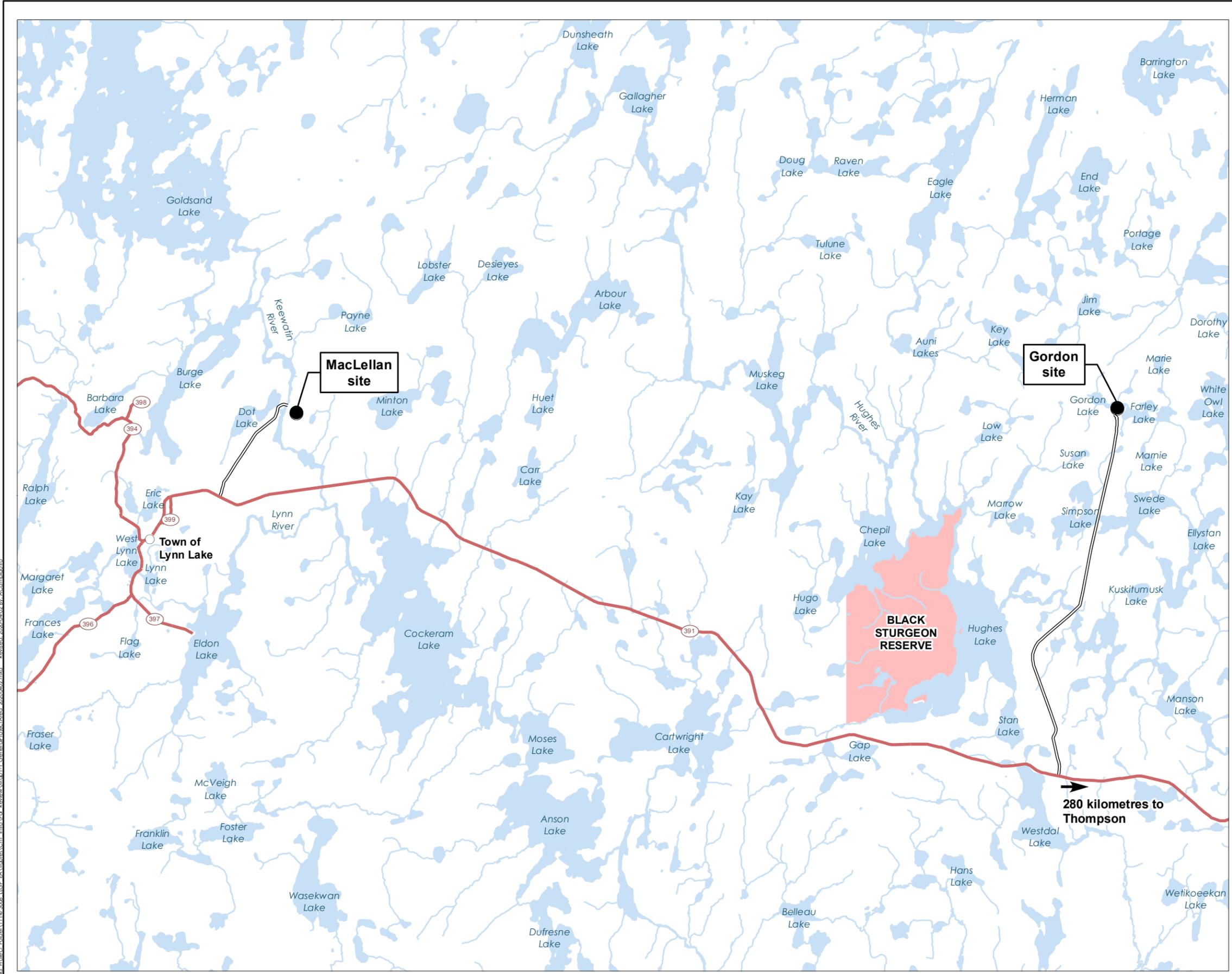
111473008

Map No.

1-1

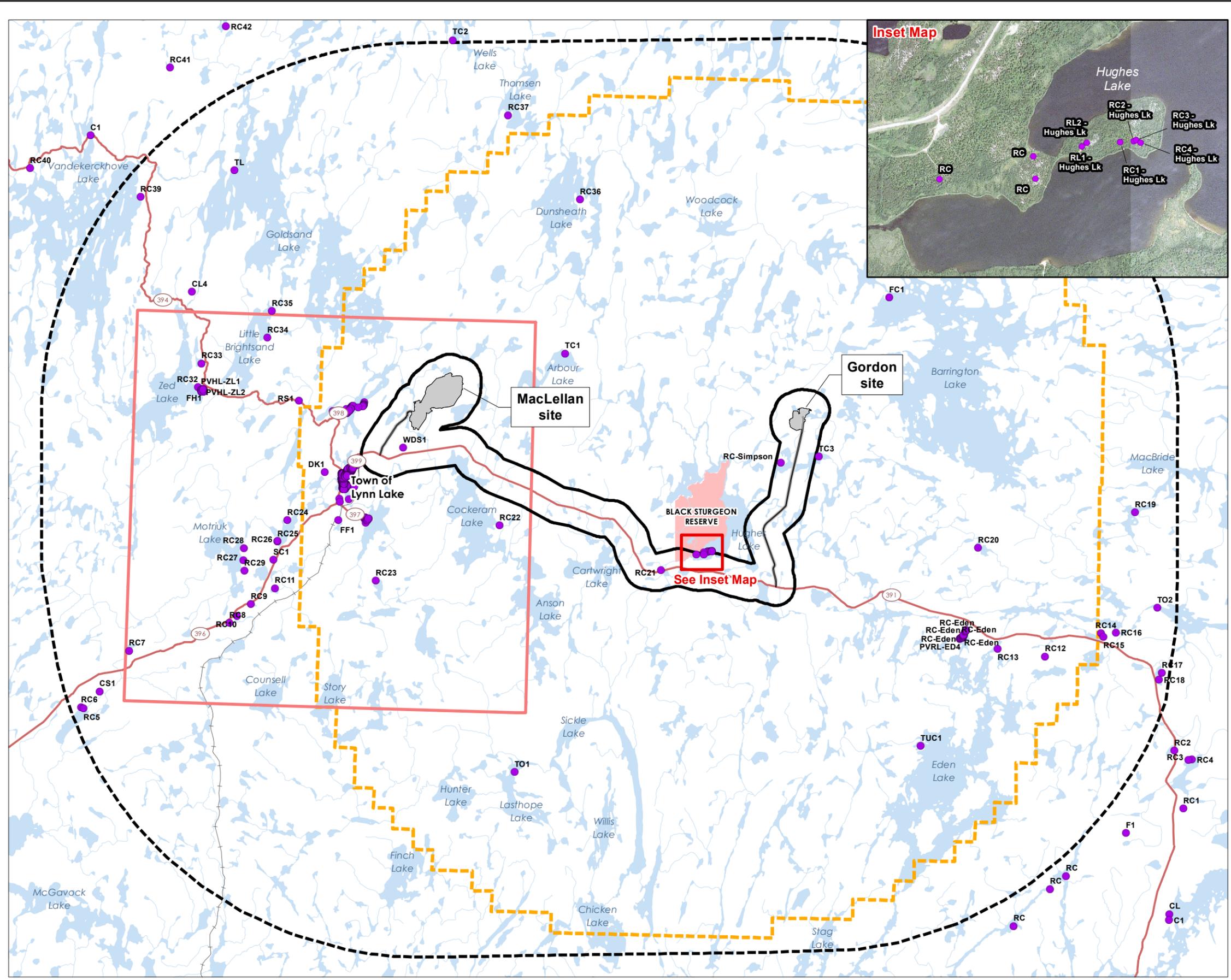
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General Project Area

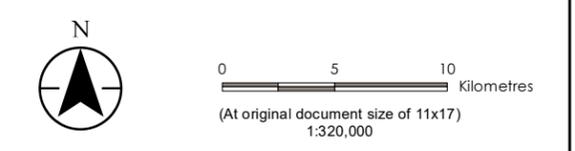


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- Project Infrastructure**
- Project Development Area
- Study Area**
- Land and Resource Use Local Assessment Area (LAA)
 - Land and Resource Use Regional Assessment Area (RAA)
- Land Use**
- Permit or Lease Site
- | | |
|-----------------------------|----------------------------------|
| RC - Remote Cabin | AS - Admin Site |
| RL - Recreation Lot | LG - Lagoon |
| RB - Riding Stable | DW - Dwelling |
| TC - Trapper Cabin | RS - Recreation Site |
| TO - Tourist Outcamp | DK - Dog Kennel |
| TL - Tourist Lodge | PK - Park |
| TUC - Traditional Use Cabin | MS - Museum Site |
| WDS - Waste Disposal Site | HY - Highway Maintenance Yard |
| WS - Warehouse Site | CR - Community Recreation |
| YC - Youth Camp | SC - Snowmobile Club |
| C - Campground | CS - Communication Site |
| CL - Commercial Lot | PVHL - Park Vacation Home Lease |
| FH - Fire Hall | PVHP - Park Vacation Home Permit |
| FP - Float Plane | F - Forestry |
| FF - Fish Farm | IS - Industrial Site |
| FC - Fish Camp | |
- Community Interest Zone
- Landbase**
- Highway
 - Access Road
 - Rail
 - Watercourse
 - Waterbody
 - First Nation Reserve
 - Lynn Lake Municipal Boundary



Notes

- Coordinate System: NAD 1983 UTM Zone 14N
- Base Data Sources: Government of Manitoba and Government of Canada
- Imagery: SPOT-7 imagery, BlackBridge Gemoatics Corp. July 2015.

