

**PROJECT DESCRIPTION**  
**Alamos Gold Inc.**  
**Lynn Lake Gold Project**

**FORMAL SUBMISSION**

Prepared for:  
Canadian Environmental  
Assessment Agency

Prepared by:



Stantec Consulting Ltd.  
500-311 Portage Avenue  
Winnipeg, MB R3B 2B9



Alamos Gold Inc.  
Brookfield Place  
181 Bay Street, Suite 3910  
Toronto, Ontario, M5J 2T3

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### **Executive Summary/ Sommaire**

Provided separately.  
Sous pli séparé.

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### Acronyms and Abbreviations

µg	microgram(s)
µm	micrometer(s)
Agency, the	Canadian Environmental Assessment Agency
Alamos	Alamos Gold Inc.
AMSL	above mean sea level
ARD	acid rock drainage
AuRico	AuRico Gold Inc.
Ausenco	Ausenco Limited
BLFN	Barren Lands First Nation
BQCMB	Beverly and Qamanirjuaq Caribou Management Board
Carlisle	Carlisle Goldfields Limited
CD Regulation	<i>Classes of Development Regulation</i>
CDWQG	<i>Canadian Drinking Water Quality Guidelines</i>
CDWQG-FAL	<i>Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life</i>
CEAA 2012	<i>Canadian Environmental Assessment Act, 2012</i>
CEPA	<i>Canadian Environmental Protection Act, 1999</i>
CIP	carbon-in-pulp
CO <sub>2e</sub>	carbon dioxide equivalent
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CRA	commercial, recreational, or Aboriginal
dBA	decibel A-weighting
DFO	Fisheries and Oceans Canada
dm <sup>3</sup>	cubic decameters
EA	environmental assessment
EAP Guidelines	<i>Environment Act Proposal Report Guidelines</i>
EAP	Environment Act Proposal
ECCC	Environment and Climate Change Canada
EIS	environmental impact statement
EMP	Environmental Management Plan

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EPP	Environmental Protection Plan
ERAP	Emergency Response Assistance Plan
g	gram(s)
GHG	greenhouse gas
Golder	Golder Associates
Guidelines, the	<i>Guide to Preparing a Description of a Designated Project under the Canadian Environmental Assessment Act, 2012</i>
H	horizontal
ha	hectare(s)
HHERA	Human Health and Ecological Risk Assessment
HRIA	Heritage Resources Impact Assessment
Kinoosao	Kinoosao-Thomas Clarke reserve
km	kilometre(s)
km <sup>2</sup>	square kilometre(s)
L	litre(s)
LAA	Local Assessment Area
LD	Limited Development District
L <sub>eq</sub>	equivalent continuous sound level
LGD	Local Government District
LLFC	Lynn Lake Friendship Centre
m	metre(s)
m <sup>2</sup>	square metre(s)
m <sup>3</sup>	cubic metre(s)
MB CDC	Manitoba Conservation Data Centre
MB ESEA	<i>The Endangered Species and Ecosystems Act (Manitoba)</i>
MBCA	<i>Migratory Birds Convention Act</i>
MCCN	Mathias Colomb Cree Nation
MCDC	Marcel Colomb Development Corporation
MCFN	Marcel Colomb First Nation
MGET	Manitoba Growth, Enterprise, and Trade
MI	Manitoba Infrastructure
ML	metal leaching
Mm <sup>3</sup>	cubic megametre(s)
MMER	<i>Metal Mining Effluent Regulations</i>

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MMF	Manitoba Métis Federation
MN-S	Métis Nation-Saskatchewan
MP	Member of Parliament
MPWQG	<i>Manitoba Provincial Water Quality Guidelines</i>
MPWQG-AL	<i>Manitoba Provincial Water Quality Guidelines for Aquatic Life</i>
MSCH	Manitoba Sport, Culture, and Heritage
MSD	Manitoba Sustainable Development
Mt	million tonne(s)
NAG	non-acid generating
NCN	Nisichawayasihk Cree Nation
NPA	<i>Navigation Protection Act</i>
NRCan	Natural Resources Canada
OPCN	O-Pipon-Na-Piwin Cree Nation
oz	ounce(s)
PAG	potentially acid generating
PBCN	Peter Ballantyne Cree Nation
PD	Project Description
PDA	Project Development Area
PLUP	Provincial Land Use Policy
PM <sub>10</sub>	particulate matter less than 10 µm in diameter
PM <sub>2.5</sub>	particulate matter less than 2.5 µm in diameter
PR	Provincial Road
Project, the	Lynn Lake Gold Project
Proponent, the	Alamos Gold Inc.
Q'Pit	Q'Pit Inc.
RAA	Regional Assessment Area
RCMP	Royal Canadian Mounted Police
Regulations, the	<i>Regulations Designating Physical Activities</i>
RMA	Resource Management Area
ROM	run-of-mine
s	second(s)
SARA	<i>Species at Risk Act</i>
SO <sub>2</sub>	sulphur dioxide

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SOCC	species of conservation concern
Stantec	Stantec Consulting Ltd.
t	tonne(s)
TDG Act	<i>Transportation of Dangerous Goods Act, 1992</i>
TIA	Tailing Impoundment Areas
TK/TLRU	Traditional Knowledge/Traditional Land and Resource Use
TLE	Treaty Land Entitlement
TMF	Tailings Management Facility
UTM	Universal Transverse Mercator
V	vertical
VC	Valued Component

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# 1 INTRODUCTION

The Lynn Lake Gold Project (the Project) is the proposed redevelopment of two historical gold mines near Lynn Lake, Manitoba by Alamos Gold Inc. (Alamos; the Proponent). This document is a Project Description (PD) that is intended to initiate the federal environmental assessment (EA) process under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) and inform the provincial EA process under *The Environment Act* of Manitoba. This PD has been prepared in accordance with the federal *Prescribed Information for the Description of a Designated Project Regulations*, the corresponding *Guide to Preparing a Description of a Designated Project under the Canadian Environmental Assessment Act, 2012* (the Guidelines; the Agency 2015), and in consideration of the provincial *Environment Act Proposal Report Guidelines* (EAP Guidelines; MCWS 2015). The concordance table in **Appendix A** indicates where the requirements set out in the federal Regulations and Guidelines are addressed in this PD.

## 1.1 PROJECT BACKGROUND, OVERVIEW AND OBJECTIVES

The Lynn Lake Gold 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 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, 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 (**Map 1, Appendix B**). All buildings and infrastructure have been removed, as shown below in a present-day aerial photograph of the Gordon site (**Photo 1**).

The property was purchased by Carlisle Goldfields Limited (Carlisle) in 2011 and, in 2014, Carlisle and AuRico Gold Inc. (AuRico) formed a joint venture for the potential redevelopment of this mine site. Alamos subsequently inherited the joint venture when it merged with AuRico 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.

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**Photo 1 Aerial Photograph of Gordon Site**

The MacLellan site was formerly operated as an underground gold and silver mine, with a five-level shaft to a depth of 448 m and ramp access from surface to 420 m below. The mine was operated by Maskwa Nickel Chrome Mines Limited, a subsidiary of Falconbridge Nickel Mines Limited, between 1986 and 1989 and produced approximately 144,000 oz of gold and 432,000 oz of silver through a 900- to 1,200-tonnes per day (t/day) milling operation. The mine operated under a licence that allowed for the discharge of mine water and sewage-plant effluent into polishing ponds and a marshy area adjacent to the Keewatin River. Ore was trucked to the Black Hawk Mining Inc. mill facility in Lynn Lake for processing.

The mine was closed due to high operating costs and falling gold prices in 1989 and has been in a 'care and maintenance' phase since, with very little reclamation completed (Tetra Tech 2013), as shown below in a present-day aerial photograph of the MacLellan site (**Photo 2**). The site currently consists of a 4.6-km gravel access road, power transmission line (abandoned pole line), and infrastructure from the former underground mine, such as head frame, hoist house and shaft, access ramp, maintenance and other storage buildings, core shack and core racks, vent raise, and mine water settling ponds (**Map 2, Appendix B**).

Although the site has not been in operation since 1989, ownership has changed over the years. In 2004, the property was purchased by Carlisle, and similar to the Gordon site, Alamos gained consolidated ownership of the mining claims, mineral leases, and a surface lease through the acquisition of Carlisle in 2016.

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**Photo 2 Aerial Photograph of MacLellan Site**

Alamos proposes to develop new mine infrastructure at the MacLellan site, including a new 2.6-km access road, a central ore milling and processing plant, associated infrastructure, ore and overburden stockpiles, a mine rock storage area, and a Tailings Management Facility (TMF). Infrastructure at the Gordon site will be limited to the open pit, ore and overburden stockpiles, a mine rock storage area, and minor supporting infrastructure for equipment storage and maintenance. There will be no tailings storage at the Gordon site.

Construction, operation, decommissioning, reclamation, and closure of mining infrastructure at the Gordon and MacLellan sites are considered a single Project for the purposes of this PD. The objective of the Project is to produce gold (doré bullion) for sale. The current estimates are for a total Project mine excavation of 220 Mt with a maximum 8,000 t/day design processing rate and an estimated 11-year Project mine life. The total mineralized material to be mined from the open pits at both sites is estimated to be approximately 26.1 Mt, with an average recoverable grade of 1.75 grams per tonne (g/t) gold and 1.52 g/t silver, resulting in the production of 1,465,000 oz of gold and 1,267,000 oz of silver.

## 1.2 PROPONENT INFORMATION

Alamos is a Canadian-based intermediate gold producer with diversified production from three operating mines in North America: the Young-Davidson Mine in northern Ontario, Canada, and

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the Mulatos and El Chanate Mines in Sonora, Mexico. Alamos has a leading growth profile with exploration and development projects in Mexico, Turkey, Canada, and the United States (Alamos 2016).

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. (Stantec); feasibility and design/engineering support from Ausenco Limited (Ausenco); geotechnical engineering support from Golder Associates (Golder); mine design support from Q'Pit Inc. (Q'Pit); and accommodation assessment support for the Project from rePlan (an ERM Group Company).

The Proponent contact information is as follows:

<b>Project Proponent:</b>	Alamos Gold Inc. (Alamos) Address: Brookfield Place, 181 Bay Street, Suite 3910 P.O. Box #823, Toronto, ON, M5J 2T3 Website: <a href="http://www.alamosgold.com">www.alamosgold.com</a>
<b>Proponent Chief Executive Officer:</b>	John A. McCluskey President and Chief Executive Officer Address: Brookfield Place, 181 Bay Street, Suite 3910 P.O. Box #823, Toronto, ON, M5J 2T3 Phone: (416) 368-9932 Email: <a href="mailto:jmc@alamosgold.com">jmc@alamosgold.com</a>
<b>Main Proponent Contact Regarding the Project:</b>	Paolo Toscano, P.Eng. Director, Projects Address: Brookfield Place, 181 Bay Street, Suite 3910 P.O. Box #823, Toronto, ON, M5J 2T3 Phone: (416) 368-9932 x 5411 Cell: (647) 729-9605 Email: <a href="mailto:PToscano@alamosgold.com">PToscano@alamosgold.com</a>
<b>Main Proponent Contact Regarding Environmental Assessment:</b>	Michael Raess Senior Environmental and Community Relations Coordinator Address: 475 Sherritt Avenue, PO Box 580 Lynn Lake, MB, R0B 0W0 Phone: (204) 356-2647 Cell: (306) 371-1296 Email: <a href="mailto:MRaess@alamosgold.com">MRaess@alamosgold.com</a>
<b>Main Environmental Consultant Contact Regarding EA:</b>	Karen Mathers, P.Geo. Stantec Consulting Ltd., Project Manager Address: 500-311 Portage Avenue Winnipeg, MB, R3B 2B9 Phone: (204) 924-5735 Cell: (204) 799-6159 Email: <a href="mailto:Karen.Mathers@stantec.com">Karen.Mathers@stantec.com</a>

## 1.3 REGULATORY FRAMEWORK

There are several federal and provincial regulatory requirements that may apply to the Project, including EA and other environmental permitting obligations. A single Environmental Impact Statement (EIS) document will be submitted to satisfy any federal and provincial EA requirements.

### 1.3.1 Federal Jurisdiction

Under 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 Canadian Environmental Assessment Agency (the Agency) is responsible for the administration of federal EAs for metal mines under CEAA 2012.

The most relevant Project activities triggering potential requirements under CEAA 2012 are contained in the following provisions of the Regulations:

*16. The construction, operation, decommissioning and abandonment of a new*

*(b) metal mill with an ore input capacity of 4,000 t/day or more*

*(c) rare earth element mine or gold mine, other than a placer mine, with an ore production capacity of 600 t/day or more*

*17. The expansion of an existing*

*(c) rare earth element mine or gold mine, other than a placer mine, that would result in an increase in the area of mine operations of 50% or more and a total ore production capacity of 600 t/day or more*

The maximum ore production capacity for the Project (i.e., total mineralized material to be extracted from the open pits at both sites, excluding overburden and mine rock [waste]) is estimated to be approximately 9,745 t/day (3.56 Mt/year), including material to be stockpiled for future processing. Ore production capacities for the Gordon and MacLellan sites will vary by year. This overall maximum production capacity occurs in year 5 of the Project. The maximum ore production capacity at the Gordon site is estimated to be approximately 4,833 t/day (1.76 Mt/year) in year 3. The maximum ore production capacity at the MacLellan site is estimated to be approximately 5,962 t/day (2.18 Mt/year) in year 5. Based on the current mine plan, the maximum ore production capacities at each site will occur in different years and will never overlap temporally. As a result, an ore production capacity greater than 9,745 t/day is not possible for the Project and is not contemplated in the current mine plan.

The ore milling and processing plant that will be constructed at the MacLellan site for the proposed Project is designed to have an average throughput of 2.6 Mt/year. The maximum design ore input capacity is 8,000 t/day. These ore production and input capacities exceed the thresholds specified under the Regulations.

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The Project may also be considered an expansion of an existing gold mine under the Regulations because the total area of mine operations will increase by more than 50% over the areas of both the original (historical) mine operations and current mine site footprints, as shown in **Table 1.1**.

**Table 1.1 Summary of Proposed Mine Site Area Changes**

Project Site	Historical Operational Area <sup>1</sup> (ha)	Current Footprint Area <sup>2</sup> (ha)	Proposed Development Area <sup>3</sup> (ha)	Difference <sup>4</sup> (ha)	Difference <sup>4</sup> (%)
Gordon	44.6	14.4	108.5	+63.9 to +94.1	243 to 753
MacLellan	2.4	2.4	497	+494.6	20,708

Notes:

<sup>1</sup> At the Gordon site, the historical mine operational area has been considered to include the surface areas of East and Wendy Pits (9.3 ha and 5.1 ha, respectively), the North and South Rock Storage Areas (7.3 ha and 12.1 ha, respectively), and the East and West Overburden Storage Areas (7.2 ha and 3.6 ha, respectively).  
At the MacLellan site, the historical mine operational area has been considered to include the surface areas of the MacLellan Shaft and headframe (0.03 ha), the horizontal extent of the underground workings (0.03 ha), the escapeway (0.03 ha), entrance ramp (0.1 ha), mine rock storage area (0.8 ha), overburden rock storage area (1.0 ha), pump house (0.01 ha), sewage lagoon/settling pond (0.2 ha), and polishing pond (0.2 ha).

<sup>2</sup> At the Gordon site, the current mine operational area has been considered to only include the surface areas of East and Wendy Pits (9.3 and 5.1 ha, respectively) because all former storage areas have since been reclaimed.  
At the MacLellan site, the current mine operational area has been considered to be identical to the historical mine operational area because this site has not been reclaimed ('Care and Maintenance' phase since the time of mine closure).

<sup>3</sup> At the Gordon site, the proposed mine operational area has been considered to include the proposed footprints of the open pit (29 ha), mine rock storage area (61.9 ha), ore stockpile (3.4 ha), and the overburden stockpile (14.2 ha).  
At the MacLellan site, the proposed mine operational area has been considered to include the proposed footprints of the open pit (46.1 ha), mine rock storage area (163.3 ha), ore stockpiles (5.5 ha), overburden stockpile (35.7 ha), ultimate tailings management facility area (228.5 ha), and the footprint of the processing plant (17.9 ha).