Project Location
Lynn Lake, Manitoba

Prepared by ACampigotto on 2020-01-20
Technical Review by BKrawchuk on 2020-01-20
Senior GIS Review by GKroupa on 2020-01-20

Client/Project
ALAMOS GOLD INC.
Lynn Lake Gold Project

111473008

Map No.
1-2

Title
Crown Land Permits and Leases

Project Infrastructure

-  Proposed Open Pit
 -  Potential Ore Stockpile
 -  Potential Mine Rock Storage Area
 -  Potential Overburden Stockpile
 -  Project Development Area
 -  Buildings
 -  Pond
 -  Site Access Proposed Site Access Road
 -  Site Access Drainage Road
- Other Infrastructure**
 -  Construction Temporary Facility
 -  Parking
 -  Diversion Channel
 -  Fresh Water Pipe
 -  Sewer
 -  Potable Water
 -  Drainage Ditch - Clean water
 -  Drainage Ditch - Potentially Contaminated
 -  Drainage Pipe
 -  Fire Water

Landbase

-  Existing Access Road
-  Watercourse
-  Waterbody



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 14N
 2. Base Data Sources: Government of Manitoba and Government of Canada.
 3. Project Infrastructure features provided by QPit and Ausenco.

Project Location
Lynn Lake, Manitoba

Prepared by ACampigotto on 2019-12-03
Technical Review by CAnseeuw on 2019-12-03
Senior GIS Review by GKroupa on 2019-12-11

Client/Project
ALAMOS GOLD INC.
Lynn Lake Gold Project

111473008

Map No.

2-1

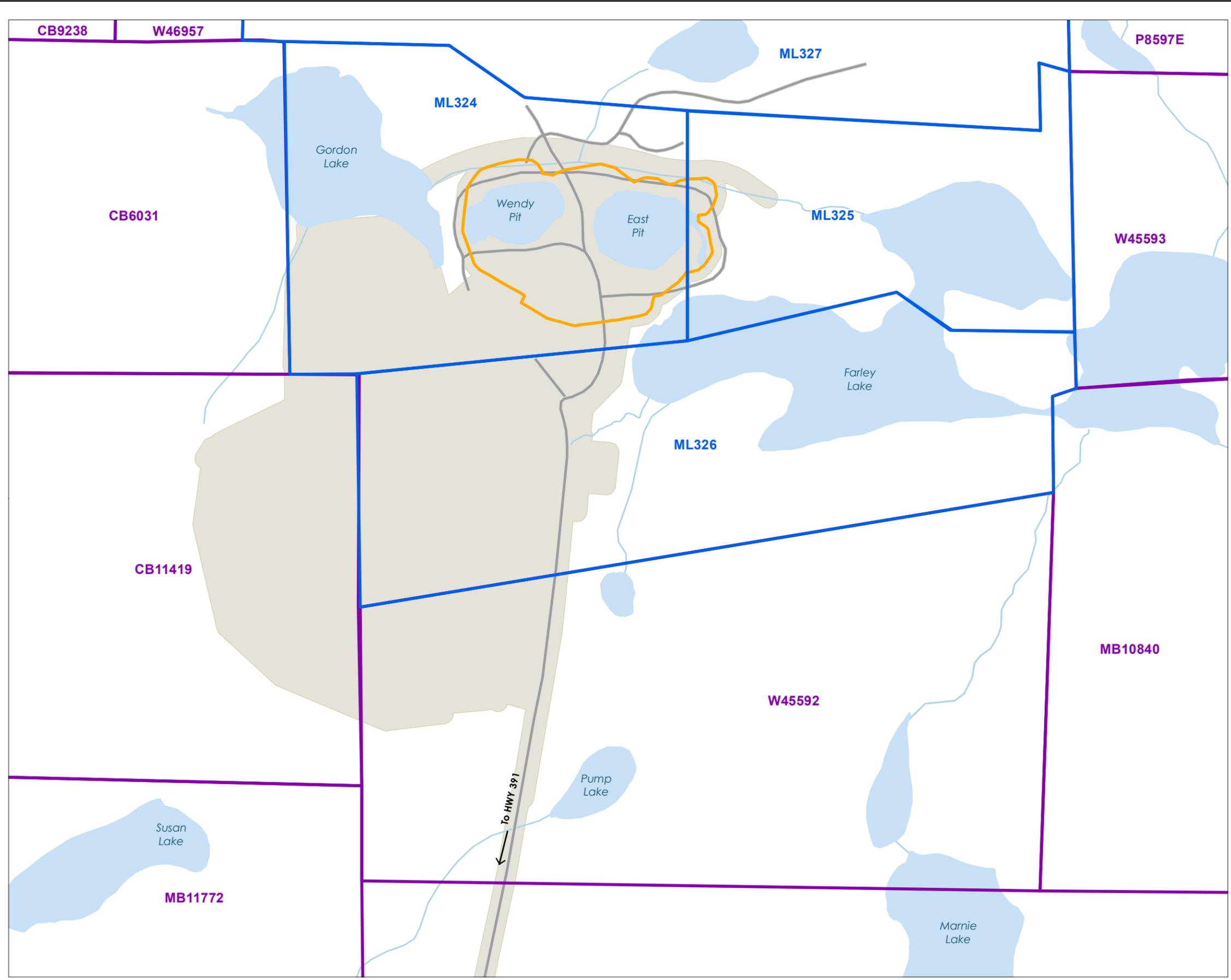
Title

Project Development Area - Gordon site

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Revised: 2020-01-17 By: ACambalita



Project Infrastructure

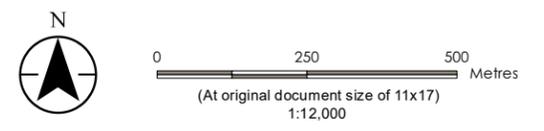
-  Proposed Open Pit
-  Project Development Area

Mining Claim Information

-  Mineral Leases
-  Mining Claims

Landbase

-  Existing Access Road
-  Watercourse
-  Waterbody



Notes

1. Coordinate System: NAD 1983 UTM Zone 14N
2. Base Data Sources: Government of Manitoba and Government of Canada.
3. Project Infrastructure features provided by QPit and Ausenco.

Project Location
Lynn Lake, Manitoba

Prepared by ACampigotto on 2020-01-17
Technical Review by CAnseeuw on 2020-01-17
Senior GIS Review by GKroupa on 2020-01-17

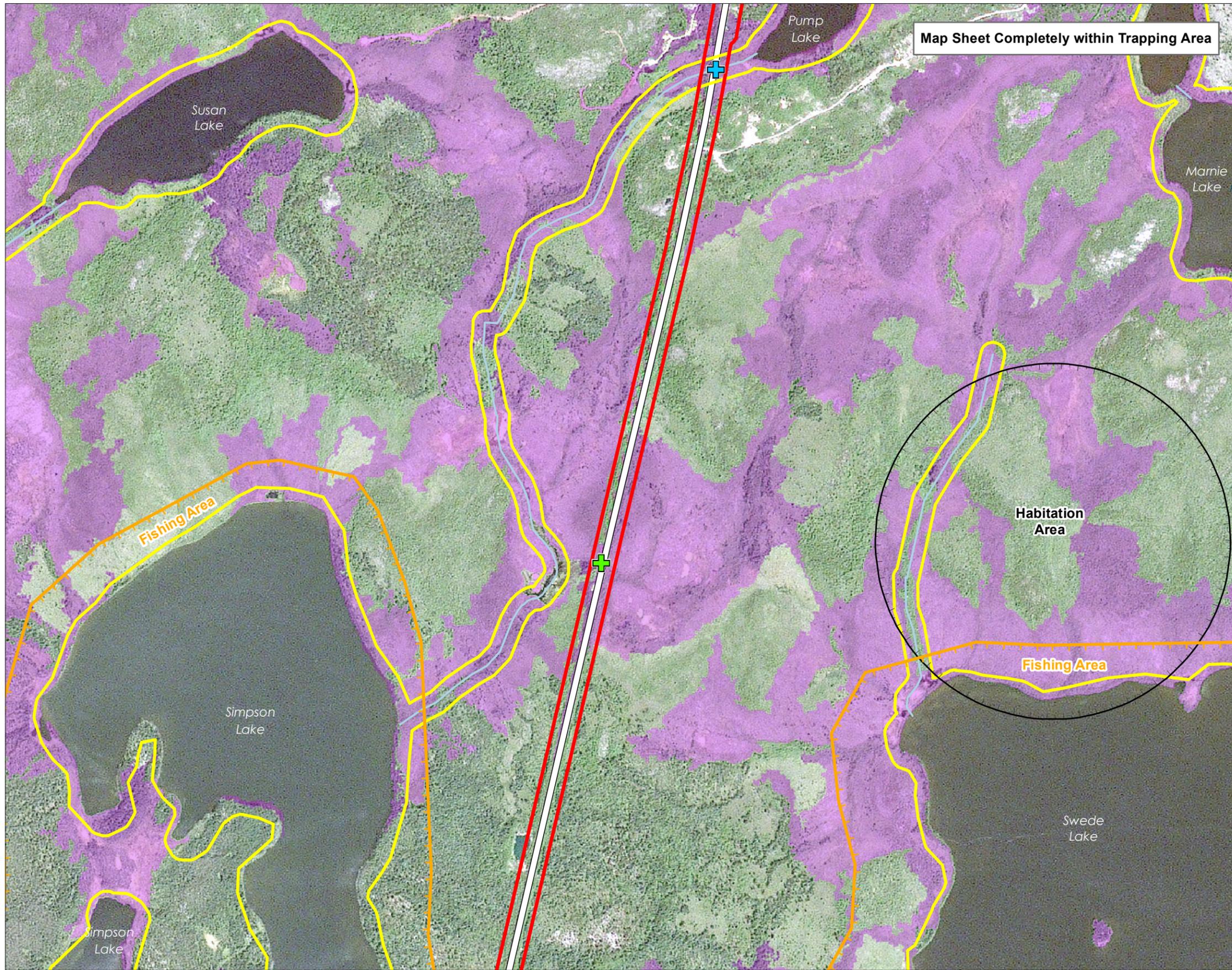
Client/Project
ALAMOS GOLD INC.
Lynn Lake Gold Project

111473008

Map No.
2-2

Title
Mineral/Mining Claims and Leases - Gordon Site

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Project Infrastructure

Project Development Area

Environmentally Sensitive Sites

Watercourse Crossing Location

Ephemeral Stream

Water Features 30m Buffer

Fishing Area

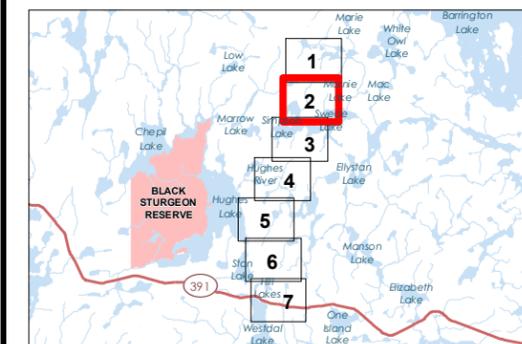
Habitation Area

Wetland Area (interpreted from satellite imagery)

Landbase

Existing Access Road

Watercourse



Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Base Data Sources: Government of Manitoba and Government of Canada.
3. Imagery: SPOT-7 imagery, BlackBridg Geomatics Corp. July 2015.

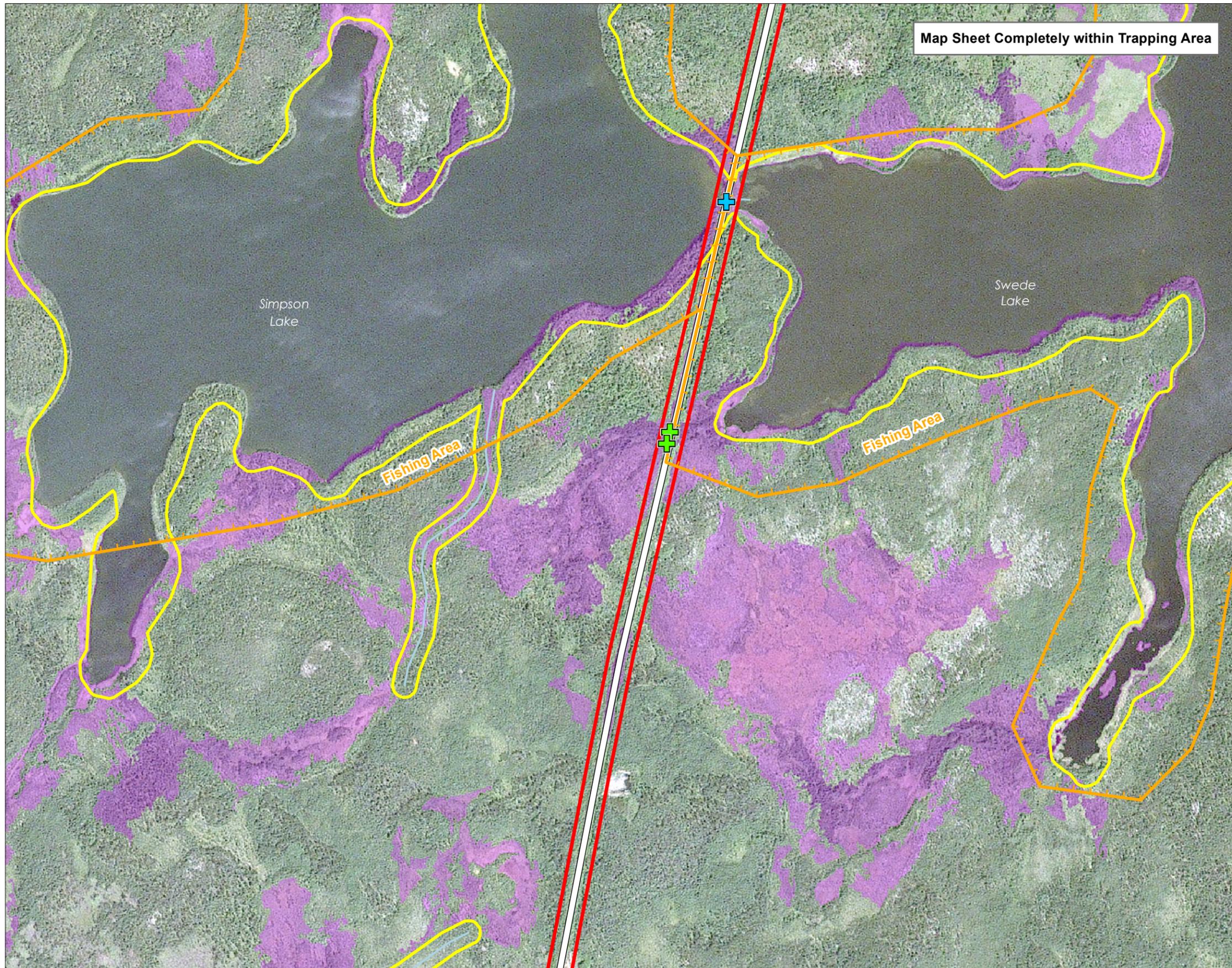
Project Location
Lynn Lake, Manitoba
Prepared by ACampigotto on 2020-04-03
Technical Review by ASomers on 2020-04-03
Senior GIS Review by GKroupa on 2020-04-03

Client/Project
ALAMOS GOLD INC.
Lynn Lake Gold Project
111473008

Map No.
2-3b

Title
Environmentally Sensitive Sites at the Gordon site

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Revised: 2020-04-13 By: ACampigotto



Map Sheet Completely within Trapping Area

Project Infrastructure

 Project Development Area

Environmentally Sensitive Sites

 Watercourse Crossing Location

 Ephemeral Stream

 Water Features 30m Buffer

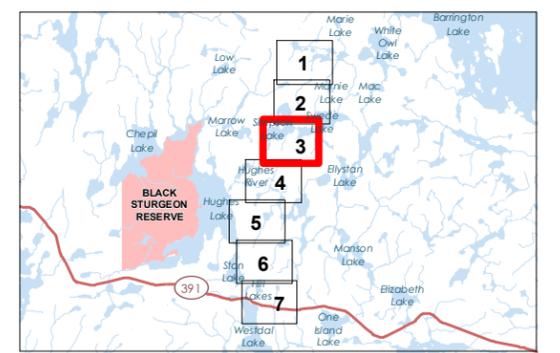
 Fishing Area

 Wetland Area (interpreted from satellite imagery)

Landbase

 Existing Access Road

 Watercourse



Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Base Data Sources: Government of Manitoba and Government of Canada.
3. Imagery: SPOT-7 imagery, BlackBridgе Geomatics Corp. July 2015.

Project Location
Lynn Lake,
Manitoba

Prepared by ACampigotto on 2020-04-03
Technical Review by ASomers on 2020-04-03
Senior GIS Review by GKroupa on 2020-04-03