<sup>4</sup> Range presented is either the actual or percentage difference between the proposed development (see note 3) and the current and historical operational areas (see notes 2 and 1, respectively).

In addition to the potential requirement to conduct a federal EA under CEAA 2012, the Project may also be subject to various other federal legislative and regulatory requirements, including several federal environmental regulatory approvals that may be required to carry out the Project. **Table 1.2** provides a summary of key potentially relevant federal legislation, but is not intended to be a complete list of all potential requirements.

The Project is not expected to receive financial support from any federal authorities, and the use of federal lands is not anticipated to be required in support of the Project. The nearest parcel of federal land is associated with a Royal Canadian Mounted Police (RCMP) detachment located approximately 6 km southwest of the MacLellan site.

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**Table 1.2 Summary of Key Potentially Relevant Federal Legislation**

<b>Legislation</b>	<b>Regulatory Authority</b>	<b>Scope</b>	<b>Potentially Applicable Permitting Requirement(s)</b>
<i>Canadian Environmental Assessment Act, 2012</i> (CEAA 2012)	the Agency	CEAA 2012 and its regulations establish the legislative basis for the federal practice of environmental assessment in most regions of Canada. It is intended to protect components of the environment that are within federal legislative authority from significant adverse environmental effects caused by a designated project.	As discussed above, federal EAs are possibly required for 'designated projects' consisting of one or more physical activities specified in the <i>Regulations Designating Physical Activities</i> , including the construction, operation, decommissioning, and abandonment of a new metal mill or gold mine above certain ore input capacity and ore production thresholds and the expansion of an existing gold mine above certain area increase and ore production thresholds.
<i>Canadian Environmental Protection Act, 1999</i> (CEPA)	Environment and Climate Change Canada (ECCC)	CEPA pertains to pollution prevention and the protection of the environment and human health to contribute to sustainable development. Among other items, CEPA provides a wide range of tools to manage toxic substances and other pollution and wastes, including hazardous wastes.	A permit may be required under section 185(1)(b) of CEPA, and the associated <i>Export and Import of Hazardous Waste and Hazardous Recyclable Materials Regulations</i> , if the Project involves the import, export, or conveyance in transit of a hazardous waste or hazardous recyclable material, or prescribed non-hazardous waste for final disposal.
<i>Explosives Act</i>	Natural Resources Canada (NRCan)	The <i>Explosives Act</i> applies with respect to the manufacture, testing, acquisition, possession, sale, storage, transportation, importation and exportation of explosives and the use of fireworks.	The Act requires anyone working with explosives to have a licence, certificate or permit issued by the federal Minister of Natural Resources.
<i>Fisheries Act</i>	Fisheries and Oceans Canada (DFO)  ECCC (administers section 36, specifically)	The <i>Fisheries Act</i> contains provisions for the protection of fish, shellfish, crustaceans, marine mammals, and their habitats. Under the <i>Fisheries Act</i> , no person shall carry on any work, undertaking, or activity that results in serious harm to fish that are part of a commercial, recreational, or Aboriginal (CRA) fishery, or to fish that support such a fishery, unless this activity has been authorized by the Minister of Fisheries and Oceans under section 35(2) of the Act.  Section 36 of the <i>Fisheries Act</i> pertains to the general prohibition of the deposition of a deleterious	Based on the current mine plan, authorization is not anticipated under section 35(2) of the Act as no aspect of the Project is expected to cause serious harm to fish that are part of a CRA fishery or that support a CRA fishery.  The Project is also not anticipated to require designation of a new TIA under Schedule 2 of the MMER. Following discussions with DFO and ECCC in September 2016 (refer to Section 3.1.2), the preliminary TMF design was revised to avoid the potential deposition of mine tailings into any watercourses or waterbodies frequented by fish.

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**Table 1.2 Summary of Key Potentially Relevant Federal Legislation**

Legislation	Regulatory Authority	Scope	Potentially Applicable Permitting Requirement(s)
		<p>substance into waters frequented by fish unless authorized by regulation. The <i>Metal Mining Effluent Regulations</i> (MMER) allow the discharge of mine effluent containing deleterious substances under certain conditions and subject to certain requirements. Deposition of mine tailings into watercourses or waterbodies frequented by fish is prohibited unless those watercourses and waterbodies are designated as Tailing Impoundment Areas (TIA) by the Parliament of Canada and listed in Schedule 2 of the MMER.</p>	
<p><i>Migratory Birds Convention Act</i> (MBCA)</p>	<p>ECCC</p>	<p>Under the MBCA, it is illegal to kill migratory bird species not listed as game birds or destroy their nests, eggs or young. The Act also prohibits the deposit of oil, oil wastes or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds.</p>	<p>Based on the current mine plan, the Project is not anticipated to require any permitting under section 19 of the <i>Migratory Birds Regulations</i>. No collection of migratory birds, nests, or their eggs for scientific purposes is anticipated.</p> <p>There are no permits for incidental take.</p>
<p><i>Navigation Protection Act</i> (NPA)</p>	<p>Transport Canada</p>	<p>The NPA is intended to protect specific inland and nearshore navigable waters (as identified on the schedule to the Act) by regulating the construction of works on those waters and by providing the Minister of Transport with the power to remove obstructions to navigation.</p> <p>The NPA also prohibits the depositing or throwing of materials that risk impacting navigation in navigable waters and the dewatering of navigable waters. The NPA requires that a Notice to the Minister be submitted by any owner who proposes to construct, place, alter, repair, rebuild, remove or decommission a work in a waterway on the list of scheduled waters, unless the work meets the criteria set out in the Minor Works Order.</p>	<p>No applicable permitting requirements under the NPA have been identified for the Project, as none of the watercourses and waterbodies in the vicinity of the Gordon and MacLellan sites (including the Keewatin River) are listed on the schedule of navigable waters specified in the NPA.</p>

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**Table 1.2 Summary of Key Potentially Relevant Federal Legislation**

Legislation	Regulatory Authority	Scope	Potentially Applicable Permitting Requirement(s)
<i>Species at Risk Act (SARA)</i>	DFO ECCC Parks Canada	SARA is intended to protect species at risk in Canada and their 'critical habitat' (as defined by SARA). The main provisions of the Act are scientific assessment and listing of species, species recovery, protection of critical habitat, compensation, permits and enforcement. The Act also provides for development of official recovery plans for species found to be most at risk, and management plans for species of special concern. Under the Act, proponents are required to complete an assessment of the environment and demonstrate that no harm will occur to listed species, their residences or critical habitat or identify adverse effects on listed wildlife species and their critical habitat, followed by the identification of mitigation measures to avoid or minimize effects. All activities must comply with SARA. Section 32 of the Act provides a complete list of prohibitions.	No permits are expected to be required under section 73(1) of SARA. For all other species at risk, a permit is only required if project activities occur on federally owned lands.  These permits are only granted for scientific research, or if affecting the species is incidental to the carrying out of the activity. They are not typically required for industrial developments if land clearing occurs outside of bird breeding period.
<i>Transportation of Dangerous Goods Act, 1992 (TDG Act)</i>	Transport Canada	The TDG Act and Regulations specify certain requirements for transporting dangerous goods, such as means of containment, permits and emergency response assistance plans.	Requirements under the TDG Act and Regulations may be applicable with respect to the potential transportation of explosives, cyanide, and other substances and chemicals that may be used in support of Project.  An Emergency Response Assistance Plan (ERAP) must be developed and approved before a person offers for transport or imports certain dangerous goods.  If a person wishes to carry on an activity related to transporting dangerous goods in a way that is not technically in compliance with the TDG Regulations, he or she can apply for a permit (Equivalency Certificate) for the activity if it can be shown to provide an equivalent level of safety and compliance with the intent of the regulations.

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### 1.3.2 Provincial Jurisdiction

The *Classes of Development Regulation* (CD Regulation) under *The Environment Act* of 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 (other than pits and quarries or potash mines and milling facilities) as Class 2 developments. The Project may also involve one or more 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 (refer to Section 2.3.1.4). The Project has potential to be upgraded to a Class 3 development if it includes any of the water development 'triggers' listed under section 4(4) of the CD Regulation, including:

- Inter-basin water transfers with diversion rates greater than 10 cubic metres per second (m<sup>3</sup>/s).
- Flood control projects protecting areas greater than 100 square kilometers (km<sup>2</sup>).
- Water supply impoundments greater than 50,000 cubic decameters (dm<sup>3</sup>).
- Land drainage projects draining areas greater than 500 km<sup>2</sup>.
- Works resulting in modification to lake or river levels and affecting a water surface area greater than 200 km<sup>2</sup>.
- Withdrawal of water of more than 10,000 dm<sup>3</sup> per year, including non-consumptive closed systems where water is returned to its sources and the flow rate is greater than 250 litres per second (L/s).
- Aquifer recharge with a closed system where water is returned to the aquifer from which it is taken with no change in quality other than temperature and flow rates not less than 25 L/s and not greater than 250 L/s.

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 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* of Manitoba. The Environmental Approvals Branch will allow both sites to be assessed in a single EIS under the provincial EA process (refer to Section 3.1.2).

In addition to the provincial EA and licensing requirements noted above, the Project is also subject to various other provincial legislative and regulatory requirements, including several provincial environmental regulatory approvals that may be required to carry out the Project. **Table 1.3** provides a summary of key potentially relevant provincial legislation, but is not intended to be a complete list of all potentially applicable requirements.

**PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT**

**Table 1.3 Summary of Key Potentially Relevant Provincial Legislation**

<b>Legislation</b>	<b>Regulatory Authority</b>	<b>Scope</b>	<b>Potentially Applicable Permitting Requirement(s)</b>
<i>The Mines and Minerals Act</i>	Manitoba Growth, Enterprise, and Trade (MGET) – Mineral Resources Division, Mines Branch	The object and purpose of the Act is to provide for, encourage, promote, and facilitate exploration, development and production of minerals and mineral product in Manitoba, consistent with the principles of sustainable development.	<p>A Mineral Lease obtained under the <i>Mineral Disposition and Mineral Lease Regulation, 1992</i> pursuant to the Act grants exclusive rights to Crown minerals and is required to work, mine and erect buildings.</p> <p>A Surface Lease obtained under the Act grants rights to use the surface for the efficient and economical performance of mining operations.</p> <p>Potentially applicable permitting requirements under the <i>Mine Closure Regulation</i> pursuant to the Act include the obligation to provide notice of expansion, alteration, suspension, or closure, and to file a closure plan.</p>
<i>The Crown Lands Act</i>	MSD – Lands Branch	<p><i>The Crown Lands Act</i> gives the provincial government discretionary power to issue permits, licences and leases that grant a temporary or permanent right or interest to use, access or occupy Crown lands. The provincial government can also purchase, exchange or dispose of (sell) Crown lands or 'designate' particular areas such that certain activities and/or uses are permitted or prohibited within the defined area.</p> <p>Similarly, Crown lands can be set aside under the Act for public usage.</p>	Work permits are required under section 7(1)(c) of the Act for work conducted on provincial Crown lands. (Work permits are also required under <i>The Wildfires Act</i> for industrial operations conducted within a Province of Manitoba Burning Permit Area.) A lease or permit may also be required under section 7(1)(a) or 7(1)(b) if the use or occupation of Crown lands is proposed in support of the Project. An easement or right-of-way would be required under section 7(1)(e) of the Act for any works upon, over, under, or in respect of Crown lands.
<i>The Dangerous Goods Handling and Transportation Act</i>	MSD – Environmental Approvals Branch	<i>The Dangerous Goods Handling and Transportation Act</i> sets out requirements for the handling and transportation of dangerous goods and hazardous waste. The Act enables the provincial government to establish standards pertaining to the generation, storage, transportation and disposal of hazardous waste.	Potential Project-related activities that may require licences or permits under the Act and its regulations include the transportation of hazardous wastes, construction or alteration of a petroleum storage tank system, petroleum storage with tanks greater than 230 L, and withdrawal of petroleum storage tanks from service for more than 30 days.

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**Table 1.3 Summary of Key Potentially Relevant Provincial Legislation**

Legislation	Regulatory Authority	Scope	Potentially Applicable Permitting Requirement(s)
<i>The Endangered Species and Ecosystems Act</i>	MSD – Wildlife Branch	<p>The Act was established in recognition of the ecological, educational, aesthetic, historical, medical, recreational, and scientific value of plant and animal species and ecosystems to Manitoba and the residents of Manitoba. The purpose of the Act is to promote coordinated efforts to protect plant and animal species and ecosystems that are at risk and to promote their recovery.</p> <p>Under the Act, it is unlawful to kill, injure, possess, disturb, or interfere with the species; destroy, disturb, or interfere with the habitat of the species; or damage, destroy, obstruct, or remove a natural resource on which the species depends for its life and propagation. The Act also protects endangered or threatened ecosystems.</p>	<p>Under section 11(1) of the Act, the Minister may issue a permit authorizing a person to kill, take, collect or capture; or collect or capture and hold alive; members of an endangered or threatened species for scientific purposes or for purposes related to the protection, management, or reintroduction of endangered, threatened or extirpated species. Such a permit may be required for baseline or monitoring studies on plants or with respect to species at risk.</p>
<i>The Environment Act</i>	MSD – Environmental Approvals Branch	<p>The intent of this Act is to develop and maintain an environmental protection and management system in Manitoba which will ensure that the environment is protected and maintained in such a manner as to sustain a high quality of life, including social and economic development, recreation and leisure for this and future generations, and in this regard, the Act:</p> <ul style="list-style-type: none"> <li>• is complementary to, and supports, existing and future provincial planning and policy mechanisms;</li> <li>• provides for the environmental assessment of projects which are likely to have significant effects on the environment;</li> <li>• provides for the recognition and utilization of existing effective review processes that adequately address environmental issues;</li> </ul>	<p>A licence must be obtained as part of the provincial EA process to allow the construction, operation, or decommissioning of a mine and milling facility.</p> <p>The Environmental Approvals Branch of MSD considers the Gordon and MacLellan sites to be separate “developments” that will require separate licences under <i>The Environment Act</i>. It is understood, however, that both sites can be assessed in a single EIS under the provincial EA process (refer to Section 3.1.2).</p> <p>Other potentially applicable permitting requirements under the Act include registration for the construction, installation, siting, locating, replacement, expansion, or modification of an on-site wastewater management system with flow less than 10,000 L/day in accordance with the <i>On-site Wastewater Management Systems</i></p>

**PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT**

**Table 1.3 Summary of Key Potentially Relevant Provincial Legislation**

<b>Legislation</b>	<b>Regulatory Authority</b>	<b>Scope</b>	<b>Potentially Applicable Permitting Requirement(s)</b>
		<ul style="list-style-type: none"> <li>provides for public consultation in environmental decision making while recognizing the responsibility of elected government including municipal governments as decision makers; and</li> <li>prohibits the unauthorized release of pollutants having a significant adverse effect on the environment.</li> </ul>	<i>Regulation.</i> Permits may also be required under the Act and its regulations for potential Project-related activities such as the use of pesticides on Crown land or a right-of-way.
<i>The Fisheries Act</i>	MSD – Fisheries Branch	Commercial and recreational fishing in Manitoba is governed by <i>The Fisheries Act</i> . The purpose of the Act is to develop, maintain, enhance, manage, and use Manitoba's fisheries in a sustainable manner.	A permit may be required under the Act for the handling or storage of live fish during inventorying, monitoring or salvage operations.
<i>The Forest Act</i>	MSD – Forestry Branch	The Act pertains to timber administration and pricing, timber tracking and scaling, and enforcement, penalties, and offences.	A permit may be required under the Act if the cutting or removing of timber on Crown land is proposed in support of the Project.
<i>The Heritage Resources Act</i>	Manitoba Sport, Culture, and Heritage – Historic Resources Branch	<i>The Heritage Resources Act</i> pertains to the designation and protection of heritage sites, heritage objects, and human remains.	The Act stipulates that, if the Minister has reason to believe that heritage resources or human remains that are upon, within or beneath a site are likely to be damaged or destroyed by reason of any work, a Heritage Resource Impact Assessment of the Project may be required. A Heritage Permit is required for searching or excavating in association with an archaeological excavation.
<i>The Highways Protection Act</i>	Manitoba Infrastructure	The purposes of the Act are to control the location, construction and use of entrances to and exits from certain highways; to control the use made of land that is contiguous or adjacent to, or that lies near certain highways; and to control the erection of structures along certain highways; with the objectives of protecting the interests of the public in the highways, promoting the safety of persons using the highways and	If alterations to Manitoba highway entrances are proposed, a permit may be required to construct, relocate, or substantially alter or change the use of, an entrance or exit from a limited access highway. A permit may also be required if the Project involves the addition, relocation, or rebuilding of any structures within a controlled area of a Manitoba highway.

**PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT**

**Table 1.3 Summary of Key Potentially Relevant Provincial Legislation**

<b>Legislation</b>	<b>Regulatory Authority</b>	<b>Scope</b>	<b>Potentially Applicable Permitting Requirement(s)</b>
		generally furthering the amenities of travel on the highways.	
<i>The Public Health Act</i>	Manitoba Health, Seniors, and Active Living – Public Health	The purpose of the Act is to enable the delivery of public health services to protect and promote the health and wellbeing of the people of Manitoba.	The Project may be subject to permitting requirements under various regulations pursuant to the Act, such as the <i>Collection and Disposal of Wastes Regulation</i> ; <i>Protection of Water Sources Regulation</i> ; and <i>Waterworks, Sewerage, and Sewage Disposal Regulation</i> .
<i>The Water Rights Act</i>	MSD – Water Use Licensing Section	<i>The Water Rights Act</i> is the legislative mechanism for ensuring that water resources are allocated in the best possible manner within the province.	A licence to construct water control works is required under section 3(1) of the Act for the construction of any dyke, dam, surface or subsurface drain, drainage, improved natural waterway, canal, tunnel, bridge, culvert, borehole, or contrivance for carrying or conducting water that temporarily or permanently changes flow, level, or direction of flow of water in a waterbody (including a wetland or aquifer).  The diversion and use of surface water or groundwater for industrial or other purposes also requires licensing under section 3(1) of the Act.
<i>The Wildlife Act</i>	MSD – Wildlife Branch	The scope of <i>The Wildlife Act</i> encompasses matters primarily associated with wildlife management, research and protection of property or persons. This is accomplished by prohibiting activities such as the hunting, killing, capturing, taking, possessing, importing, exporting, buying, or selling of wild animals except as permitted by the Act, a regulation, or a permit.	Potentially applicable permitting requirements under the Act include authorization to conduct any activities that disrupt a beaver dam (e.g., removal of a dam, installation of a pond leveler, etc.). Authorizations that may be required in association with baseline studies in support of the Project include a permit authorizing the holder to possess dead wildlife (e.g., for specimen collection, if required) and authorization to capture a wild animal.
<i>The Wildfires Act</i>	MSD – Wildfire Program	This Act regulates the Manitoba governments' practices and procedures in preventing and dealing with wildfires.	A Burn Permit may be required for open burning activities in a Burning Permit Area during the wildfire season (April 1 to November 15).

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**Table 1.3 Summary of Key Potentially Relevant Provincial Legislation**

Legislation	Regulatory Authority	Scope	Potentially Applicable Permitting Requirement(s)
			A Travel Permit may be required to authorize travel in an area designated in an Area Closure during the period specified in the Order. Such a permit may be necessary to allow continued operation the Project during times of Area Closure as specified by Ministerial Order due to wildfire risk.
<i>The Workplace Safety and Health Act</i>	MGET – Workplace Safety and Health	<i>The Workplace Safety and Health Act</i> protects the safety and health of workers in Manitoba.	Under the <i>Operation of Mines Regulation</i> pursuant to the Act, licences are required to authorize above-ground and underground magazines for storing explosives.

## 2 PROJECT INFORMATION

This section provides details regarding the Project location; Project components and activities; scheduling; and the potential emissions, discharges, and wastes that are likely to result from Project activities.

### 2.1 PROJECT LOCATION

The Gordon site is located 37 km east of Lynn Lake, and the MacLellan site is located 7 km northeast of Lynn Lake in Manitoba (**Map 3, Appendix B**). Lynn Lake is located approximately 820 km northwest of Winnipeg. **Table 2.1** provides the geographic coordinates for the two mine sites (specifically the centroid for each proposed open pit). The distance between the Gordon and MacLellan sites is approximately 30 km.

**Table 2.1 Geographic Coordinates for Gordon and MacLellan Sites**

Mine Site	Geographic Coordinates (UTM Zone 14N)	
	Easting	Northing
Gordon	412400	6307800
MacLellan	380900	6307500

The proposed preliminary site layouts for the redeveloped Gordon and MacLellan sites are shown on **Maps 4 and 5 (Appendix B)**. These site plans will be refined based on the results of further engineering feasibility and scientific studies and ongoing consultation and engagement activities.

Through the acquisition of Carlisle, Alamos has obtained the rights to existing mining claims and provincial leases issued by the Mines Branch of the Mineral Resources Division of MGET. Based upon the preliminary site layouts, the proposed Project infrastructure at the Gordon and MacLellan sites will be entirely located within the boundaries of those mining claims and leasehold lands, which are registered with the provincial Mines Branch in the name of Carlisle, a wholly-owned subsidiary of Alamos (**Map 6 and Map 7, Appendix B**).

### 2.2 GENERAL APPROACH AND ENVIRONMENTAL PROTECTION MEASURES

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

- Where possible, siting facilities to avoid sensitive areas such as watercourses, wetlands, important habitat types, and areas of high archaeological potential; and where unavoidable, reducing the size and number of natural features that may be affected.

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- Where possible, siting facilities within, instead of across, watershed boundaries 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.
- Adhering to regulated standards for air and water emissions, for storage or disposal of solid wastes, and for handling and disposal of hazardous materials.
- Adhering to regulated and/or industry design and management standards to address environmental risks such as seismicity, unusual weather events, flooding, and erosion.
- Preparing an Environmental Protection Plan (EPP) for construction activities that is included in, and enforced through, construction contracts.
- Preparing and implementing an Environmental Management Plan (EMP) during operation 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 Closure Plan, including the provision of security to the provincial Crown for performance of rehabilitation work.
- Planning and financing activities to compensate for unavoidable adverse effects on environmental resources such as aquatic habitats.
- A public, stakeholder and Indigenous engagement program. Alamos has commenced consultation and engagement activities, as summarized in Section 3. These consultation and engagement efforts will be ongoing throughout the Project planning and permitting phase and implemented throughout construction, operation, and eventual mine 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.

The location of Project components will be finalized based on engineering feasibility studies and environmental considerations. To the extent possible, Project facilities will be sited to avoid or reduce interactions with watercourses/waterbodies, important habitat types, and areas of high archaeological potential. Where avoidance is not possible, mitigation measures will be developed in consultation with the applicable regulatory authorities and Indigenous communities.

### 2.3 PROJECT ACTIVITIES AND COMPONENTS

The key activities and components associated with each mine site comprising the proposed Project are described below.

## PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT

### 2.3.1 Gordon Site

After closure of the historical 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 and two overburden storage areas that have been capped, and two water-filled open pits (see **Map 1, Appendix B**). All buildings and infrastructure from the historical operations have been removed.

Alamos proposes to develop all new mine infrastructure at the MacLellan site for the processing of ore. As such, the infrastructure at the Gordon site will be limited to the open pit, ore and overburden stockpiles, a mine rock storage area, and minor supporting infrastructure for equipment storage and maintenance.

The Project activities and components proposed for the Gordon site are described further below.

#### 2.3.1.1 Resource Extraction and Storage

##### 2.3.1.1.1 Open Pit

The Gordon resource will be developed as an open pit mine operation. The current mine plan<sup>1</sup> calls for the removal of 3.8 Mt of rock and overburden during pre-production, and the stockpiling of 0.12 Mt of ore during this period. The current mine plan considers that 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 (see Section 2.3.2.1.2).

The total quantity of material to be mined from the Gordon open pit during Project mine operations is approximately 58.6 Mt, which includes ore material of 8.6 Mt.

The anticipated depth of the Gordon open pit is approximately 190 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 proposed 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 7 of Project operation. The mining rate (including all ore destined for immediate milling and processing, as well as all ore, overburden [if applicable and including top soil, muskeg, etc.], and mine rock to be stockpiled) at the Gordon site is planned to peak at 13 Mt/year or approximately 35,590 t/day (rounded for seasonal considerations) in year 3. Mine operations at the Gordon site are currently

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<sup>1</sup> Mine Plan Reference No. G12A M12B\_MAC5V

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planned to cease after year 6. The transfer of stockpiled ore, however, will continue into year 7 of Project operation.

### 2.3.1.1.2 Ore, Overburden, and Mine Rock Stockpiles/Storage Areas

Ore will be stockpiled at the Gordon site and used as feedstock for the ore milling and processing plant at the MacLellan site when the MacLellan site ore production is less than the plant capacity. The current mine plan calls for a peak stockpile of 0.83 Mt at the Gordon site, which will be stored within ore stockpiles. The ore stockpile area is currently proposed to be approximately 33,800 m<sup>2</sup>, located south of the open pit at the Gordon site (see **Map 4, Appendix B**). Depletion of this stockpiled material is anticipated in year 7.

ROM ore (i.e., raw/unprocessed ore that is intended for immediate processing rather than stockpiling) from the Gordon site will be transported to a pad directly adjacent to the ore milling and processing plant at the MacLellan site (see **Map 5, Appendix B**) for short-term storage before it is used as feedstock for the plant (refer to Section 2.3.2.1.2).

The Gordon site will also have stockpile areas for removed overburden as well as mine rock. These stockpile/storage areas are proposed to be located to the southwest and south of the open pit (see **Map 4, Appendix B**). **Table 2.2** provides the estimated maximum volumes of each material based on the current mine plan for the Gordon site.

**Table 2.2 Approximate Quantity of Mine Materials for the Gordon Site**

Project Site	Ore Stockpiles		Overburden		Mine Rock	
	Tonnage (Mt)	Volume (Mm <sup>3</sup> )	Tonnage (Mt)	Volume (Mm <sup>3</sup> )	Tonnage (Mt)	Volume (Mm <sup>3</sup> )
<b>Gordon</b>	0.83	0.37	1.2	0.75	49.0	21.8
Notes: Based on Mine Plan Reference No. G12A M12B_MAC5V Mine rock and ore stockpiled densities assumed to be 2.25 t/m <sup>3</sup> . Overburden stockpile density assumed to be 1.6 t/m <sup>3</sup> . Mine rock volumes based on a bulking factor of 1.3. Overburden volumes based on a bulking factor of 1.1.						

**Table 2.3** provides the general characteristics of each stockpile/storage area (i.e., height, bench configuration and overall slope). Final configurations are anticipated to be modified as the Project engineering is advanced.

**Table 2.3 Proposed Configurations for Stockpiles/Storage Areas at the Gordon Site**

Stockpile	Maximum Surface Area (m <sup>2</sup> )	Maximum Total Height (m)	Maximum Bench Height (m)	First Bench Thickness (m)	Berm Width (m)	Bench Face Angle (degrees)	Maximum Overall Slope (H:V)
Ore	33,800	10	5	5	3	33.7	1.8H:1V
Overburden	123,300	15	11		8	26.5	2.5H:1V
Mine Rock	618,100	50	15		14	33.7	2.5H:1V

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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 4, Appendix B**; refer to Section 2.6.2).

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 is 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. Any mine rock that is classified as PAG and/or ML that is expected to produce runoff may require additional mitigation, such as blending, dry and/or wet covers, and/or treatment. Final required mitigation measures will be determined as the Project plan and environmental assessment are advanced.

### 2.3.1.2 Other Waste Storage and Management

#### 2.3.1.2.1 Sewage Treatment

For the Gordon site, sewage treatment will be required and is proposed to consist of a septic tank with subsurface disposal or a small treatment plant designed in accordance with applicable regulatory requirements (e.g., *Onsite Wastewater Management Systems Regulation* under *The Environment Act* of Manitoba).

#### 2.3.1.2.2 Domestic Solid Waste Handling

All 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. 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, CEPA and associated regulations, and the TDG Act and associated regulations).

### 2.3.1.3 Utilities and Infrastructure

#### 2.3.1.3.1 Water Distribution System

Potable water for the Gordon Site will be obtained from the potable water treatment plant located at the MacLellan Site (refer to Section 2.3.2.3.1). The water will be trucked to a central storage facility that will be set up on the Gordon site. Raw water will be used at the Gordon Site for non-potable use such as fire water.

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### 2.3.1.3.2 Power Distribution System

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

General site lighting at the Gordon site will be building-mounted fixtures designed to reduce spill-over lighting.

### 2.3.1.3.3 Fuel Storage and Distribution System

Tanker trucks will deliver diesel and gasoline fuels to the Gordon 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 in accordance with provincial regulations and standards. 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*). Stationary and mobile mine equipment will be fueled with a fuel-dispensing truck. Additional details of the fuel storage and distribution system will be determined as the Project plan is advanced.

### 2.3.1.3.4 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 potential need for upgrades to PR 391 and/or weight exception requirements to support the Project is currently being discussed with the highway authority (i.e., Manitoba Infrastructure). Based on an assumed haulage rate of 7,000 t/d (which is more than is planned), the Project is estimated to require 13 truckloads per hour between the Gordon and MacLellan sites during the first five 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 existing 15-km site access road from PR 391 is expected to be upgraded as required; these upgrades are included in the scope of the Project to be assessed. 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.

### 2.3.1.3.5 Buildings and Yards

Only a few buildings are proposed to be constructed on 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

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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.

Parking areas will be developed to service Project personnel, site visitors, and Project vehicles. The following parking areas will be required at the Gordon site:

- A central parking facility for personnel, contractors, and visitors.
- A parking area for the mobile mine fleet.
- A parking area for the 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 phases.

### 2.3.1.3.6 Explosives Storage

Emulsion explosives with non-electric detonators will be used during mine operations at the Gordon site, but all explosives storage will be located at the MacLellan site (see Section 2.3.2.3.6).

### 2.3.1.4 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 any natural watercourse re-alignments to accommodate Project components.

As part of the proposed development at the Gordon site, the existing built diversion channel from Gordon Lake to Farley Lake will require adjustment to the north (see **Map 4, Appendix B**). The channel will be designed to safely pass the 1 in 100-year return period storm and will take long-term fish passage and habitat between Gordon and Farley lakes into consideration.

A series of dewatering wells located between the ultimate footprint of the open pit and Gordon and Farley lakes will be used to reduce groundwater inflow into the open pit during mine operations. At this time, the wells are anticipated to be sited approximately 40 m from the boundary of the ultimate open pit towards each lake. Baseline water quality testing has indicated that groundwater extracted from the dewatering wells (originating from the adjacent lakes) will be able to be discharged directly to the environment without treatment and it is anticipated that the water will be recirculated back into the lakes. The engineering design for these wells will be finalized during the detailed design phase for the Project and will be included in the scope of the Project to be assessed.

Based on the current mine plan, no amendment(s) to Schedule 2 of the MMER are anticipated to be required for the Project and no habitat used by any CRA fish species will be physically affected by construction of the Project. Assuming there will be no significant effects to stream flows or lake levels, no authorization(s) are likely to be required under section 35(2) of the *Fisheries Act*.

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Details regarding other liquid discharges associated with Project operations are discussed in Section 2.6.2.

### 2.3.2 MacLellan Site

The historical MacLellan site has been in a 'care and maintenance' phase since 1989 with very little reclamation having taken place. The site currently consists of a 4.6-km gravel access road, power transmission line (abandoned pole line), and infrastructure from the former underground mine, such as a head frame, hoist house, shaft, access ramp, maintenance and other storage buildings, core shack and racks, vent raise, and mine water settling ponds (see **Map 2, Appendix B**).

Alamos proposes to develop all mine infrastructure at the MacLellan site, including a new 2.6-km access road, a central ore milling and processing plant, associated infrastructure, ore and overburden stockpiles, a mine rock storage area, and a TMF. With the proposed development of this site, the existing former head frame, hoist house and maintenance building will be demolished. Under the current Project plan, demolition activities are anticipated to occur during the Project construction phase; however, some demolition activities may be phased, depending on the location of the former infrastructure and its overlap with the footprint for the new mine infrastructure.