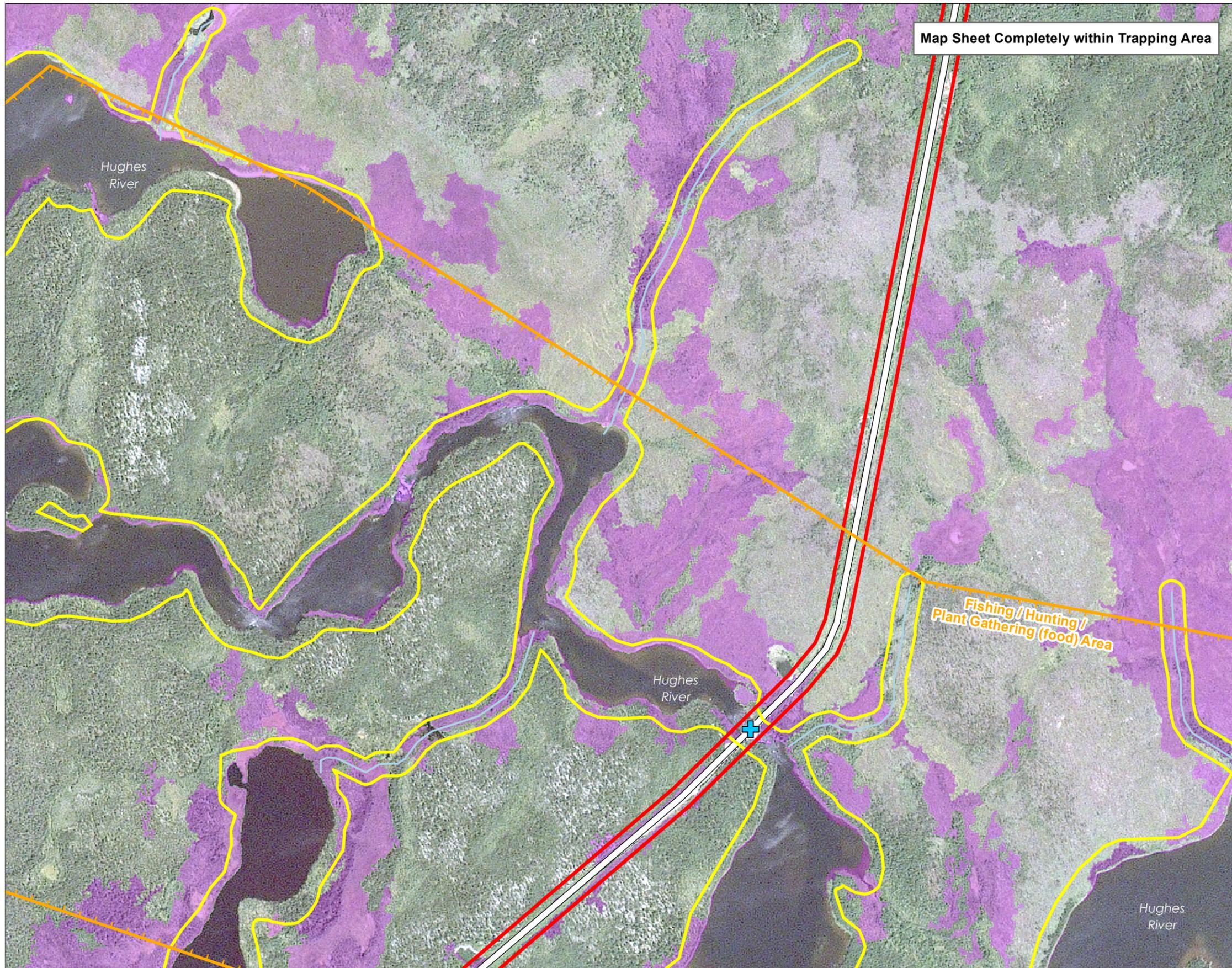
Client/Project
ALAMOS GOLD INC.
Lynn Lake Gold Project

111473008

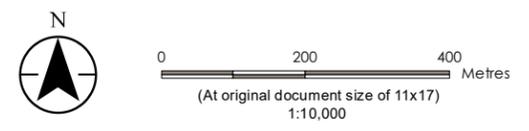
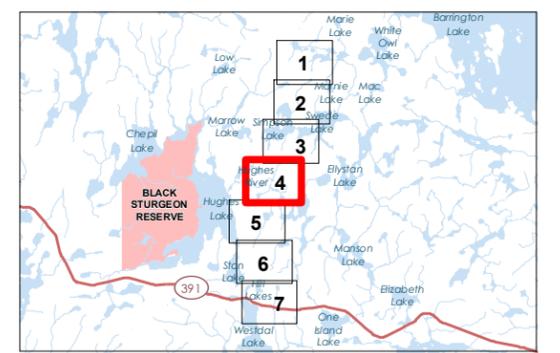
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2-3c

Title
Environmentally Sensitive Sites at the Gordon site

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- Project Infrastructure**
-  Project Development Area
- Environmentally Sensitive Sites**
-  Watercourse Crossing Location
 -  Water Features 30m Buffer
 -  Fishing / Hunting / Plant Gathering (food) Area
 -  Wetland Area (interpreted from satellite imagery)
- Landbase**
-  Existing Access Road
 -  Watercourse



Notes

1. Coordinate System: NAD 1983 UTM Zone 14N
2. Base Data Sources: Government of Manitoba and Government of Canada.
3. Imagery: SPOT-7 imagery, BlackBridge Geomatics Corp. July 2015.

Project Location
Lynn Lake, Manitoba

Prepared by ACampigotto on 2020-04-03
Technical Review by ASomers on 2020-04-03
Senior GIS Review by GKroupa on 2020-04-03

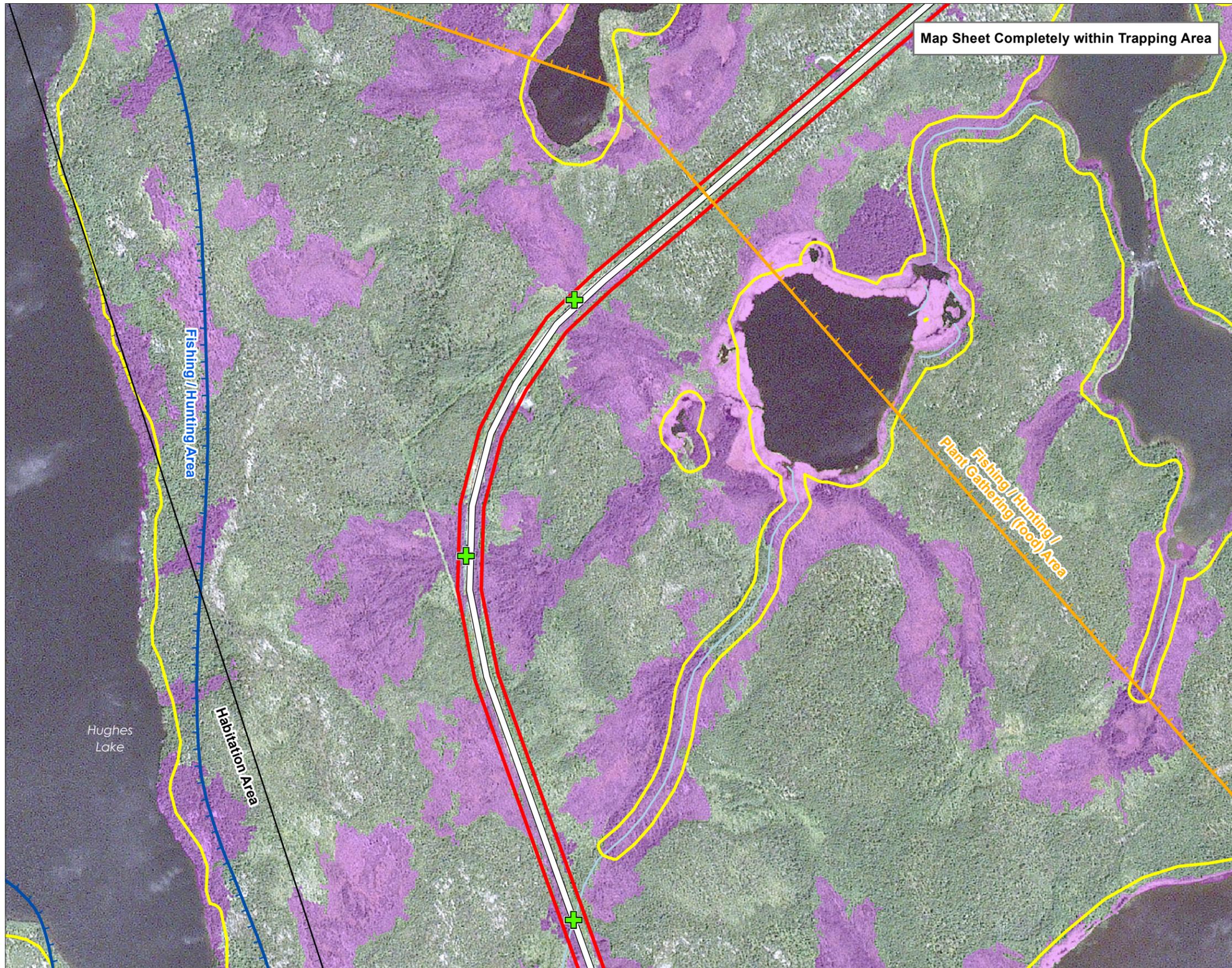
Client/Project
ALAMOS GOLD INC.
Lynn Lake Gold Project

111473008

Map No.
2-3d

Title
Environmentally Sensitive Sites at the Gordon site

Map Sheet Completely within Trapping Area



Project Infrastructure

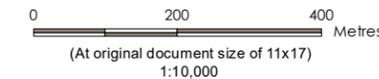
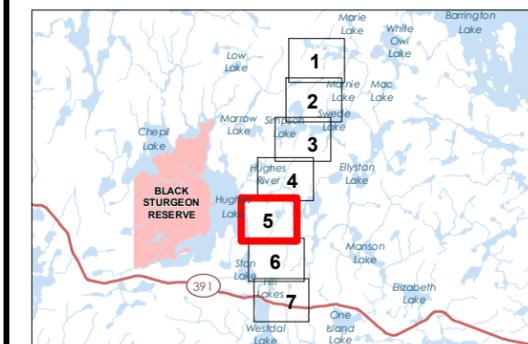
Project Development Area

Environmentally Sensitive Sites

- Ephemeral Stream
- Water Features 30m Buffer
- Habitation Area
- Fishing / Hunting / Plant Gathering (food) Area
- Fishing / Hunting Area
- Wetland Area (interpreted from satellite imagery)

Landbase

- Existing Access Road
- Watercourse



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 14N
 2. Base Data Sources: Government of Manitoba and Government of Canada.
 3. Imagery: SPOT-7 imagery, BlackBridgе Geomatics Corp. July 2015.

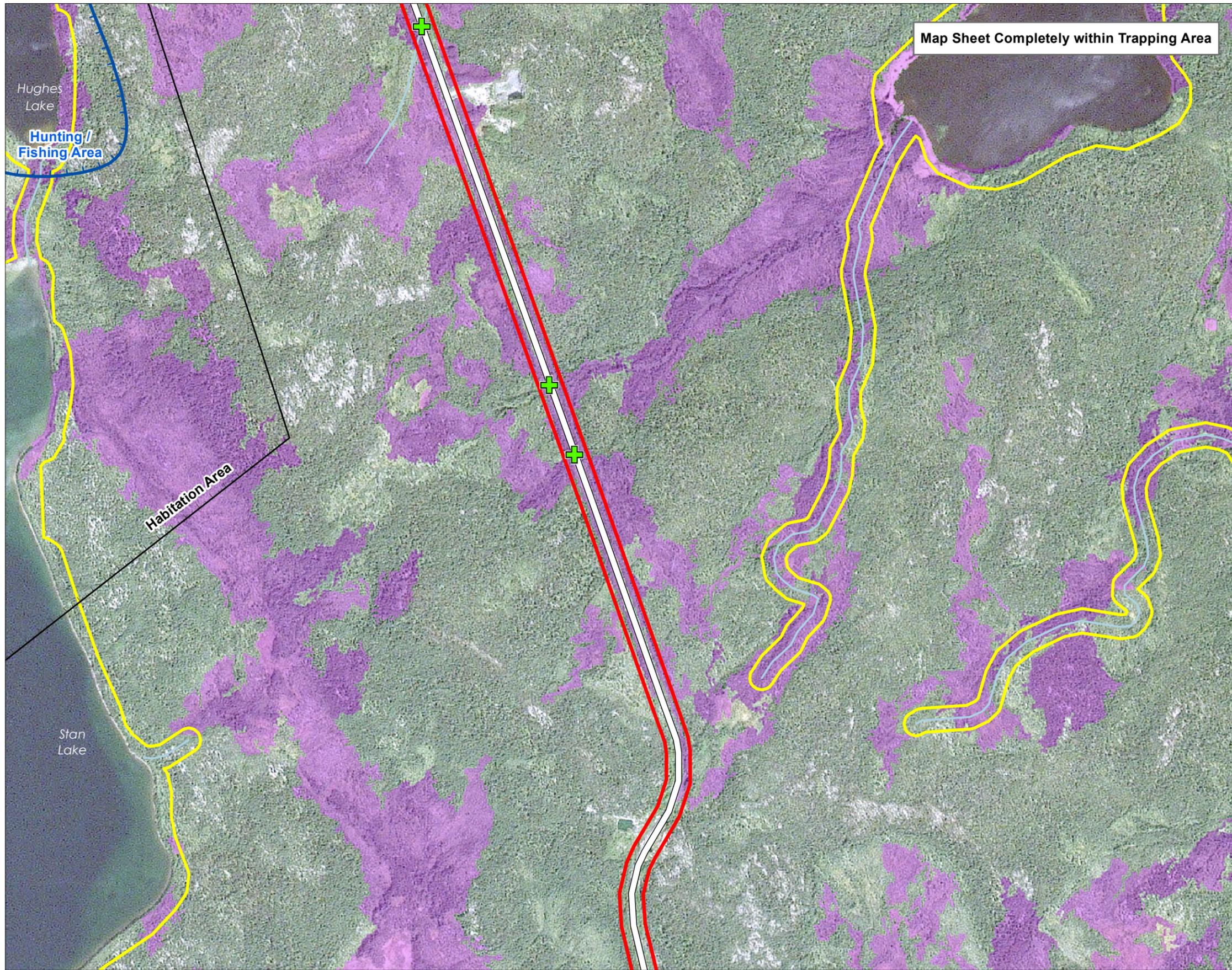
Project Location
Lynn Lake, Manitoba
Prepared by ACampigotto on 2020-04-03
Technical Review by ASomers on 2020-04-03
Senior GIS Review by GKroupa on 2020-04-03

Client/Project
ALAMOS GOLD INC.
Lynn Lake Gold Project
111473008

Map No.
2-3e

Title
Environmentally Sensitive Sites at the Gordon site

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Project Infrastructure

Project Development Area

Environmentally Sensitive Sites

Ephemeral Stream

Water Features 30m Buffer

Habitation Area

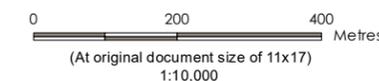
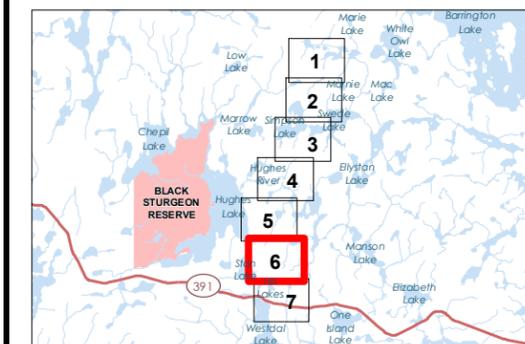
Fishing / Hunting Area

Wetland Area (interpreted from satellite imagery)

Landbase

Existing Access Road

Watercourse



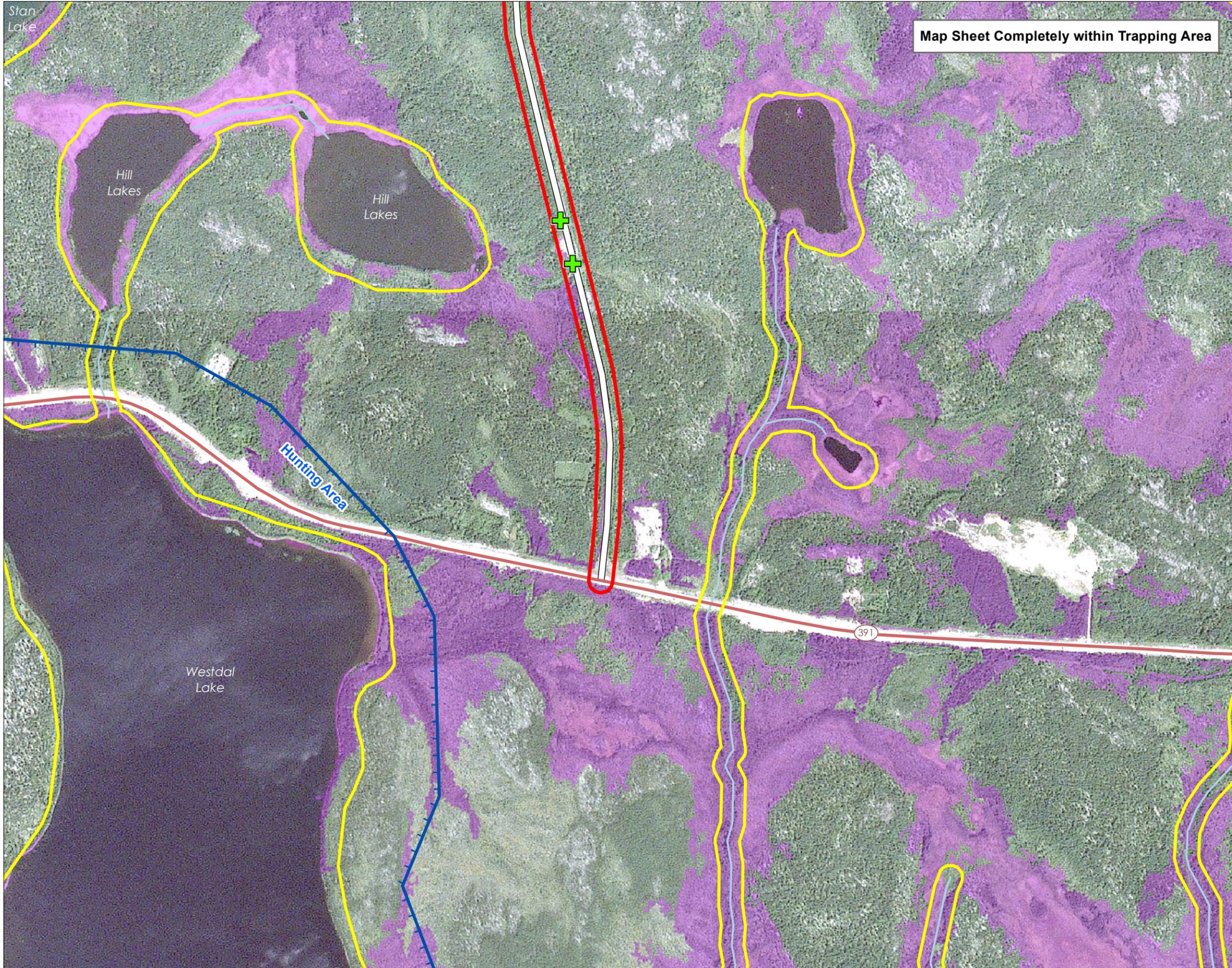
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1. Coordinate System: NAD 1983 UTM Zone 14N
2. Base Data Sources: Government of Manitoba and Government of Canada.
3. Imagery: SPOT-7 imagery, BlackBridg Geomatics Corp. July 2015.