The project activities and components proposed for the MacLellan site are described further below.

#### 2.3.2.1 Resource Extraction, Storage, and Processing

##### 2.3.2.1.1 Open Pit

The MacLellan resource will be developed as an open pit mine operation. The current mine plan<sup>2</sup> calls for the removal of 4.9 Mt of rock and overburden during pre-production, and the stockpiling of 0.14 Mt of ore during this period. The total quantity of material to be excavated from the MacLellan open pit during Project mine operations is approximately 163.3 Mt; this includes 17.5 Mt of ore.

The anticipated depth of the MacLellan open pit is approximately 340 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 proposed 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.

Mining operations after year 6 will take place exclusively at the MacLellan site, with an expected peak mining rate (including all ore destined for immediate milling and processing, as well as all

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<sup>2</sup> Mine Plan Reference No. G12A M12B\_MAC5V

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ore, overburden [if applicable and including top soil, muskeg, etc.], and mine rock to be stockpiled) of 24.7 Mt/year (in year 6).

The current mine plan calls for the stockpiling of ore at the MacLellan site, which will be used as feedstock for the ore milling and processing plant when ore production is less than the plant capacity. The current mine plan calls for a peak stockpile of 2.16 Mt at the MacLellan site. The ore stockpiles at MacLellan are planned to be active until the end of mine operation.

### 2.3.2.1.2 Mill Feed Storage Area and Crushing Plant

ROM ore (i.e., raw/unprocessed ore that is intended for immediate processing rather than stockpiling) from both sites will be transported to a pad directly adjacent to the ore milling and processing plant at the MacLellan site (see **Map 5, Appendix B**) for short-term storage before it is used as feedstock for the plant.

A truck dump and crushing circuit is proposed to be located west of the ore milling and processing plant at the MacLellan site and accessed by the open pit road (**Map 5, Appendix B**). The crushing circuit will feed the ore milling and processing plant (see Section 2.3.2.1.3). Ore will be transported to the ore milling and processing plant by a conveyor system. Potential dust emissions will be reduced through dust containment (e.g., enclosure) and collection systems.

### 2.3.2.1.3 Ore Milling and Processing Plant

Ore milling and processing will be carried out at the MacLellan site (**Figure 2.1**). The ore milling and processing plant is designed to process up to a maximum of 8,000 t/day of ore. Ore will first be crushed in a two-stage crushing circuit comprising a primary jaw crusher, followed by a secondary cone crusher. Processing will continue with semi-autogenous grinding, then further grinding in a closed-circuit ball mill and cyclone circuit. The fine-ground product will then enter a pre-leach thickener feed box to be thickened from 33% to 55% solids. This will be in preparation for the downstream pre-aeration, leaching, and carbon-in-pulp (CIP) steps. The cyanidation process for gold recovery will begin in the leach tank circuit, which will consist of four tanks in a series. Each tank will be interconnected with launders to allow slurry to flow sequentially to each tank in the train, and each tank will be equipped with a dual-impeller mechanical agitator to ensure uniform mixing of slurry, lime slurry, sodium cyanide, and oxygen. From the last tank in the leach circuit, the slurry will flow to the first CIP tank in the adsorption circuit, which will consist of six adsorption tanks in series. Pulp will flow continuously from the first tank to the last, while carbon will be pumped counter current from the last tank to the first. The countercurrent process will be repeated until carbon, progressively loaded with gold, advances to the first CIP tank, where it will be washed and transferred to the acid wash column. The carbon will be acid washed and any residual acid on the carbon will be neutralized with both the acid and neutralization solutions being discharged to the tailings pumpbox. The washed and loaded carbon will then be transferred to the elution column, where it will be stripped of gold and silver by reversing the adsorption kinetics through the use of a sodium hydroxide and cyanide solution (approximately 3% each by volume). After completion of the elution process, stripped carbon will be fed into the carbon regeneration kiln feed hopper and the regenerated carbon will be ready for re-introduction to the CIP circuit. Gold and silver will be recovered from the pregnant solution in three electrowinning cells by stainless steel framed

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cathodes, after which the gold sludge will be smelted and refined into gold doré bars ready for transport to a certified facility for further processing. The slurry from the last CIP tank will be sent to the cyanide detoxification circuit (Air/SO<sub>2</sub> oxidation process) for cyanide destruction prior to being discharged to the tailings pumpbox and then to the TMF.

The TMF is proposed to be located approximately 3 km from the ore milling and processing plant (**Map 5, Appendix B**). Water demand at the ore milling and processing plant will be met with reclaimed water from the TMF to reduce the need for fresh surface water demand (refer to Section 2.6.2). Dewatering water from the open pit and other mine contact water (i.e., any water, surface water or groundwater, that contacts mine workings or interacts with any mine rock material) will be collected in a site water management pond for management and/or treatment (if required) prior to discharge (refer to Section 2.6.2).

### 2.3.2.1.4 Ore, Overburden, and Mine Rock Stockpiles/Storage Areas

As previously noted, some ore will be stockpiled for future processing at the MacLellan site. Two ore stockpile areas are currently planned for the MacLellan site, located north of the mill and near the open pit exit (see **Map 5, Appendix B**). Based on the current mine plan, the ore stockpile areas will be approximately 54,800 m<sup>2</sup>.

The MacLellan site will also contain stockpile areas for removed overburden as well as mine rock. These stockpile/storage areas are proposed to be located to the north of the ore milling and processing plant (refer to **Map 5, Appendix B**). **Table 2.4** provides the estimated maximum volumes of each material at the MacLellan site based on the current mining plan.

**Table 2.4 Approximate Quantity of Mine Materials for the MacLellan Site**

Project Site	Ore Stockpiles		Overburden		Mine Rock	
	Tonnage (Mt)	Total Volume (Mm <sup>3</sup> )	Tonnage (Mt)	Volume (Mm <sup>3</sup> )	Tonnage (Mt)	Total Volume (Mm <sup>3</sup> )
<b>MacLellan</b>	2.16	0.96	6.5	4.1	139.4	62.0
Notes: Mine rock and ore stockpiled densities assumed to be 2.25 t/m <sup>3</sup> . Overburden stockpile density assumed to be 1.6 t/m <sup>3</sup> . Mine rock volumes based on a bulking factor of 1.3. Overburden volumes based on a bulking factor of 1.1.						

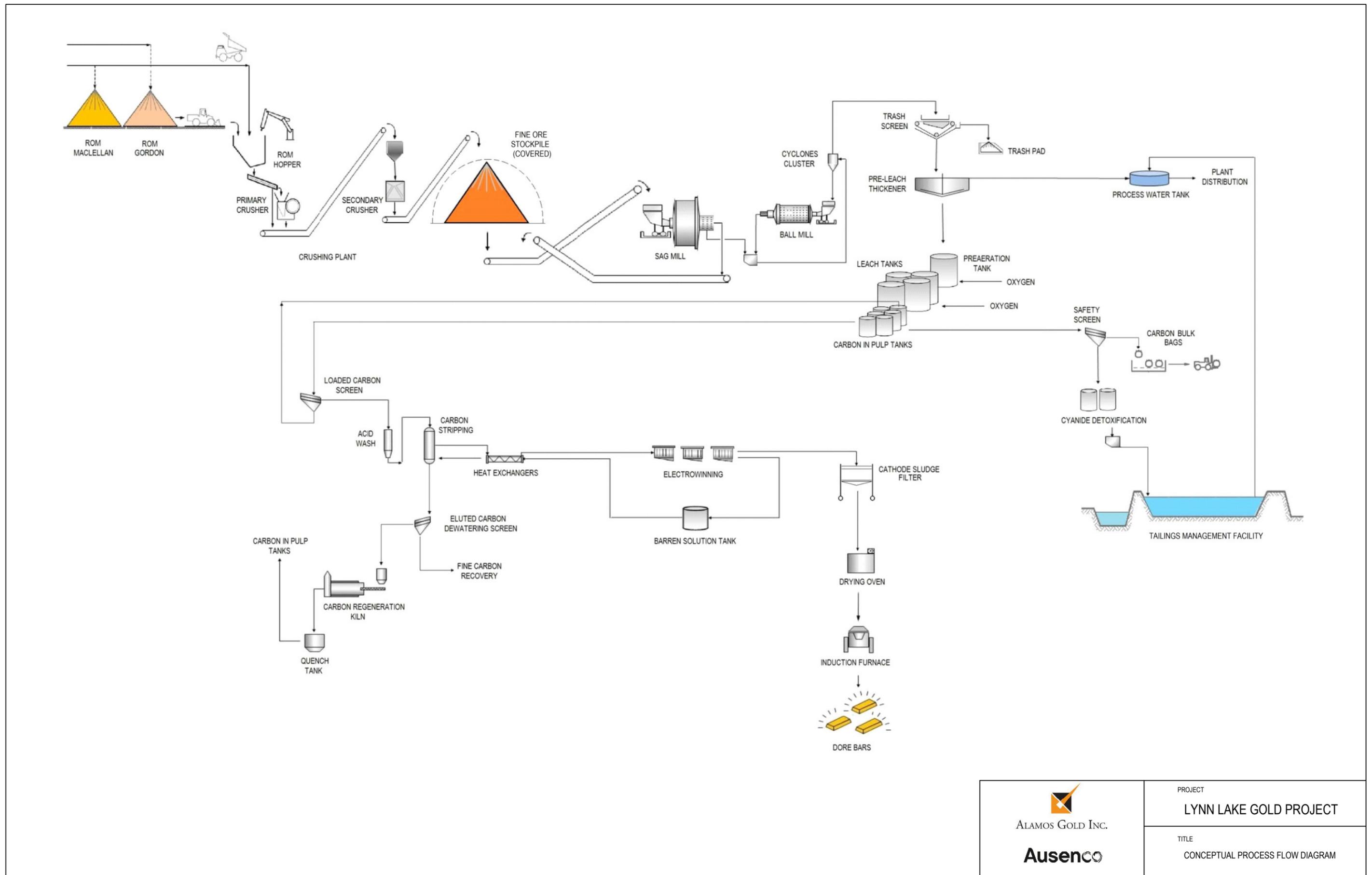


Figure 1: Conceptual Process Flow Diagram for Ore Mining and Processing Plant

 <b>Alamos Gold Inc.</b> 	PROJECT <b>LYNN LAKE GOLD PROJECT</b>
	TITLE CONCEPTUAL PROCESS FLOW DIAGRAM

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**Table 2.5** provides the general characteristics of each stockpile/storage area (i.e., height, bench configuration and overall slope). Final configurations are anticipated to be modified as the Project engineering is advanced.

**Table 2.5 Proposed Configurations for Stockpiles/Storage Areas at the MacLellan Site**

Stockpile	Maximum Surface Area (m <sup>2</sup> )	Maximum Total Height (m)	Maximum Bench Height (m)	First Bench Thickness (m)	Berm Width (m)	Bench Face Angle (degrees)	Maximum Overall Slope (H:V)
Ore	54,800	20	10	5	11	33.7	2.25H:1V
Overburden	315,100	20	15		13.5	26.5	2.75H:1V
Mine Rock	1,489,150	60	15		16.5	33.7	2.5H:1V

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 5, Appendix B**; refer to Section 2.6.2).

The results of preliminary geochemical testing indicate that the Project may result in the generation of mine rock that could have the potential for ARD and ML. Geochemical testing and water quality modelling is ongoing. Any mine rock that is classified as PAG and/or ML that is expected to produce runoff may require additional mitigation, such as blending, dry and/or wet covers, and/or treatment. Final required mitigation measures will be determined as the Project plan and environmental assessment are advanced.

### 2.3.2.2 Other Waste Storage and Management

#### 2.3.2.2.1 Tailings Management Facility

The proposed location of the TMF is shown on **Map 5 (Appendix B)**. The TMF site selection process was generally carried out in accordance with ECCC's *Guidelines for the Assessment of Alternatives for Mine Waste Disposal* (Environment Canada 2011). The site was selected in consideration of technically and economically feasible alternatives, environmental constraints, the use of natural topography for containment, existing land tenure, the spatial footprint of the Project, and the benefits of having tailings contained in a single facility.

Following discussions with DFO and ECCC in September 2016 (refer to Section 3.1.2), the preliminary TMF design was revised to avoid the potential deposition of mine tailings into any watercourses or waterbodies frequented by fish. The currently proposed design of the TMF (including start-up and ultimate TMF infrastructure) does not overlap spatially with any fish-bearing waters (**Map 9, Appendix B**).

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The conceptual design of the TMF for the Project (ultimate footprint) is based on the design criteria provided in **Table 2.6**.

The TMF will initially be constructed to store two years' worth of tailings production at a maximum 8,000 t/day (a total of 3.65 Mm<sup>3</sup>). The TMF dams will be raised progressively to provide additional storage capacity. Currently, it is projected that three dam raises will be required during the operating period, with construction occurring on average once every three years.

It is assumed at this time that the TMF dams will consist of a low permeability core constructed of suitable material with internal bedding and filter zones, and upstream and downstream shells of granular material. The dams will have an upstream slope of 3H:1V, a downstream slope of 2H:1V, and a crest width of 10 m. The starter dam crest elevation has currently been set at 347 m above mean sea level (AMSL), with an average dam height of 4 m and length of 3,550 m.

**Table 2.6 Tailings Management Facility (Ultimate Footprint) Conceptual Design Basis**

Item	Quantity	Units
Mineral Reserve	30	Mt
Tailings/Ore Ratio	1.0	-
Tailings Production	30	Mt
Maximum Daily Mill Throughput	8,000	t/day
Specific Gravity	3.0	-
Deposition Method	Spigot/End of Pipe	-
% Solids	50%	-
Average Void Ratio	1.0	-
Deposited Dry Density	1.5	t/m <sup>3</sup>
Tailings Volume Requirement	20	Mm <sup>3</sup>

Geochemical testing and water quality modelling is ongoing. The potential effects for any ARD and ML to reach the environment will be mitigated by collecting and containing seepage/runoff and/or covering the tailings (wet, including water, and/or dry covers). Addition of a circuit for removal of sulphides from tailings and containment of produced concentrate will also be considered.

Based on available information regarding subsurface soils, it has been assumed that foundation seepage will be controlled via low permeability seepage cutoffs. A downstream seepage collection system, consisting of a series of sumps in combination with a buried weeping tile or rockfill finger drain system, will be installed during the starter dam construction to capture seepage at the toe of the dam and will be pumped back to the TMF pond. The TMF pond will be sectioned off to allow for clarification and treatment of reclaim water prior to recirculation back to the mill.

Rockfill and aggregate for construction will be sourced from non-acid generating (NAG) mine rock and from local quarries and borrow pits near the Project sites. These quarries and borrow pits

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will be determined as the Project plan is further developed and included (or excluded) from the scope of the Project assessment, as required, depending on ownership.

All containment structures for the TMF will be designed in accordance with the Canadian Dam Association *Dam Safety Guidelines* (CDA 2013, 2014).

### 2.3.2.2.2 Sewage Treatment

The average sanitary wastewater flow rate would be approximately 100,000 L/d. At the current stage of Project planning, it has been assumed that a package treatment plant will be required with a discharge consisting of an outfall pipe and diffuser to the selected surface water receiver (likely the Keewatin River south of the MacLellan site). Effluent will be treated to meet applicable regulatory requirements (e.g., *Wastewater Systems Effluent Regulations* under the federal *Fisheries Act*) prior to discharge to the environment.

### 2.3.2.2.3 Domestic Solid Waste Handling

All 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. 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, CEPA and associated regulations, and the TDG Act and associated regulations).

## 2.3.2.3 Utilities and Infrastructure

### 2.3.2.3.1 Water Distribution System

The source of fresh water will be the Keewatin River, located to the west of MacLellan site. A potable water treatment plant with a capacity of 100,000 L/d is required to produce water for both the Gordon and MacLellan sites. This system will also provide potable water for personnel working at the Project site, for eyewash, safety shower, personal hygiene, and drinking water. Treated water is anticipated to be stored in an on-site tank at the MacLellan site with water distribution providing potable water to the surface buildings at the MacLellan site. Raw water will be used for non-potable use such as fire water.

### 2.3.2.3.2 Power Distribution System

Power for the MacLellan site will be supplied by Manitoba Hydro. The Project will require upgrades to the existing power supply between Laurie River and Lynn Lake, as well as a new pole line into the MacLellan site. A new substation will also be required to accommodate the Project. The new pole line is proposed to follow the proposed new access road.

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Details are still being confirmed with Manitoba Hydro but it is anticipated that Manitoba Hydro will independently undertake the upgrade from Laurie River to Lynn Lake and provide the power distribution to the MacLellan site from Lynn Lake. Alamos will not have the ability to direct or influence the construction of the power distribution system (including pole line and substation). The upgraded power distribution system is expected to be assessed, built, owned, and operated by Manitoba Hydro. The power distribution system will also be entirely under the care and control of Manitoba Hydro and is therefore excluded from the scope of the Project to be assessed.

Power distribution at the MacLellan site will be via overhead lines, cable tray and underground conduits, with local outdoor type e-houses for transformers and load centres at each point of utilization.

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.

### 2.3.2.3.3 Fuel Storage and Distribution System

Tanker trucks will deliver diesel and gasoline fuels to the MacLellan site on an as-needed basis for use by heavy equipment and Project vehicles. Propane will be considered for space heating. Fuels will be stored in approved above-ground storage tanks equipped with secondary containment in accordance with provincial regulations and standards. 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*). Stationary and distant mine equipment will be fueled with a fuel-dispensing truck. The precise requirements for on-site fueling will be determined as detailed engineering is advanced.

### 2.3.2.3.4 Roads and Pipelines

The MacLellan site will be accessed via the existing all-weather PR 391, which is under the authority of Manitoba Infrastructure. PR 391 will be used by personnel, material deliveries, and haulage trucks transporting material to the ore milling and processing plant. The potential need for upgrades to PR 391 and/or weight exception requirements to support the Project is currently being discussed with the highway authority (i.e., Manitoba Infrastructure). Based on an assumed haulage rate of 7,000 t/d (which is more than is planned), the Project is estimated to require 13 truckloads per hour between the Gordon and MacLellan sites during the first five 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 existing 4.6-km MacLellan site access road will be retained for service and construction vehicle access. A new 2.6-km site access road is proposed to be constructed from PR 391 to the MacLellan ore milling and processing plant and exit PR 391 east of the existing access road (see **Map 5, Appendix B**). The new access road is included in the scope of the Project to be assessed.

Alamos will own and maintain internal site roads at the MacLellan site, which will allow movement of Project personnel, equipment, and materials on the site. Large haul truck traffic and other site

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vehicle traffic will be separated where appropriate. For example, large mine haul trucks being used at the site will have dedicated roads from the open pit to the various stockpiles and storage areas and to the central maintenance and shift changeover area.

Pipelines will be needed on-site to transport and dispose of contact water between various facilities, including the open pit, ore milling and processing plant, and TMF. The locations and dimensions of these pipelines will be confirmed as Project engineering is advanced. A 10-inch high-density underground pipeline will also be constructed to provide fresh water from the Keewatin River for potable and process water (make-up) requirements. The current preliminary proposed location of this (and other pipelines) is shown on **Map 5** in **Appendix B**.

### 2.3.2.3.5 Buildings and Yards

Several buildings are proposed for the site and will be amalgamated where possible without compromising Project requirements for efficiency, power, functionality, and safety.

#### **Parking Areas**

Parking areas will be developed to service Project personnel, site visitors, and Project vehicles including road trucks and haul trucks. The following parking areas will be required:

- A central parking facility for personnel, contractors, and visitors.
- A parking area for the mobile mine fleet.
- A parking area for the road haul trucks.

#### **Security Buildings**

Security buildings will be erected to control access to the MacLellan site and associated facilities.

#### **Administration Offices**

An administration office building will be required at the MacLellan site. The building will contain offices for site management staff, operating and maintenance, geology, engineering, and administration personnel. It will contain conference rooms, washroom facilities, mine dry facilities, a meal room, filing rooms, and mine rescue, fire and first aid facilities.

#### **Truck Shop**

The primary truck shop will be located at the MacLellan site. The shop will have 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.

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### Laboratory

Assay and metallurgical laboratories will be required for the Project and will be located at the MacLellan site.

### Plant Control Room

A plant control room will be built within the ore milling and processing plant complex.

### Workshop

The workshop will be located to service the ore milling and processing plant. The workshop will be sized to accommodate electrical, instrumentation, welding, piping, fabrication, and machining activities. The workshop will include an overhead crane and an office facility will be incorporated for daily operations/management.

### Warehouse

The warehouse will be used to store equipment parts and other material required throughout the life of the Project.

### Laydown Areas

Laydown areas will be required for the outdoor storage of equipment, maintenance, and construction equipment, as well as facilities for the construction and operation phases. Laydown areas will also include platforms for equipment erection.

#### 2.3.2.3.6 Explosives Storage

Emulsion explosives with non-electric detonators will be used and stored during mine operations at the MacLellan site. Explosives storage requirements will be determined in consultation with the selected explosives supplier and will be established in accordance with the National Standard of Canada document number CAN/BNQ 2910-510 – *Explosives – Quantity Distances* (SCC and BNQ 2015), and the facility will be licensed under the *Explosives Act*.

#### 2.3.2.4 Temporary Facilities and Infrastructure

Although permanent accommodations for Project personnel will be off-site during the operation phase, a temporary construction camp may be required for approximately 300 workers during the construction phase. If a temporary construction camp is required in support of the Project, it will be included in the scope of the Project to be assessed and its location and other details will be determined as the Project plan is further developed.

#### 2.3.2.5 Water Development and Control

No watercourse re-alignments are required at the MacLellan site to accommodate the mine rock or TMF Project components. There is an operational need for the small pond ('East Pond') located between the proposed open pit and the ore milling and processing plant at the MacLellan site to be dewatered and infilled (see **Map 5, Appendix B**). The pond will be backfilled with engineered

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fill consisting of material that is not mine waste (e.g., borrow sourced material that has been tested) to meet the intended foundation requirements. This pond is shallow, freezes to the bottom in winter, and does not host any CRA fish species.

Based on the current mine plan, no amendment(s) to Schedule 2 of the MMER is anticipated to be required for the Project and no habitat used by any CRA fish species will be physically affected by construction of the Project. Assuming there will be no significant effects to stream flows or lake levels, no authorization(s) are likely to be required under section 35(2) of the *Fisheries Act*.

Details regarding other liquid discharges associated with Project operations are discussed in Section 2.6.2.

It is expected that approximately 60-70 m<sup>3</sup>/day of fresh water will be withdrawn from the Keewatin River for use as potable water and 30 m<sup>3</sup>/hour of fresh water will be withdrawn from the Keewatin River for use as process (make-up) water. Construction and operation of the 10-inch high-density underground water withdrawal pipeline (refer to Section 2.3.2.3.4) is not anticipated to result in substantial changes to water level, flow, or pH. There may be a temporary increase in turbidity during pipeline construction; this will be mitigated through development and implementation of a Project-specific Erosion and Sediment Control Plan that includes consideration of in-water and shoreline activities associated with pipeline construction. The pipe will be constructed in accordance with the DFO *Freshwater Intake End of Pipe Fish Screen Guideline* (1995).

## 2.4 PROJECT PHASES

### 2.4.1 Construction

Construction will begin after associated permitting processes have been completed. The timeframe to complete the required site preparation and surface infrastructure to start open pit activities is approximately nine months. Construction of the ore milling and processing plant is expected to take two years. Ore will be stored in stockpiles until the facility is operational.

Primary construction activities are generally expected to consist of:

- Site preparation.
- Physical construction and equipment installation.
- Commissioning.

#### 2.4.1.1 Site Preparation

Construction will begin with clearing the areas for the ore milling and processing plant, open pits, stockpiles, a portion of the TMF area, access roads, and ancillary facilities. Cleared merchantable timber will be sold, and any remaining cleared vegetation will be stockpiled/stored on-site for future use in reclamation activities.

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Dust suppression and water containment will be employed during the earthworks program to mitigate the potential environmental effects of fugitive dust on the surrounding area, and of surface erosion.

If sufficient off-site accommodations are not available for Project construction personnel, development of the temporary construction camp would be conducted early as part of the site preparation activities at the MacLellan site.

Access roads connecting the sites to PR 391 (i.e., upgrades to the existing 15-km access road at the Gordon site and construction of the proposed new 2.6-km access road at the MacLellan site) are proposed to be developed in conjunction with site preparation activities.

### 2.4.1.2 Physical Construction and Equipment Installation

As clearing is completed, internal access roads, ore stockpiles, mine rock storage areas, and the TMF surfaces will be prepared. Any watercourse re-alignment works that may be required (Gordon site) will be initiated early. Grading and site preparations for the ore milling and processing plant area will include the backfilling of the small pond (East Pond) at the MacLellan site with clean material (not of mine waste origin) during the early (winter) stages of construction.

Starter dams for the TMF embankments at the MacLellan site will be constructed, and the embankments will be raised as storage requirements increase over the mine life.

The ore stockpile and mine rock storage pads 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.

An aggregate crusher and a concrete batch ready mix plant will be required on-site during construction. To meet future needs (e.g., road maintenance) for crushed aggregate, the portable crusher and concrete batch plant used during construction may remain on-site or be contracted out on a periodic basis. Raw materials used for crushing will be NAG mine rock from the open pit, if suitable, or materials from nearby approved pits or borrow areas.

Services, including the power supply, waste handling and fresh water supply systems, will be installed. The power supply will be provided into the MacLellan site by Manitoba Hydro.

Footings and foundations for buildings and structures associated with the ore milling and processing plant will be poured in place. Pre-packaged and field-erected ancillary facilities, including the buildings, fueling, tanks and processing equipment, 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.

Removal of overburden in the area of the open pits will occur in preparation for mining activities. The overburden, where suitable, will be used on-site during construction as required with excess stored on-site for future use in reclamation activities.

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### 2.4.1.3 Commissioning

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, tailings management water reclaim system, the ore milling and processing plant, and on-site fueling system. Following commissioning, the Project will start commercial operation.

### 2.4.2 Operation

The operating life of the Project is estimated to be 11 years (excluding the pre-production period estimated at one to two years). As operations continue, the open pits will become progressively deeper, and related overburden, ore stockpiles, mine rock storage areas, and the TMF, will increase in size. Solid and liquid wastes will be managed to comply with applicable federal and provincial regulatory requirements (refer to Sections 2.3.1.2, 2.3.2.2, and 2.6.2). Based on an assumed haulage rate of 7,000 t/d (which is more than is planned), the Project is estimated to require 13 truckloads per hour between the Gordon and MacLellan sites during the first five years of mining operations.

### 2.4.3 Decommissioning, Reclamation, and Closure

A Closure Plan will be developed and implemented, in accordance with the *Mine Closure Regulation* under *The Mines and Minerals Act* of Manitoba and associated *General Closure Plan Guidelines* (MGET n.d.), to remove unneeded facilities and restore the Gordon and MacLellan sites following the completion of mining activities. The primary objective of reclamation and closure activities will be to establish self-sustaining physical, chemical, and biological stability of the sites, and to meet desired end land functions and uses. The Closure Plan will be updated as necessary to reflect the environmental requirements in place at the time of closure.

At the end of operations of the Project, the main features will include the open pits, mill processing facilities, offices, storage areas, TMF, and mine rock storage areas. Reclamation measures expected for each of the main features are described below. Progressive reclamation activities will be carried out where possible throughout the mine life; however, most decommissioning and reclamation work will take place once mining has been completed.

The main elements of the reclamation plan are comprised of:

- 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.

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- Reclamation of mine rock storage areas with suitable covers as needed, revegetation, and establishment of stable drainage conditions.
- Allowing the open pits to fill with water to form pit lakes and directing the overflows to established drainages.
- Implementation of public safety measures around the pits (e.g., re-sloping, fencing or rock berms).
- Management of site runoff from developed areas, including from the ore milling and processing plant site, mine rock storage areas, TMF, and open pits, to meet federal and provincial regulatory requirements for downstream water quality.
- Installation of a suitable cover and revegetation of TMF and establishment of drainage to provide long term erosion control.
- Removal of equipment and facilities from Gordon and MacLellan sites, together with above-ground concrete structures.
- Re-vegetation 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: prevent erosion and sedimentation to protect aquatic resources; prevent invasive plant establishment; and re-establish a land use that is of value for wildlife and/or humans (including Indigenous peoples), and mitigates the residual environmental effects of the Project on the environment.

## 2.5 PROJECT SCHEDULE

Construction of the Project is anticipated to start in Q1 2019 with commissioning anticipated in Q1 2021. 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 scheduled to begin in Q1 2019 and is expected to take approximately 2 years to complete. Project construction activities will be carried out concurrently at both mine sites.
- Operation (i.e., ore and mine rock extraction, processing, and waste management) is scheduled to begin in Q1 2021 and is expected to take approximately 11 years to complete.
  - Mining operations are expected to commence at both sites in year 1 (i.e., 2021). Mining at the Gordon site will be undertaken for six years while mining at the MacLellan site will be undertaken for the entire life of the Project (i.e., all 11 years).
  - The ore stockpiled during mine operations (both sites) will provide additional feedstock to the ore milling and processing plant during the Project.
- Active reclamation/closure is scheduled to begin in 2028 (year 7) at the Gordon site and in 2032 (year 11) at the MacLellan site, and is expected to take approximately 5-6 years to complete at each site. It will be followed by 10 years of post-closure monitoring and approximately 50+ years of pit flooding.

## 2.6 EMISSIONS, DISCHARGES AND WASTES

### 2.6.1 Atmospheric Emissions

#### 2.6.1.1 Air Contaminant Emissions

Air contaminant emissions during construction will consist mainly of combustion gas emissions from heavy equipment on-site and the heavy-duty trucks used to deliver equipment to the Project site, which will release particulates, sulphur dioxide, nitrogen oxides, and other criteria air contaminants from the combustion of fuel, as well as point source particulate matter and fugitive dust emissions resulting from earthworks and on-site activities.

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). It has been assumed that the land-use change GHG emissions for the Project disturbance area will be released during the construction phase only; however, this will be reviewed and assessed more fully during the EA. The total annual construction emissions are estimated at approximately 100,000 tonnes of carbon dioxide equivalent (CO<sub>2e</sub>) per year.

Project operations will result in GHG emissions from the combustion of fuel in mobile and stationary equipment and releases from blasting activities. Assuming typical operations with the MacLellan mine operations 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-power generation, GHG emissions for the Project during operations are estimated to be less than 50,000 tonnes CO<sub>2e</sub> per year.

Compared with available 2014 provincial and national GHG totals, it is estimated that the proposed construction and operation activities will increase the totals by 0.2-0.5% and 0.006-0.01%, respectively. The magnitude of this change from existing conditions is considered low.

The GHG emissions estimates for Project construction and operation were derived primarily based on a review of EAs for other recent comparable projects. **Table 2.7** summarizes the key assumptions that the estimate is based on.

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**Table 2.7 Derivation of Project GHG Emissions Estimates**

Activity	CO <sub>2</sub> e (tonnes/year)
<b>Construction (Both Sites)</b>	
Blasting	300
Mobile Equipment	15,000
Stationary Combustion	5,000
Land Use Change	79,000 <sup>1</sup>
<b>Total (by year) for Project Construction</b>	<b>99,300</b>
Activity	CO <sub>2</sub> e (tonnes/year)
<b>Operations (Both Sites)<sup>2</sup></b>	
Blasting	1,000
Mobile Equipment	25,000
Heating	10,000
Power Generation	4,587 <sup>3</sup>
<b>Total (per year) for Project Operations</b>	<b>40,587</b>
NOTES:	
<sup>1</sup> Assumes all land use change for the entire Project will be cleared in the construction phase instead of spread out during the construction and operation phases.	
<sup>2</sup> Methane Liberation is not included as this requires information from the formation to understand if carbon (i.e., coal) will be exposed to the atmosphere	
<sup>3</sup> Assumes that power at MacLellan site will not be generated on-site through diesel combustion. Power to be taken from the Manitoba Hydro grid.	

Dust suppression using water sprays, and associated water containment, will be employed during construction to mitigate the potential environmental effects of fugitive dust on surrounding properties.