Project Location
Lynn Lake, Manitoba
Prepared by ACampigotto on 2020-04-03
Technical Review by ASomers on 2020-04-03
Senior GIS Review by GKrupa on 2020-04-03

Client/Project
ALAMOS GOLD INC.
Lynn Lake Gold Project
111473008

Map No.
2-3f

Title
Environmentally Sensitive Sites at the Gordon site



Project Infrastructure

Project Development Area

Environmentally Sensitive Sites

Ephemeral Stream

Water Features 30m Buffer

Hunting Area

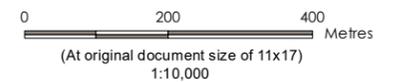
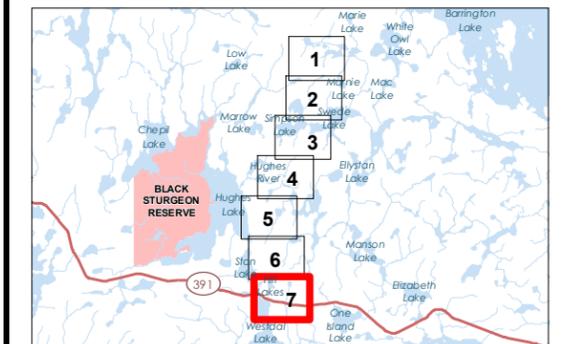
Wetland Area (interpreted from satellite imagery)

Landbase

Existing Access Road

Highway

Watercourse



Notes
 1. Coordinate System: NAD 1983 UTM Zone 14N
 2. Base Data Sources: Government of Manitoba and Government of Canada.
 3. Imagery: SPOT-7 imagery, BlackBridg Geomatics Corp. July 2015.

Project Location
 Lynn Lake, Manitoba
 Prepared by ACampigotto on 2020-04-03
 Technical Review by ASomers on 2020-04-03
 Senior GIS Review by GKroupa on 2020-04-03

Client/Project
 ALAMOS GOLD INC.
 Lynn Lake Gold Project
 111473008

Map No.
2-3g

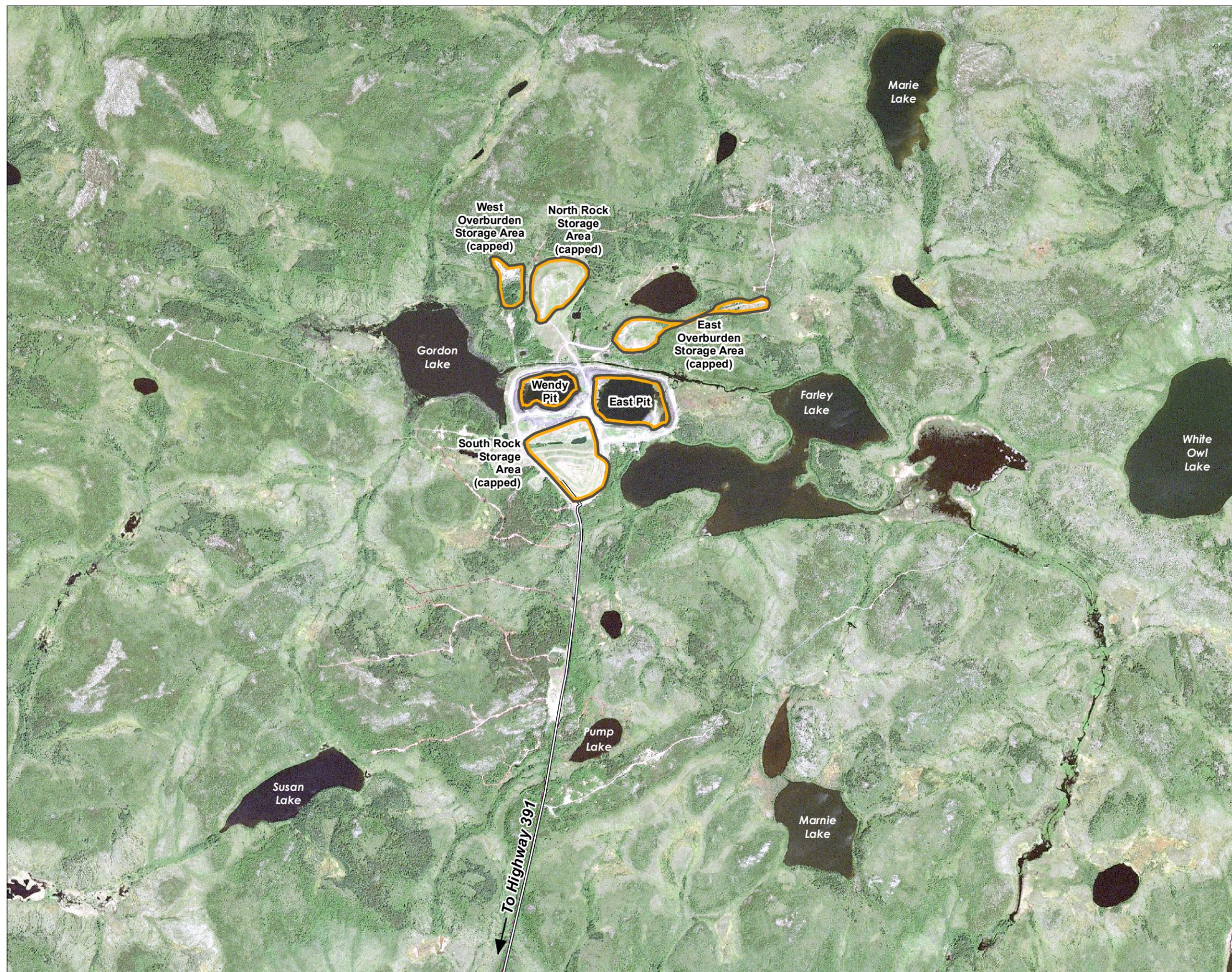
Title
Environmentally Sensitive Sites at the Gordon site

Historical Mine Infrastructure

 Existing Infrastructure Associated with Historical Mine

Landbase

 Existing Access Road



0 250 500 Metres
(At original document size of 11x17)
1:20,000

- Notes**
1. Coordinate System: NAD 1983 UTM Zone 14N
 2. Base Data Sources: Government of Manitoba and Government of Canada.
 3. Imagery: SPOT-7 imagery, BlackBridge Gemoatics Corp. July 2015.

Project Location
Lynn Lake, Manitoba

Prepared by ACampigotto on 2019-10-24
Technical Review by ASomers on 2019-10-24
Senior GIS Review by GKroupa on 2019-12-11

Client/Project
ALAMOS GOLD INC.
Lynn Lake Gold Project

111473008

Map No.

2-4

Title

Existing Gordon Site

Appendix A SUMMARY OF RESIDUAL EFFECTS



LYNN LAKE GOLD PROJECT ENVIRONMENT ACT PROPOSAL REPORT – GORDON SITE

Appendix A Summary of Residual Effects

Table A-1 Summary of Effects Assessment for the Gordon Site for Routine Project Effects and Activities

Potential Effect	Project Activity	Residual Effects								Significance of Residual Effect
		Direction	Magnitude	Geographic Extent	Duration	Timing	Frequency	Reversibility	Ecological and Socio-economic Context	
Value Component: Atmospheric Environment										
Change in air quality • Atmospheric dispersion of air emissions from Project equipment and activities during operation	C	A	L	LAA	ST	A	IR	R	D	Not significant
	O	A	L/M/H	LAA	MT	A	IR	R	D	Not significant
	D	A	N	LAA	LT	A	IR	R	D	Not significant
Change in atmospheric greenhouse gases (GHG) • GHG emissions from Project equipment and activities during construction and operation	C	A	L	N/A*	ST	N/A	C	I	D	Not significant
	O	A	L	N/A*	MT	N/A	C	I	D	Not significant
	D	A	N	N/A*	LT	N/A	IR	I	D	Not significant
Note: * Geographic extent during construction and operation is not applicable as the effect is determined at the provincial, national, and global scales. Geographic extent during decommissioning/closure is not applicable because the effect is global.										
Valued Component: Acoustic Environment										
Change in noise level • Noise emissions from Project equipment and activities, including pile driving, ore movement, and equipment operation	C	A	L-M	RAA	ST	N/A	C	R	D	Not significant
	O	A	L-M	RAA	MT	N/A	C	R	D	
	D	A	L-M	RAA	ST	N/A	C	R	D	
Change in vibration level • Vibration from activities such as pile driving, compacting, and haul truck traffic • Blast-related ground-borne vibration and air overpressure	C	A	N-L	LAA	ST	N/A	R	R	D	Not significant
	O	A	N-M	RAA	MT	N/A	R	R	D	
	D	A	N-L	LAA	ST	N/A	R	R	D	
Valued Component: Groundwater										
Change in groundwater quantity and/or flow • Project activities will result in changes in groundwater recharge and changes to groundwater levels and flow. A decrease in groundwater levels may result in loss of yield to dug or drilled wells, reducing their ability to meet water supply requirements. • As a pathway to surface water and wetlands, a decrease in groundwater levels and changes in the natural groundwater flow could affect discharge to nearby surface water bodies (assessed in Chapter 9 of EIS) and water levels within wetlands (assessed in Chapter 11 of EIS).	C	A	H	PDA & LAA/RAA	MT	A	C	R	D	Not significant
	O	A	H	PDA & LAA/RAA	MT	A	C	I	D	