Emissions will also be released from crushing and processing activities at the mill. Mill air emissions will include bullion furnace ventilation (typically once a week), and carbon kiln ventilations from the carbon circuit. Environmental effects of the Project on air quality will be considered and mitigated, where appropriate.

### 2.6.1.2 Noise Emissions

Noise will be generated during construction, and will be typical of that associated with construction projects involving the movement of heavy equipment.

Mining and surface crushing activities, including blasting of rock, and movement of material will be a source of noise throughout the Project operation phase. The diesel generators will also generate noise and will be primarily used during construction at both sites and during the operation phase at the Gordon site.

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Noise source modelling will be carried out. Noise-related environmental effects will be considered and mitigated where appropriate.

### 2.6.2 Liquid Discharges and Management

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

Where practical, collection ditches may 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 of the mine.

Collection ditches will be constructed around all 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 each site and discharged directly to the environment if it meets applicable federal and provincial regulatory requirements. If it does not meet federal and provincial regulatory requirements, the water will be treated prior to discharge.

For the MacLellan site, seepage water associated with the TMF will be collected and pumped back to the TMF. Reclaim water from the TMF, underground/open pit dewatering water, and/or contact water from the water management facility will be used to meet ore milling and processing demand requirements. Tailings and excess water from the ore milling and processing plant will be piped to the TMF. Current modelling and engineering feasibility studies show that no discharge from the TMF will be required during operations. If discharge is required, it will be treated to meet relevant federal and provincial regulatory requirements (e.g., the MMR under the federal *Fisheries Act* and the *Manitoba Water Quality Standards, Objectives and Guidelines Regulation* under the provincial *Water Protection Act*) and *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (CCME 2014) prior to discharge to the environment, where applicable.

At each 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 environment, including the authorized limits of deleterious substances specified in Schedule 4 of the MMR. The water management ponds in the current mine plan have been sized in consideration to the retention time for the settling of suspended solids. Identification of the discharge locations for each site will be confirmed during the EA and detailed engineering.

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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. Ongoing hydrogeological studies contributing to the EA and detailed engineering are designed to evaluate the groundwater regime and flow characteristics at each of the proposed open pits.

Domestic sewage at the MacLellan site will be treated at the sewage treatment facility. Any effluent discharged from the facility will be treated to meet regulatory requirements. Details regarding the treatment of domestic sewage at the Gordon site will be developed during detailed engineering and addressed in the EA.

At closure, the water management related infrastructure will be sustained or re-configured to meet the requirements of the approved Closure Plan. Net runoff and drainage from the Project site will return to approximately its pre-Project conditions.

### 2.6.3 Solid Wastes and Management

Solid wastes include:

- Domestic waste
- Waste oils, fuels, and hazardous wastes.

All 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. 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.

### 3 CONSULTATION AND ENGAGEMENT

This section summarizes the status and results of regulatory, stakeholder and community consultation and Indigenous engagement efforts that Alamos has carried out to date, including an overview of the key comments and concerns that have been raised by interested parties. It also outlines ongoing and proposed consultation and engagement activities to be undertaken throughout the Project approvals process.

#### 3.1 REGULATORY CONSULTATION

##### 3.1.1 Relevant Regulatory Authorities and Jurisdictions

As noted in Section 1.3, the Project is subject to various federal and provincial legislative and regulatory requirements. The regulatory authorities that administer those requirements are expected to have an interest in the Project, as is the local government of the Town of Lynn Lake (Table 3.1).

**Table 3.1 Relevant Regulatory Authorities and Jurisdictions**

Federal Government	Provincial Government	Municipal Government
<ul style="list-style-type: none"> <li>• The Canadian Environmental Assessment Agency (the Agency)</li> <li>• Environment and Climate Change Canada (ECCC)</li> <li>• Fisheries and Oceans Canada (DFO)</li> <li>• Natural Resources Canada (NRCan)</li> <li>• Transport Canada</li> </ul>	<ul style="list-style-type: none"> <li>• Manitoba Growth, Enterprise, and Trade (MGET)</li> <li>• Manitoba Infrastructure (MI)</li> <li>• Manitoba Sport, Culture, and Heritage (MSCH)</li> <li>• Manitoba Sustainable Development (MSD)</li> </ul>	<ul style="list-style-type: none"> <li>• Town of Lynn Lake</li> </ul>

##### 3.1.2 Summary of Regulatory Consultation Activities Undertaken to Date

Table 3.2 summarizes regulatory consultation activities undertaken to date by Alamos. Members of the Proponent Team have supported these consultation efforts, where appropriate. This table is not intended to represent a complete list of all regulatory consultation activities (e.g., does not include informal meetings and all written correspondence and telephone calls).

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**Table 3.2 Summary of Regulatory Consultation Conducted for the Project**

Organization	Date	Means of Engagement	Key Topics
<b>Federal Government</b>			
DFO and ECCC	September 20, 2016	Teleconference	<ul style="list-style-type: none"> <li>• Environmental baseline studies</li> <li>• Fish and fish habitat</li> <li>• Project engineering</li> <li>• Regulatory requirements</li> </ul>
NRCan, the Agency, and members of parliament (MPs) from political parties	November 28 and 29, 2016	Introductions, meetings and discussions with various department staff and parliamentarians, including Policy Advisor (NRCan); Director General, Regional Operations (the Agency); Director, Prairie and Northern Region (the Agency); Prairies and Northern Regional Desk (Prime Minister's Office); and MPs for several districts in Manitoba (Churchill-Keewatinook Aski, Saint Boniface-Saint Vital, Selkirk-Interlake-Eastman, Provencher; and Dauphin-Swan River-Neepawa)	<ul style="list-style-type: none"> <li>• Introduction to Alamos</li> <li>• General Project information</li> <li>• Regulatory requirements</li> </ul>
the Agency	December 14, 2016	Teleconference and presentation to introduce Alamos, describe the Project (including target schedule), discuss the EA and PD development, and confirm the Agency's expectations	<ul style="list-style-type: none"> <li>• Introduction to Alamos</li> <li>• General Project information</li> <li>• Regulatory requirements</li> </ul>
	January 10, 2017	Teleconference with Project Manager and Environmental Assessment Officer	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Regulatory requirements</li> </ul>
	June 1, 2017	Meeting	<ul style="list-style-type: none"> <li>• Indigenous engagement</li> </ul>
<b>Provincial Government</b>			
Former Department of Mineral Resources (now Mineral Resources Division of MGET)	November 19, 2014	Meeting with Director and Assistant Deputy Minister	<ul style="list-style-type: none"> <li>• General Project information</li> </ul>
	January 7, 2015	Meeting with Department staff	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Regulatory requirements</li> </ul>

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**Table 3.2 Summary of Regulatory Consultation Conducted for the Project**

<b>Organization</b>	<b>Date</b>	<b>Means of Engagement</b>	<b>Key Topics</b>
	April 25, 2016	Meetings with Director and Assistant Deputy Minister	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Geology/ Geochemistry</li> </ul>
	April 25, 2016	Meeting with Director, Assistant Deputy Minister, and Chief Mining Engineer	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Indigenous agreements and protocols</li> </ul>
Former Departments of Mineral Resources (now Mineral Resources Division of MGET) and Conservation and Water Stewardship (now MSD)	February 9, 2015	Meeting with government and Marcel Colomb First Nation representatives	<ul style="list-style-type: none"> <li>• Regulatory requirements</li> <li>• Community involvement</li> <li>• Education</li> <li>• Indigenous sacred and cultural sites</li> <li>• Traditional knowledge</li> <li>• Water resources</li> </ul>
Former Department of Conservation and Water Stewardship (now MSD)	June 10, 2015	Meeting with Natural Resources District Officer	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Exploration investigations</li> </ul>
Mineral Resources Division of MGET	May 24, 2016	Meeting with Assistant Deputy Minister, Director, and Chief Mining Engineer, including helicopter fly-over of Gordon and MacLellan sites	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Geology/ Geochemistry</li> </ul>
	June 17, 2016	Meeting with Assistant Deputy Minister and Director	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Environmental aspects of the Project</li> </ul>
	June 17, 2016	Meeting with Assistant Deputy Minister, Director, and Aboriginal Issues Policy Analyst	<ul style="list-style-type: none"> <li>• General Project information</li> </ul>
	August 31, 2016	Meeting with Assistant Deputy Minister, Director, and Aboriginal Issues Policy Analyst	<ul style="list-style-type: none"> <li>• General Project information</li> </ul>
	October 26, 2016	Meeting with Assistant Deputy Minister, Director, Aboriginal Issues Policy	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Business opportunities</li> </ul>

**PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT**

**Table 3.2 Summary of Regulatory Consultation Conducted for the Project**

<b>Organization</b>	<b>Date</b>	<b>Means of Engagement</b>	<b>Key Topics</b>
		Analyst, and Labour Force Development Officer	<ul style="list-style-type: none"> <li>• Socio-economic environment</li> </ul>
	November 16, 2016	Meeting with Minister, Assistant Deputy Minister, Director, Special Assistant, and MLA – Thompson	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Workforce housing study</li> <li>• First Nations engagement</li> <li>• Regulatory requirements</li> </ul>
	December 1, 2016	Telephone call with Mines Inspector	<ul style="list-style-type: none"> <li>• Geology/geochemistry</li> <li>• Geotechnical investigations</li> </ul>
MGET and MI	August 31, 2016	Meeting with Ministers, Deputy Minister (MGET), Assistant Deputy Minister (MGET), Adjoint Special (MGET), Special Assistant (MGET), and Member of Legislative Assembly	<ul style="list-style-type: none"> <li>• General Project information</li> </ul>
Environmental Approvals Branch of MSD and Mineral Resources Division of MGET	December 19, 2016	Teleconference and presentation to describe the Project (including target schedule), discuss the EA and PD development, and confirm the expectations of the Environmental Approvals Branch	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Regulatory requirements</li> </ul>
	May 3, 2017	Meeting with Environmental Engineer responsible for overall management of activities of the Municipal and Industrial Section of the Environmental Approvals Branch (MSD), Environmental Engineer responsible for licensing proposals for mining under <i>The Environment Act</i> (MSD), and Director (MGET)	<ul style="list-style-type: none"> <li>• Regulatory requirements</li> </ul>
<b>Municipal Government</b>			
Town of Lynn Lake	November 25, 2014	Attendance at Town Council meeting	<ul style="list-style-type: none"> <li>• General Project information</li> </ul>
	January 13, 2015	Meeting with Mayor and Town Councilors	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Employment opportunities</li> </ul>

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**Table 3.2 Summary of Regulatory Consultation Conducted for the Project**

<b>Organization</b>	<b>Date</b>	<b>Means of Engagement</b>	<b>Key Topics</b>
	June 22, 2015	Meeting with Mayor and Town Councilors	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Community involvement</li> <li>• Employment opportunities</li> </ul>
	August 20, 2015	Telephone interview with Chief Administrative Officer	<ul style="list-style-type: none"> <li>• Socio-economic environment</li> </ul>
	November 10, 2015	Meeting with Economic Development Officer	<ul style="list-style-type: none"> <li>• General Project information</li> </ul>
	January 29, 2016	Meeting with Economic Development Officer	<ul style="list-style-type: none"> <li>• General Project Information</li> <li>• Project engineering</li> <li>• Project Open House</li> </ul>
	February 16, 2016	Meeting with Economic Development Officer	<ul style="list-style-type: none"> <li>• Community involvement</li> </ul>
	April 26, 2016	Meeting with Economic Development Officer	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Business opportunities</li> <li>• Community involvement</li> </ul>
	April 27, 2016	Meeting with Mayor and Town Councilors	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Community involvement</li> </ul>
	May 25, 2016	Mayor and Town Councilors	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Community involvement</li> <li>• Business opportunities</li> </ul>
	August 29, 2016	Meeting with Mayor, Town Councilors, Chief Administrative Officer, and Economic Development Officer	<ul style="list-style-type: none"> <li>• General Project information</li> </ul>
	October 25, 2016	Meeting with Mayor and Town Councilors	<ul style="list-style-type: none"> <li>• Community involvement</li> <li>• Employment opportunities</li> <li>• Socio-economic environment</li> <li>• Workforce housing study</li> </ul>
	October 26, 2016	Meeting with Mayor and Town Councilors	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Business opportunities</li> </ul>

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**Table 3.2 Summary of Regulatory Consultation Conducted for the Project**

Organization	Date	Means of Engagement	Key Topics
			<ul style="list-style-type: none"> <li>• Socio-economic environment</li> </ul>
	May 12, 2017	Email communication with Mayor, CAO and Town Clerk	<ul style="list-style-type: none"> <li>• Accommodation Study</li> </ul>
Town of Flin Flon	January 24, 2017	Telephone call with representative of the Town of Flin Flon	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Employment opportunities</li> </ul>

Key issues identified and discussed during the regulatory consultation activities undertaken to date have pertained to:

- The provincial requirement to obtain separate licences under *The Environment Act* for the Gordon and MacLellan sites.
- The importance of redesigning the TMF to avoid interactions with waters frequented by fish.
- The importance of proactively engaging the local First Nation community (i.e., MCFN whose traditional territory the Project falls within) and other potentially affected Indigenous groups.
- The importance of local economic benefits.

With respect to the provincial requirement to obtain separate licences under *The Environment Act* for the Gordon and MacLellan sites, the Environmental Approvals Branch of MSD advised (during a meeting with the Director of the Mines Branch and representatives of the Proponent Team on May 3, 2017) that it considers proposed Project activities at the Gordon and MacLellan sites to be distinct “developments” under the Act. Separate provincial licences will therefore be required for each site. MSD also indicated that one EIS may be submitted, but it must be accompanied by separate Environment Act Proposals (EAPs) for each site. The EAPs will summarize the Project activities, environmental effects, and mitigation for each site, with reference to the core information in the EIS.

With respect to the importance of redesigning the TMF to avoid interactions with waters frequented by fish, DFO and ECCC indicated (during a meeting with representatives of the Proponent Team on September 20, 2016) that the deposit of tailings, waste rock, drainage water, or other mine effluent into watercourses or waterbodies that are frequented by finfish (including stickleback) constitutes introduction of a deleterious substance and is prohibited under the MMR pursuant to the *Fisheries Act* unless authorized by ECCC. It is understood that this policy applies whether or not the fish are part of or support a CRA fishery. The regulators advised that the preliminary TMF design presented during that meeting would be expected to trigger a Schedule 2 amendment under the MMR, if not changed. In consideration of this regulatory guidance, the Proponent Team subsequently re-designed the dam alignment for the east end of the TMF to

## PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT

avoid encroaching on the headwaters of two tributaries to Minton Lake that are frequented by fish. The currently proposed design of the TMF (including start-up and ultimate TMF infrastructure) does not overlap spatially with any fish-bearing waters (**Map 9, Appendix B**).

### 3.1.3 Ongoing and Proposed Regulatory Consultation Activities

Regulatory consultation with all three levels of government will continue throughout the EA process and will remain ongoing (on an as-needed basis) for the duration of the Project. It is understood that there will also be several government-led engagement opportunities during the federal and provincial EA processes (e.g., public review and comment periods for EA-related documents).

As a responsible corporate citizen, Alamos is also committed to providing Project and corporate updates to interested government officials, as appropriate.

## 3.2 STAKEHOLDER AND COMMUNITY CONSULTATION AND ENGAGEMENT

### 3.2.1 Potentially Affected or Interested Stakeholders

The following is a preliminary list of the types of non-regulatory and non-Indigenous stakeholders that have been identified as potentially having an interest in the Project:

- Business/economic stakeholders (e.g., local businesses, business associations, and industry groups).
- Development corporations.
- Local community members (e.g., residents and property owners).
- Local services (e.g., fire and police departments, hospitals).
- Non-governmental organizations.
- Research/academic organizations.

### 3.2.2 Summary of Stakeholder and Community Consultation and Engagement Activities Undertaken to Date

Four Open House public meetings have been held to date: three in Lynn Lake for members of the local community including Marcel Colomb First Nation (MCFN), and one in Winnipeg, Manitoba for MCFN members residing in the City. The Open Houses were advertised using posters, mail-outs, word of mouth, and social media.

The first two events were informal drop-in style Open Houses held on March 25, 2015 in Lynn Lake and on March 26, 2015 in Winnipeg. These Open Houses were attended by 42 individuals. Preliminary Project details were communicated through the distribution of a four-page Project

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information handout. Representatives from Alamos and Stantec were present to answer questions about the Project.

The third and fourth Open Houses occurred on April 26, 2016 and May 1, 2017, respectively, in Lynn Lake. During each of these events, the Proponent and Proponent Team distributed handouts and delivered a formal presentation to share Project information and solicit feedback/input. The sign-in sheet that was used for these Open Houses captured the following details regarding the breakdown of attendees (the same level of detail was not captured for the 2015 Open House meetings):

- A total of 70 people were recorded as attendees at the third Open House. Most attendees (45 individuals, or 64% of attendees) noted on the sign-in sheet that they lived in the Town of Lynn Lake; however, 14 (20%) of the attendees did not indicate where they lived. Eleven (16%) of the attendees identified themselves as members of MCFN on the sign-in sheet.
- There were a total of 53 recorded attendees at the fourth Open House. As noted on the sign-in sheet, the majority of the attendees (28 individuals, or 53% of attendees) live in the Town of Lynn Lake; however, 13 (25%) of the attendees did not indicate where they lived. Nine (17%) of the attendees identified themselves as members of MCFN on the sign-in sheet; two of these individuals also indicated on the sign-in sheet that they live in Lynn Lake. Five (9%) of the attendees indicated on the sign-in sheet that they live in other areas (i.e., Churchill River Lodge, Manitoba; Montreal Lake, Saskatchewan; Prince Albert, Saskatchewan; and Thompson, Manitoba).

At all four Open Houses, attendees were invited to fill out questionnaires to provide feedback as well as any inquiries or issues that they wanted to raise.

Of the 42 recorded attendees at the first two Open Houses in March 2015, 16 (38%) completed the questionnaire. None of the 16 respondents identified themselves as members of MCFN. In general, the questions, comments and concerns identified on the questionnaires completed at the 2015 Open Houses pertained to:

- Opportunities for employment and economic development in local communities.
- Opportunities for education/training, employment, and engagement specifically for members of MCFN.
- The status and results of environmental baseline studies.
- Potential Project-related effects on water quantity and quality, soil quality, wildlife, traplines, human health, and community services and infrastructure.
- Site remediation.
- Potential accidental events.

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Thirty-three people (47% of the 70 recorded attendees) completed the questionnaire in April 2016 at the third Open House; 15 (45%) of these indicated that they had also attended one of the previous Open Houses. Eight (24%) of the 33 respondents identified themselves as members of MCFN. In general, the questions, comments and concerns identified on the questionnaires completed for the 2016 Open House pertained to:

- Opportunities for employment and economic development in local communities.
- Opportunities for education/training, employment, and other benefits specifically for members of MCFN.
- The importance of ongoing consultation and engagement.
- Tailings containment.
- Potential Project-related environmental effects on water, fish and fish habitat, wildlife, vegetation, human health, local housing, and MCFN/Black Sturgeon Falls Reserve.

Of the 53 attendees at the fourth Open House in May 2017, a total of 37 people (70%) completed the provided questionnaire; 13 (35%) of these indicated that they had also attended one of the previous Open House sessions. The 2017 questionnaire was more detailed than the previous questionnaires used for the 2015 and 2016 Open House meetings. Twenty-three (62%) of the 37 respondents indicated that live in Lynn Lake, and three (8%) responded “yes” to owning property near the Project. Thirteen (35%) of the respondents self-identified as Indigenous, representing MCFN, O-Pipon-Na-Piwin Cree Nation, and Cross Lake First Nation.

Fishing was identified as the activity conducted by the highest percentage (51%) of respondents. This was followed by boating (49%), gathering (46%), hunting (41%), snowmobiling (35%), and trapping (30%). Activities not listed, but mentioned by respondents, included hiking (8%), tourism (5%), employment (5%), swimming, outfitting, and camping (each 3%). Areas in which respondents are conducting these activities include Berge Lake, Cockeram Lake, Barrington Lake, Zed Lake, Hughes River, Churchill River, Fox Mine Road, Highway 391, Highway 397, Black Sturgeon Falls Reserve, and the general vicinity of the MacLellan Mine, Gordon Mine, and Lynn Lake.

In general, the questions, comments and concerns identified on the questionnaires completed for the 2017 Open House pertained to:

- Opportunities for employment and economic development in local communities.
- Opportunities for improved housing or other benefits specifically for local First Nations communities.
- Project infrastructure.
- The results of environmental baseline studies.
- Potential Project-related effects on the local economy, community services, and infrastructure.

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- Potential Project-related environmental effects on the current use of lands and resources for traditional purposes by Indigenous peoples.

Where direct responses were warranted or requested in 2015 and 2016, the Proponent Team sent follow-up letters to individuals to address questions, comments or concerns noted on their questionnaires. Follow-up letters were sent to 11 individuals in response to their questionnaires from the 2015 Open Houses, and to 20 individuals in response to their questionnaires from the 2016 Open House. The Proponent Team is in the process of reviewing the results of the 2017 questionnaire and preparing responses where warranted or requested. Nine respondents from the 2017 questionnaire requested that someone follow up with them regarding their questions, comments, or concerns.

At all four Open Houses, the questionnaires asked respondents to use a scale from 1 (not important) to 5 (very important) to rate the importance of studying various topics as part of the EA. The following topics were rated 'very important' in the opinions of more than 60% of the respondents from the 2015 questionnaire:

- Tailings and mine rock management (94%)
- Wildlife and fish habitat (94%)
- Employment (75%)
- Surface water and groundwater (75%).

For the questionnaires completed in 2016, the following topics were rated 'very important' in the opinions of more than 60% of respondents:

- Wildlife and fish habitat (91%)
- Tailings and waste rock management (85%)
- Surface water and groundwater (79%)
- Plants (76%)
- Air quality (73%)
- Employment (67%)
- Contracts and business opportunities (64%)
- Training and job skills (64%).

More than 60% of respondents from the 2017 questionnaire rated the following topics as 'very important':

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- Surface water and groundwater (86%)
- Community health (81%)
- Wildlife and fish habitat (81%)
- Tailings and waste rock management (73%)
- Plants (68%)
- Air quality (65%)
- Employment (65%)
- Training and job skills (65%).

When asked to list various environmental aspects in order of importance (in the 2017 questionnaire only), the highest percentage (33%) of respondents identified surface water and groundwater as the most important environmental aspect, followed closely by wildlife and fish habitat (27%). The environmental aspect identified as second most important by the highest percentage of respondents was wildlife and fish habitat (31%). The environmental aspect identified as third most important by the highest percentage of respondents was evenly split between community health, contracts and business opportunities, training and job skills, and increased traffic (each 13%).

Alamos has conducted other stakeholder and community consultation and engagement activities in addition to the Open Houses, as summarized in **Table 3.3**. Members of the Proponent Team have supported these consultation and engagement efforts, where appropriate. This table is not intended to represent a complete list of all stakeholder and community engagement activities (e.g., does not include informal meetings or all written correspondence and telephone calls).

**Table 3.3 Summary of Other Stakeholder Consultation and Engagement Conducted for the Project**

Organization	Date	Means of Engagement	Key Topics
<b>Business/Economic Stakeholders</b>			
Esso Gas Station	April 29, 2016	Meeting with local business owner who was unable to attend Project Open House	<ul style="list-style-type: none"> <li>• General Project information</li> </ul>
Green Water Group	November 9, 2015	Discussion at Government of Manitoba's Mineral Resources Open House	<ul style="list-style-type: none"> <li>• Employment opportunities</li> </ul>

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**Table 3.3 Summary of Other Stakeholder Consultation and Engagement Conducted for the Project**

<b>Organization</b>	<b>Date</b>	<b>Means of Engagement</b>	<b>Key Topics</b>
Leaf Rapids Consumer Cooperative	November 9, 2015	Discussion at Government of Manitoba's Mineral Resources Open House	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Water resources</li> </ul>
Lynn Inn	May 3, 2016	Meeting	<ul style="list-style-type: none"> <li>• Citizens Committee</li> </ul>
	July 4, 2016	Meeting	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Citizen's Committee</li> </ul>
	July 5, 2016	Meeting	<ul style="list-style-type: none"> <li>• Citizen's Committee</li> </ul>
	July 8, 2016	Meeting	<ul style="list-style-type: none"> <li>• Citizen's Committee</li> </ul>
Lynn Lake Chamber of Commerce	June 19, 2015	Meeting	<ul style="list-style-type: none"> <li>• Community involvement</li> </ul>
Manitoba Hydro	April 14, 2016	Meeting	<ul style="list-style-type: none"> <li>• Project Open House</li> </ul>
	April 19, 2016	Phone Call	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Project Open House</li> </ul>
<b>Development Corporations</b>			
Marcel Colomb Development Corporation	Refer to <b>Table 3.5</b>	Refer to <b>Table 3.5</b>	Refer to <b>Table 3.5</b>
Northwest Manitoba Community Futures	May 3, 2016	Meeting	<ul style="list-style-type: none"> <li>• Business opportunities</li> <li>• Citizen's Committee</li> </ul>
<b>Local Services</b>			
Lynn Lake Fire Department	June 10, 2015	Meeting	<ul style="list-style-type: none"> <li>• General Project information</li> </ul>
	April 14, 2016	Meeting	<ul style="list-style-type: none"> <li>• Fire safety protocols</li> <li>• Project Open House</li> </ul>
Lynn Lake Hospital	August 18, 2015	Telephone interview	<ul style="list-style-type: none"> <li>• Socio-economic environment</li> </ul>
Lynn Lake RCMP	September 2, 2015	Telephone interview	<ul style="list-style-type: none"> <li>• Socio-economic environment</li> </ul>
<b>Non-Governmental Organization</b>			
Northern Manitoba Sector Council	November 19, 2015	Meeting	<ul style="list-style-type: none"> <li>• Community involvement</li> <li>• Employment opportunities</li> </ul>

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**Table 3.3 Summary of Other Stakeholder Consultation and Engagement Conducted for the Project**

Organization	Date	Means of Engagement	Key Topics
<b>Research/Academic Organizations</b>			
Frontier School Division	January 13, 2016	Presentation at Career Fair	<ul style="list-style-type: none"> <li>• Education</li> <li>• Employment opportunities</li> </ul>
	May 2, 2017	Presentation at Career Fair	<ul style="list-style-type: none"> <li>• Education</li> <li>• Employment opportunities</li> </ul>
Northern Manitoba Mining Academy	November 20, 2015	Meeting	<ul style="list-style-type: none"> <li>• Community involvement</li> <li>• Education</li> <li>• Employment opportunities</li> </ul>
West Lynn Heights School	Several dates between April 22, 2015 and May 2, 2017	Meetings, presentations at career fairs, site visits for students, etc.	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Employment opportunities</li> <li>• Education</li> <li>• Community involvement</li> </ul>

### 3.2.3 Ongoing and Proposed Stakeholder and Community Consultation Activities

Alamos has a local office/presence in Lynn Lake that facilitates ongoing communications with members of the local community.

One more public Open House is planned to be held in support of the Project. It is tentatively scheduled to be held in November 2017.

Additional stakeholders are expected to be identified as the Project progresses.

Proponent-led stakeholder and community consultation will continue throughout the EA process and will remain ongoing (on an as-needed basis) for the duration of the Project. It is understood that there will also be several additional government-led engagement opportunities during the federal and provincial EA processes (e.g., public review and comment periods for EA-related documents).

### 3.3 ADDITIONAL ENGAGEMENT WITH INDIGENOUS PEOPLES

#### 3.3.1 Potentially Affected or Interested Indigenous Communities

Based on 2011 census data (the latest census data available at the time this document was prepared), Indigenous people account for approximately 16.7% of the total population of Manitoba, which includes approximately 195,900 First Nations, Métis, and Inuit people (Statistics Canada 2013).

First Nations people represent the largest portion of Manitoba's Indigenous population. As of July 2014, there were 148,455 registered First Nation members in Manitoba, with a total of 88,076 members (59.3%) living on reserves (INAC 2016). First Nations groups indigenous to Manitoba include Ojibway, Cree, Oji-Cree, Dakota, and Dene (MIMR n.d.). There is a total of 63 First Nation communities in Manitoba (INAC 2016).

Based on current understanding of traditional lands located in proximity to, and/or downstream or downwind from, proposed Project activities and components, the Project could, to highly varying degrees, potentially affect areas of importance for three Indigenous communities, potentially affect or be of interest to up to four Indigenous communities, and be of interest to one additional Indigenous community (**Table 3.4**). Section 4.6.4 provides an overview of the current use of lands and resources for traditional purposes by these Indigenous communities in the vicinity of the Project.

#### 3.3.2 Summary of Indigenous Engagement Activities Undertaken to Date

The Project site is wholly within the defined traditional territory of MCFN; therefore, Alamos engagement efforts have primarily focused on MCFN. In addition to the attendance of MCFN community members and other Indigenous peoples at the Open Houses held for the Project in 2015, 2016, and 2017 (refer to Section 3.2.2), representatives of MCFN have been engaged by Alamos since 2014 through several meetings at which various topics related to the Project have been discussed (**Table 3.5**). Alamos has been supported at these meetings by members of the Proponent Team, where appropriate. Other Proponent-led efforts to engage MCFN in support of the Project have included hiring a local Community Liaison Coordinator, hiring local field support personnel, and, through 2015, establishing an Environment Committee comprised of members selected by the MCFN Chief.

**Table 3.5** is not intended to be a complete list of all Indigenous engagement activities that have been conducted in relation to the Project (e.g., does not include interviews conducted in support of the Traditional Knowledge/Traditional Land and Resource Use Study, informal meetings, or all written correspondence and telephone calls). MCFN also participated in some Project-related meetings with Alamos and the provincial government, as summarized in **Table 3.3**.

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Table 3.4 Potentially Affected or Interested Indigenous Communities

Indigenous Community	Governance Representative	Contact Details	First Nation Tribal Council	Registered Population as of March 2017	Approximate Distance Between Project Mine Sites and Nearest First Nation Reserve or Métis Local Associated with Community (km)	
					Gordon	MacLellan
<b>Indigenous Communities Most Likely to be Affected</b>						
<b>Manitoba</b>						
Marcel Colomb First Nation (MCFN)	Priscilla Colomb (Chief)	PO Box 1150, Lynn Lake, MB, R0B 0W0 Phone: (204) 356-2439 Fax: (204) 356-2330	Swampy Cree Tribal Council	Total Registered: 430 Total on Own Reserve: 38 Total on Other Reserves: 3 Total on Own Crown Land: 256 Total on Other Band Crown Land: 0 Total on No Band Crown Land: 0 Total Off-Reserve: 133	12	24
Mathias Colomb Cree Nation (MCCN)	Arlen Dumas (Chief)	General Delivery, Pukatawagan, MB R0B 1G0 Phone: (204) 553-2090 Fax: (204) 553-2419	Swampy Cree Tribal Council	Total Registered: 3,758 Total on Own Reserves: 2,186 Total on Other Reserves: 174 Total on Own Crown Land: 78 Total on Other Band Crown Land: 0 Total on No Band Crown Land: 34 Total Off-Reserve: 1,286	70	77
Manitoba Métis Federation (MMF)	David Chartrand (MMF President)	300-150 Henry Avenue, Winnipeg, MB, R3B 0J7 Phone: (204) 586-8474 Fax: (204) 947-1816	Not applicable	Not applicable	36	7
<b>Other Potentially Affected or Interested Indigenous Communities</b>						
<b>Manitoba</b>						
Barren Lands First Nation (BLFN)	John Clarke (Chief)	General Delivery, Brochet, MB, R0B 0B0 Phone: (204) 323-2300 Fax: (204) 323-2275	Keewatin Tribal Council	Total Registered: 1,153 Total on Own Reserve: 444 Total on Other Reserves: 24 Total on Own Crown Land: 0 Total on Other Band Crown Land: 0	130	115

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Indigenous Community	Governance Representative	Contact Details	First Nation Tribal Council	Registered Population as of March 2017	Approximate Distance Between Project Mine Sites and Nearest First Nation Reserve or Métis Local Associated with Community (km)	
					Gordon	MacLellan
				Total on No Band Crown Land: 35 Total Off-Reserve: 650		
Nisichawayasihk Cree Nation (NCN)	Marcel Moody (Chief)	General Delivery, Nelson House, MB, R0B 1A0 Phone: (204) 484-2332 Fax: (204) 484-2392	None	Total Registered: 5,119 Total on Own Reserves: 2,938 Total on Other Reserves: 29 Total on Own Crown Land: 0 Total on Other Band Crown Land: 0 Total on No Band Crown Land: 125 Total Off-Reserve: 2,027	80	95
O-Pipon-Na-Piwin Cree Nation (OPCN)	Chris Baker (Chief)	PO Box 139, South Indian Lake, MB, R0B 1N0 Phone: (204) 374-2271 Fax: (204) 374-2350	None	Total Registered: 1,660 Total on Own Reserves: 1,143 Total on Other Reserves: 18 Total on Own Crown Land: 0 Total on Other Band Crown Land: 0 Total on No Band Crown Land: 3 Total Off-Reserve: 496	90	120
<b>Saskatchewan</b>						
Peter Ballantyne Cree Nation (PBCN)	Peter A. Beatty (Chief)	General Delivery, Pelican Narrows, SK, S0P 0E0 Phone: (306) 632-2125 Fax: (306) 632-2275	PADC Management Company Ltd.	Total Registered: 10,655 Total on Own Reserves: 5,693 Total on Other Reserves: 200 Total on Own Crown Land: 993 Total on Other Band Crown Land: 1 Total on No Band Crown Land: 13 Total Off-Reserve: 3,755	100	70

**PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT**

Indigenous Community	Governance Representative	Contact Details	First Nation Tribal Council	Registered Population as of March 2017	Approximate Distance Between Project Mine Sites and Nearest First Nation Reserve or Métis Local Associated with Community (km)	
					Gordon	MacLellan
<b>Potentially Interested Indigenous Communities</b>						
<b>Saskatchewan</b>						
Métis Nation – Saskatchewan (MN-S)	Glenn McCallum (President)	231 Robin Crescent Saskatoon, SK, S7L 6M8 Phone: 1-306-343-8285	Not applicable	Not applicable	195	175

Source: INAC 2017, MN-S n.d., and GIS data from the Government of Canada.