Legend Key: Project Activity: C – Construction; O – Operation; D – Decommissioning/Closure; **Direction:** P – Positive; A – Adverse; **Magnitude:** N – Negligible; L – Low; M – Moderate; H – High; **Geographic Extent:** PDA – Project Development Area; LAA – Local Assessment Area; RAA – Regional Assessment Area; **Duration:** ST – Short-term; MT – Medium-term; LT – Long-term; **Timing:** A – Applicable; N/A – Not Applicable; **Frequency:** S – Single; IR – Irregular; R – Regular; C – Continuous; **Reversibility:** R – Reversible; I – Irreversible; **Ecological/Socio-economic Context:** D – Disturbed; U – Undisturbed; R – Resilient; NR – Not Resilient

LYNN LAKE GOLD PROJECT ENVIRONMENT ACT PROPOSAL REPORT – GORDON SITE

Appendix A Summary of Residual Effects

Table A-1 Summary of Effects Assessment for the Gordon Site for Routine Project Effects and Activities

Potential Effect	Project Activity	Residual Effects								Significance of Residual Effect
		Direction	Magnitude	Geographic Extent	Duration	Timing	Frequency	Reversibility	Ecological and Socio-economic Context	
	D	A	L	LAA/RAA	LT	A	C	I	D	
Change in groundwater quality • Changes in groundwater levels and flow direction and recharge or infiltration from the Project activities may alter groundwater quality in dug or drilled wells, reducing their ability to meet water supply requirements without treatment. • As a pathway, recharge or infiltration from Project activities may result in changes to groundwater quality discharging to surface water (assessed in Chapter 9).	C	P	M	PDA & LAA/RAA	ST	A	C	I	D	Not significant
	O	A	M	PDA & LAA/RAA	LT	A	C	I	D	
	D	A	M	PDA & LAA/RAA	LT	A	C	I	D	
Valued Component: Surface Water										
Change in surface water quantity • Change in lake levels and stream flows due to diversion, extraction, storage, or discharge of surface water during development, operation, and closure of the open pits, TMF, MRSAs, and associated mine infrastructure.	C	A	H	LAA	ST	N/A	C	R	D	Not significant
	O	A	H	LAA	MT	N/A	C	R	D	
	D	A	N	LAA	LT	N/A	C	I	D	
Change in surface water quality • Change in surface water quality associated with any mine effluent releases or surface runoff during construction, operation, and closure of the open pits, TMFs, MRSAs, and associated mine infrastructure.	C	A	M	LAA	MT	N/A	R	R	D	Not significant
	O	A	M	LAA	MT	A	R	R	D	
	D	A	M	LAA	LT	A	R	I	D	
Valued Component: Fish and Fish Habitat										
Change in fish habitat • Change in physical habitat due to mine infrastructure • Altered lake levels and stream flow (timing, duration, volume) for surface water due to construction of water management facilities and pits	C	A	H	LAA	MT	A	C	R	D	Not significant
	O	A	H	LAA	MT	A	C	R	D	
	D	A	H	LAA	MT	A	C	R	D	
Change in fish health, growth, or survival • Lethal effects due to dewatering, infilling, blasting, change in angling pressure, or entrainment in water intakes • Change in water quality parameters that influence habitat suitability: dissolved oxygen, temperature, total suspended solids • Chronic or acute toxicity effects due to changes in water and sediment quality from mine effluent releases	C	A	N	LAA	LT	A	R	I	R	Not significant
	O	A	N	LAA	LT	A	R	I	R	
	D	A	N	LAA	LT	A	R	I	R	

Legend Key: Project Activity: C – Construction; O – Operation; D – Decommissioning/Closure; **Direction:** P – Positive; A – Adverse; **Magnitude:** N – Negligible; L – Low; M – Moderate; H – High; **Geographic Extent:** PDA – Project Development Area; LAA – Local Assessment Area; RAA – Regional Assessment Area; **Duration:** ST – Short-term; MT – Medium-term; LT – Long-term; **Timing:** A – Applicable; N/A – Not Applicable; **Frequency:** S – Single; IR – Irregular; R – Regular; C – Continuous; **Reversibility:** R – Reversible; I – Irreversible; **Ecological/Socio-economic Context:** D – Disturbed; U – Undisturbed; R – Resilient; NR – Not Resilient



Table A-1 Summary of Effects Assessment for the Gordon Site for Routine Project Effects and Activities

Potential Effect	Project Activity	Residual Effects								Significance of Residual Effect
		Direction	Magnitude	Geographic Extent	Duration	Timing	Frequency	Reversibility	Ecological and Socio-economic Context	
Valued Component: Vegetation and Wetlands										
Change in landscape diversity • Fragmentation of native plant community patches arising from native vegetation clearing	C	A/P	L	RAA	LT	N/A	S	R	D	Not significant
	O	A/P	L	RAA	LT	N/A	S	R	D	
	D	A/P	L	RAA	LT	N/A	S	R	D	
Change in community diversity • Direct loss or alteration of native vegetation communities, including ecological communities of management concern arising from native vegetation clearing • Indirect alteration of native vegetation communities, including ecological communities of management concern from the introduction or establishment of regulated weeds, vegetation control (i.e., herbicide application) or deposition of dust and contaminants	C	A	L	PDA	LT	N/A	C	I	D	Not significant
	O	A	L	PDA	LT	N/A	C	I	D	
	D	A	L	PDA	LT	N/A	C	I	D	
Change in species diversity • Direct loss of plant SOCC or traditional use plant species due to vegetation clearing • Indirect loss of plant SOCC or traditional use plant species due to the introduction or establishment of regulated weeds, vegetation control (i.e., herbicide application) or deposition of dust and contaminants	C	A	M-H	LAA	LT	N/A	C	I/R	U	Not significant
	O	A	M-H	LAA	LT	N/A	C	I/R	U	
	D	A	M-H	LAA	LT	N/A	C	I/R	U	
Change in wetland functions • Direct loss or alteration of wetland area or change in wetland type from vegetation clearing or alteration of surface or groundwater flow patterns • Indirect loss or alteration of wetland area, structure, or function (i.e., nutrient cycling and carbon sequestration)	C	A	M	LAA	LT	N/A	C	I/R	U	Not significant
	O	A	M	LAA	LT	N/A	C	I/R	U	
	D	A	M	LAA	LT	N/A	C	I/R	U	

Legend Key: Project Activity: C – Construction; O – Operation; D – Decommissioning/Closure; **Direction:** P – Positive; A – Adverse; **Magnitude:** N – Negligible; L – Low; M – Moderate; H – High; **Geographic Extent:** PDA – Project Development Area; LAA – Local Assessment Area; RAA – Regional Assessment Area; **Duration:** ST – Short-term; MT – Medium-term; LT – Long-term; **Timing:** A – Applicable; N/A – Not Applicable; **Frequency:** S – Single; IR – Irregular; R – Regular; C – Continuous; **Reversibility:** R – Reversible; I – Irreversible; **Ecological/Socio-economic Context:** D – Disturbed; U – Undisturbed; R – Resilient; NR – Not Resilient



Table A-1 Summary of Effects Assessment for the Gordon Site for Routine Project Effects and Activities

Potential Effect	Project Activity	Residual Effects								Significance of Residual Effect
		Direction	Magnitude	Geographic Extent	Duration	Timing	Frequency	Reversibility	Ecological and Socio-economic Context	
Valued Component: Wildlife and Wildlife Habitat										
Change in habitat • Direct and/or indirect loss or alteration of habitat due to vegetation clearing, sensory disturbance (e.g., avoidance), and/or edge effects.	C	A	L*	RAA	ST	A	S	R	D/U	Not significant
	O	A	L	RAA	MT	A	C	R	D/U	
	D	P/A	L	RAA	LT	A	C	R	D/U	
Change in mortality risk • Direct change in mortality risk due to vegetation clearing activities, vehicular collisions, human-wildlife conflicts, and indirect change in mortality risk due to predation and harvest pressure.	C	A	L	LAA	ST	A	IR	R	D/U	Not significant
	O	A	L	LAA	MT	A	IR	R	D/U	
	D	A	L	LAA	LT	A	IR	R	D/U	
Change in wildlife health • Activities associated with construction, operation, and/or decommissioning/closure of the Project may result in increased risk of exposure of wildlife to contaminants.	C	A	N-L	LAA	LT	A	C	R	D/U	Not significant
	O	A	N-L	LAA	MT	A	C	R	D/U	
	D	A	N-L	LAA	LT	A	C	R	D/U	
Note: * magnitude is low for Gordon as effects will result in a <10% and <5% change in wildlife habitat and SAR and SOCC habitat in the LAA, respectively.										
Valued Component: Labour and Economy										
Change in local and regional labour force • Project demand for labour	C	P	L	LAA/RAA	ST	N/A	C	R	NR/R	Not significant
	O	P	L	LAA/RAA	MT	N/A	C	R	NR/R	
	D	A	L	LAA/RAA	ST	N/A	C	I	NR/R	
Change in local and regional business • Project regional expenditures • Project direct employment	C	P	L	LAA/RAA	ST	N/A	C	R	NR/R	Not significant
	O	P	L	LAA/RAA	MT	N/A	C	R	NR/R	
	D	A	L	LAA/RAA	ST	N/A	C	I	NR/R	

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Table A-1 Summary of Effects Assessment for the Gordon Site for Routine Project Effects and Activities

Potential Effect	Project Activity	Residual Effects								Significance of Residual Effect
		Direction	Magnitude	Geographic Extent	Duration	Timing	Frequency	Reversibility	Ecological and Socio-economic Context	
Change in local and regional economy • Project regional expenditures • Project direct employment • Project property taxes	C	P	L-M	LAA/RAA	ST	N/A	C	R	R	Not significant
	O	P	L-M	LAA/RAA	MT	N/A	C	R	R	
	D	A*	M	LAA/RAA	ST	N/A	C	I	R	
Note: * Adverse effects associated with losses in employment and contributions to GDP occur continuously over the short-term during decommissioning/closure.										
Valued Component: Community Services, Infrastructure and Well-being										
Change in housing and temporary accommodations • Demand on housing and temporary accommodations may be affected by Project activities and Project-related population growth.	C	A	N	LAA	MT	N/A	C	R	NR	Not significant
	O	A	N	LAA	MT	N/A	C	R	NR	
	D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Change in local services and infrastructure • Demand on local services and infrastructure may be affected by Project activities and Project-related population growth.	C	A	L	LAA	MT	N/A	C	R	R	Not significant
	O	A	L	LAA	MT	N/A	C	R	R	
	D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Change in transportation services and infrastructure • Demand on transportation services and infrastructure may be affected by Project activities and Project-related population growth.	C	A	L	LAA	MT	N/A	C	R	R	Not significant
	O	A	L	LAA	MT	N/A	C	R	R	
	D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Change in community well-being • Project-related employment has the potential to increase individual and household income, increase disposable income, and reduce financial barriers to beneficial health practices or negative coping mechanisms. • Project-related population growth has potential to change the demographics of nearby communities and result in changes to community cohesion • The Project has the potential to change (increase or decrease) the amount of time individuals and households have to participate in recreational, subsistence, and family-related activities through gained employment	C	P/A	L/M	LAA	MT/LT	N/A	C	R	NR	Not significant
	O	P/A	L/M	LAA	MT/LT	N/A	C	R	NR	
	D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

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LYNN LAKE GOLD PROJECT ENVIRONMENT ACT PROPOSAL REPORT – GORDON SITE

Appendix A Summary of Residual Effects

Table A-1 Summary of Effects Assessment for the Gordon Site for Routine Project Effects and Activities

Potential Effect	Project Activity	Residual Effects								Significance of Residual Effect
		Direction	Magnitude	Geographic Extent	Duration	Timing	Frequency	Reversibility	Ecological and Socio-economic Context	
Valued Component: Land and Resource Use										
Change in land use • Project activities incompatible with applicable land use plans and zoning • Disturbance and nuisance effects on property (noise, dust) • Project presence and site activities may affect use/future development	C	A	L-M	PDA/LAA	ST-LT	N/A	IR/C	R/IR	D	Not significant
	O	A	L-M	PDA/LAA	ST-LT	N/A	IR/C	R/IR	D	
	D	A	L-M	PDA/LAA	ST-LT	N/A	IR/C	R/IR	D	
Change in recreation • Project clearing may result in the loss of area available for recreational use • Project presence and site activities may affect access to or quality of recreational use (inclusive of land and water- based activities)	C	A	L-M	PDA/LAA	ST-LT	A	IR/C	R/IR	D	Not significant
	O	A	L-M	PDA/LAA	ST-LT	A	IR/C	R/IR	D	
	D	A	L-M	PDA/LAA	ST-LT	A	IR/C	R/IR	D	
Change in resource use • Project can reduce productive forest land, annual allowable cut (AAC) and merchantable timber, and cause disturbance to high- value forest sites • Disruption effects to development/extraction (minerals and aggregate) • Can disrupt resource harvesting success (hunting, trapping, fishing)	C	A	L	PDA/LAA	ST-LT	N/A	S/IR/C	R/IR	D	Not significant
	O	A	L	PDA/LAA	ST-LT	N/A	S/IR/C	R/IR	D	
	D	A	L	PDA/LAA	ST-LT	N/A	S/IR/C	R/IR	D	
Valued Component: Heritage Resources										
Change to heritage resources • Project components requiring ground disturbance have the potential to change the horizontal and vertical context of known or potential heritage resource sites	C	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not significant
	O	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

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Appendix A Summary of Residual Effects

Table A-1 Summary of Effects Assessment for the Gordon Site for Routine Project Effects and Activities

Potential Effect	Project Activity	Residual Effects								Significance of Residual Effect
		Direction	Magnitude	Geographic Extent	Duration	Timing	Frequency	Reversibility	Ecological and Socio-economic Context	
Valued Component: Current Use of Lands and Resources for Traditional Purposes										
Change in availability of resources currently used for traditional purposes <ul style="list-style-type: none"> Vegetation clearing associated with Project construction could result in a loss of habitat for species of traditional importance, including plants and animals relied on for traditional hunting, trapping, or plant harvesting Loss or alteration of fish habitat resulting from disturbance to watercourses Sensory disturbance from Project operation has the potential to affect the availability of habitat for species traditional importance An increase in hunting or fishing pressure by non-Indigenous people has the potential to affect the availability of traditionally used species Potential effects on wildlife, fish, and vegetative health that could affect the availability of traditional resources 	C	A	L	LAA	LT	A	C	R	D	Not significant
	O	A	L	LAA	LT	A	C	R	D	
	D	A	L	LAA	LT	A	C	R	D	
Change in access to resources or areas currently used for traditional purposes <ul style="list-style-type: none"> Loss, alteration, or restriction of access (including trails and travelways) to current lands and resources used for traditional purposes 	C	A	L	LAA	LT	A	C	R	D	Not significant
	O	A	L	LAA	LT	A	C	R	D	
	D	A	L	LAA	LT	A	C	R	D	
Change to traditional cultural and spiritual sites and areas <ul style="list-style-type: none"> Project construction and operation could result in a loss or alteration of identified current use harvesting sites, habitation areas, cultural and sacred sites Indirect effects on the experience of Indigenous peoples which adversely alter the perceived values of current use sites or areas 	C	A	L	LAA	MT	N/A	C	R	D	Not significant
	O	A	L	LAA	MT	N/A	C	R	D	
	D	A	L	LAA	MT	N/A	C	R	D	

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Potential Effect	Project Activity	Residual Effects								Significance of Residual Effect
		Direction	Magnitude	Geographic Extent	Duration	Timing	Frequency	Reversibility	Ecological and Socio-economic Context	
Change to the environment that affects cultural value or importance associated with current use* <ul style="list-style-type: none"> Indirect effects on the experience of Indigenous peoples which adversely alter the perceived value of access to traditional resources for current use or current use sites and areas Change to values or attributes of the area that make it important Presence of worker or increased access to the area by non-Indigenous peoples Sensory disturbance from Project construction and operation has the potential to affect Changes that could detract from use of the area or lead to avoidance of the area as a result of real and perceived disturbance of the environment 	C	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not applicable
	O	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Note: * Change to the environment that affects cultural value or importance associated with current use is considered in Chapter 17 of the EIS. As indicated there, effects on cultural value are often intangible, and do not lend themselves well to being characterized. As such, the discussion in Chapter 17 regarding cultural values is focused on presenting information shared by Indigenous communities engaged on the Project and does not assign residual effects characterizations. The inclusion of 'N/A' in the characterization categories is not meant to imply that there is no effect, but rather that this particular potential effect was not considered in the way that other potential effects are considered by other VCs.										
Valued Component: Human Health										
Change in human health <ul style="list-style-type: none"> Inhalation of contaminants of potential concern (COPC) emissions in air Ingestion and dermal contact with COPC in soil due to Project emissions. Ingestion of COPC in surface water due to Project emissions. Ingestion of COPC in backyard produce, traditional plants, wild meat, and fish due to Project emissions and uptake of COPC from soil, water and/or tissue. Ingestion and dermal contact with COPC in sediment due to Project emissions. 	C	A	N	LAA, RAA	LT	N/A	C	I	D	Not significant
	O	A	N	LAA, RAA	LT	N/A	C	I	D	
	D	A	N	LAA, RAA	LT	N/A	C	I	D	
Valued Component: Indigenous Peoples										
Indigenous Health Conditions Considered: <ul style="list-style-type: none"> Change to lands and resources currently used for traditional purposes Change in human health 	C O D	A	M	LAA	LT	A	IR	I/R	D	Not significant
Indigenous Socio-economic Conditions Considered: <ul style="list-style-type: none"> Change to land and resource use Change in community services, infrastructure, and well-being Change in labour and economy 	C O D	A, P	M	LAA	LT	A	C	R	D	

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		Direction	Magnitude	Geographic Extent	Duration	Timing	Frequency	Reversibility	Ecological and Socio-economic Context	
Indigenous Physical and Cultural Heritage Considered: - Change to heritage resources - Change to lands and resources currently used for traditional purposes	C O D	A	L	LAA	LT	N/A	C	I	D	Not significant

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