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**Table 3.5 Summary of Indigenous Engagement Conducted for the Project**

Date	Means of Engagement	Key Topics
<b>Marcel Colomb First Nation (MCFN)</b>		
November 19, 2014	Meeting with representatives of Marcel Colomb Development Corporation (MCDC)	<ul style="list-style-type: none"> <li>• General Project information</li> </ul>
November 27, 2014	Meeting with representatives of MCDC	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Business opportunities</li> <li>• Employment opportunities</li> </ul>
November 27, 2014	Presentation at MCFN Christmas dinner	<ul style="list-style-type: none"> <li>• General Project information</li> </ul>
January 13, 2015	Meeting with MCFN Chief and MCFN community members	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Exploration investigations</li> </ul>
January 13, 2015	Meeting with representatives of MCFN (including the Chief) and MCDC	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Exploration investigations</li> <li>• Environmental Committee</li> <li>• Employment opportunities</li> </ul>
February 18, 2015	Meeting with representatives of MCFN (including the Chief) and MCDC	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Business opportunities</li> <li>• Employment opportunities</li> <li>• Environmental baseline studies</li> <li>• Environment Committee</li> <li>• Project Open House</li> </ul>
March 4, 2015	Tour of Alamos' Young-Davidson Mine in Matachewan, Ontario for MCFN and MCDC representatives	<ul style="list-style-type: none"> <li>• How Alamos has engaged with the Matachewan First Nation</li> <li>• Mine-related benefits to the Matachewan First Nation</li> </ul>
March 16, 2015	Conference call with representatives of MCFN (including the Chief) and MCDC	<ul style="list-style-type: none"> <li>• Indigenous agreements and protocols</li> <li>• Environmental Committee</li> <li>• Employment opportunities</li> </ul>
April 2, 2015	Meeting with MCFN Chief	<ul style="list-style-type: none"> <li>• Employment opportunities</li> </ul>
April 8, 2015	Phone call with MCFN representative	<ul style="list-style-type: none"> <li>• Environmental Committee</li> </ul>
April 13, 2015	Interview with MCFN Field Assistant	<ul style="list-style-type: none"> <li>• Indigenous hunting, trapping and fishing</li> <li>• Terrestrial environment</li> </ul>
April 22, 2015	Meeting with representatives of MCFN (including the Chief) and MCDC	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Business opportunities</li> <li>• Project engineering</li> </ul>
April 23, 2015	Meeting with representatives of MCFN (including the Chief) and MCDC	<ul style="list-style-type: none"> <li>• Business opportunities</li> </ul>

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**Table 3.5 Summary of Indigenous Engagement Conducted for the Project**

<b>Date</b>	<b>Means of Engagement</b>	<b>Key Topics</b>
May 5, 2015	Introduction of local Community Liaison	<ul style="list-style-type: none"> <li>• Employment opportunities</li> </ul>
May 30, 2015	Tour of Gordon and MacLellan sites for representatives of MCFN (including the Chief, Community Liaison Coordinator, and MCFN Environmental Committee)	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Business opportunities</li> </ul>
June 2, 2015	Meeting with representatives of MCFN (including the Chief) and MCDC	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Project engineering</li> <li>• Environmental Committee</li> <li>• Indigenous agreements and protocols</li> <li>• Indigenous hunting, trapping and fishing</li> <li>• Water resources</li> </ul>
June 26, 2015	Meeting with MCFN Water Treatment Plant Operator	<ul style="list-style-type: none"> <li>• Potential air quality monitoring station locations</li> </ul>
July 15, 2015	Presentation to MCFN Chief	<ul style="list-style-type: none"> <li>• General Project information</li> </ul>
July 19, 2015	Meeting with MCFN Chief	<ul style="list-style-type: none"> <li>• General Project information</li> </ul>
July 30, 2015	Meeting with MCFN Chief	<ul style="list-style-type: none"> <li>• General Project information</li> </ul>
August 19, 2015	Meeting with local Community Liaison Coordinator and MCFN Environmental Committee	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Environmental baseline studies</li> <li>• Traditional ecological knowledge</li> </ul>
August 28, 2015	Meeting with MCFN community members	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Fisheries/aquatic environment</li> </ul>
September 17, 2015	Meeting with MCFN Medical and Social Assistance Coordinator	<ul style="list-style-type: none"> <li>• General Project information</li> </ul>
September 23, 2015	Meeting with MCFN Health Program Coordinator	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Environmental Committee</li> <li>• Atmospheric environment</li> </ul>
September 29, 2015	Meeting with MCFN Chief, MCFN Councilors, and MCFN Health Program Coordinator	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Environmental Committee</li> </ul>
October 27, 2015	Meeting with MCFN Chief	<ul style="list-style-type: none"> <li>• Indigenous agreements and protocols</li> <li>• Environmental Committee</li> <li>• Community involvement</li> </ul>
February 18, 2016	Meeting with MCFN Chief and Councilors	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Indigenous and Treaty rights</li> </ul>

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**Table 3.5 Summary of Indigenous Engagement Conducted for the Project**

Date	Means of Engagement	Key Topics
		<ul style="list-style-type: none"> <li>• Environmental Committee</li> <li>• Fisheries/aquatic environment</li> <li>• Terrestrial environment</li> <li>• Water resources</li> </ul>
February 23, 2016	Meeting with MCDC representative	<ul style="list-style-type: none"> <li>• Community involvement</li> </ul>
August 30, 2016	Meeting with MCFN Chief, MCFN Band Manager, and MCFN Councilors	<ul style="list-style-type: none"> <li>• General Project information</li> </ul>
October 25, 2016	Meeting with MCFN Chief, MCFN Councilors, MCDC representatives, and an independent consultant	<ul style="list-style-type: none"> <li>• Community involvement</li> <li>• Socio-economic environment</li> <li>• Workforce housing study</li> </ul>
October 26, 2016	Meeting with MCFN Chief, MCFN Councilors, and MCDC representatives	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Employment opportunities</li> <li>• Business opportunities</li> <li>• Socio-economic environment</li> </ul>
January 17, 2017	Meeting with MCFN Chief and Councilors	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Indigenous agreements and protocols</li> <li>• Business opportunities</li> <li>• Employment opportunities</li> </ul>
March 1, 2017	Meeting with MCFN Chief and Councilors (regularly scheduled meeting to discuss Project updates, potential concerns, upcoming events, and increase communication between MCFN and Alamos)	<ul style="list-style-type: none"> <li>• General project information</li> <li>• Indigenous agreements and protocols</li> <li>• Business opportunities</li> <li>• Employment opportunities</li> <li>• Traditional Knowledge/Traditional Land and Resource Use Study</li> </ul>
April 24, 2017	Meeting with MCFN Councilors and MCFN community member (regularly scheduled meeting to discuss Project updates, potential concerns, upcoming events, and increase communication between MCFN and Alamos)	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Community involvement</li> <li>• Business opportunities</li> <li>• Employment opportunities</li> <li>• Project Open House</li> </ul>
May 1, 2017	Meeting with MCFN Chief and Councilors	<ul style="list-style-type: none"> <li>• General Project information</li> <li>• Business opportunities</li> <li>• Employment opportunities</li> <li>• Traditional Knowledge/Traditional Land and Resource Use Study</li> </ul>
May 16, 2017	Meeting with MCFN Councilors and a MCFN community member (regularly scheduled meeting to discuss Project updates, potential concerns,	<ul style="list-style-type: none"> <li>• General project information</li> <li>• Community involvement</li> </ul>

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**Table 3.5 Summary of Indigenous Engagement Conducted for the Project**

Date	Means of Engagement	Key Topics
	upcoming events, and increase communication between MCFN and Alamos)	<ul style="list-style-type: none"> <li>Indigenous agreements and protocols</li> <li>Indigenous hunting, trapping, and fishing</li> <li>Traditional Knowledge/Traditional Land and Resource Use Study</li> </ul>
May 30, 2017	Meeting with MCFN Chief and Councilors	<ul style="list-style-type: none"> <li>Aboriginal Agreements &amp; Protocols</li> <li>General Project Information</li> </ul>
May 30, 2017	Meeting with MCFN Elders to review the Traditional Knowledge/Traditional Land and Resource Use Study	<ul style="list-style-type: none"> <li>Traditional Knowledge/Traditional Land and Resource Use Study</li> </ul>
June 1, 2017	Telephone conversation with MCFN community member	<ul style="list-style-type: none"> <li>Traditional Knowledge/Traditional Land and Resource Use Study</li> <li>General Project Information</li> </ul>
June 2, 2017	Meeting with MCFN Chief and Councilors	<ul style="list-style-type: none"> <li>Traditional Knowledge/Traditional Land and Resource Use Study</li> </ul>
June 3, 2017	Annual Community Clean-Up Participation at Black Sturgeon Falls Reserve	<ul style="list-style-type: none"> <li>Annual community clean-up</li> <li>Traditional Knowledge/Traditional Land and Resource Use Study</li> </ul>
June 15, 2017	Meeting with MCFN Chief and Councilors	<ul style="list-style-type: none"> <li>Aboriginal Agreements &amp; Protocols</li> <li>General Project Information</li> </ul>
June 16, 2017	Telephone conversation with MCFN community member	<ul style="list-style-type: none"> <li>Job Opportunities</li> <li>Environment in general</li> </ul>
<b>Lynn Lake Friendship Centre (LLFC)</b>		
October 27, 2015	Meeting with Manager of LLFC	<ul style="list-style-type: none"> <li>Community involvement</li> </ul>
November 24, 2015	Meeting with Manager of LLFC	<ul style="list-style-type: none"> <li>Community involvement</li> </ul>
November 1, 2016	Meeting with Manager of LLFC	<ul style="list-style-type: none"> <li>Community involvement</li> <li>Education</li> </ul>

The main comments and concerns that have been raised by MCFN and documented during the engagement activities undertaken to date have pertained to the:

- Importance of ongoing Indigenous engagement and partnership.
- Importance of education and training for MCFN members, particularly youth.
- Importance of building capacity and preparing for mining industry employment.
- Lack of previous engagement from mining and hydroelectric companies.
- Current general lack of training for MCFN members.

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- Current general lack of opportunities and amenities for MCFN causing social problems.
- Current general lack of MCFN capacity to benefit from mine development.
- Potential Project-related effects on water quality and terrestrial habitat, and potential implications for hunting and fishing in the area.
- Importance of water quality monitoring.
- Compensation for effects on traditional activities.
- Post-mining legacy long-term effects of mining (i.e., 50-100 years after mining ceases).
- Importance of keeping Winnipeg-based MCFN members informed of future potential employment opportunities.
- Ability of the Environment Committee to interpret and understand environmental studies and analyses being completed in support of the Project, as well as environmental permitting process.

### 3.3.3 Ongoing and Proposed Indigenous Engagement Activities

Alamos has a local office/presence in Lynn Lake that facilitates ongoing communications with members of MCFN.

A Project-specific Traditional Knowledge/Traditional Land and Resource Use Study is currently being completed in support of the EA, with participation from Indigenous peoples and Elders in the Manitoba communities of Lynn Lake, Pukatawagan, and Winnipeg, as well as Regina, Saskatchewan.

Proponent-led Indigenous engagement will continue throughout the EA process and will remain ongoing (on an as-needed basis) for the duration of the Project. It is understood that there will also be several additional government-led engagement opportunities during the federal and provincial EA processes (e.g., public review and comment periods for EA-related documents), in addition to government-led Indigenous consultation.

## 4 ENVIRONMENTAL SETTING

The following subsections describe the environmental setting with reference to a “General Project Area”, which does not have strictly defined spatial boundaries but generally includes the area indicated on **Map 3** in **Appendix B**; this area is considered to be generally representative of the local environmental context for the Project.

Several environmental baseline studies have been or are being carried out in support of the Project. The corresponding technical data reports are identified in **Table 4.1**. Some high-level information obtained during these studies has been incorporated into the description of the environmental setting below.

**Table 4.1 Technical Data Reports Associated with Environmental Baseline Studies in Support of the Project**

Technical Data Report	Data Sources
Acoustic Baseline	Review of desktop information and collection of field data (i.e., noise monitoring)
Air Quality Baseline	Review of desktop information and collection of field data (i.e., active [continuous] particulate monitoring and dustfall monitoring)
Ambient Lighting Baseline	Review of desktop information and collection of field data (i.e., light survey and photographs)
Amphibian Baseline	Review of desktop information and collection of field data (i.e., habitat assessment, amphibian survey, and visual encounter survey)
Benthos and Sediment Baseline	Review of desktop information and collection of field data (i.e., periphyton sampling, phytoplankton sampling, zooplankton sampling, benthic invertebrate sampling, sediment sampling, and water quality sampling)
Bird Baseline	Review of desktop information and collection of field data (i.e., breeding bird survey, common nighthawk survey, waterbird survey, raptor nest survey, and barn swallow survey)
Climate and Meteorology Baseline	Review of desktop information
Fish Habitat, Distribution, and Tissue Analysis	Review of desktop information and collection of field data (i.e., fish habitat assessment, fish population sampling, fish spawning survey, and fish tissue sampling)
Geochemistry Baseline	Review of desktop information and collection of field data (i.e., sampling of ore, waste rock, and overburden from exploration/geotechnical drill cores, and high- and low-grade ore and solid tailings derived as part of a metallurgical study)
Heritage Resources Baseline	Review of desktop information and collection of field data (i.e., pedestrian transects, shovel testing, and photographs)
Human Health and Ecological Risk Assessment	Review of desktop information and collection of field data (i.e., soil sampling, vegetation sampling, and small mammal sampling)

**Table 4.1 Technical Data Reports Associated with Environmental Baseline Studies in Support of the Project**

Technical Data Report	Data Sources
Hydrogeology Baseline	Review of desktop information and collection of field data (i.e., borehole drilling, hydraulic response testing, water level monitoring, and water quality monitoring)
Hydrology Baseline	Review of desktop information and collection of field data (i.e., snow survey, hydrometric monitoring, levelling survey, channel geometry survey, and bathymetric survey)
Mammal Baseline	Review of desktop information and collection of field data (i.e., aerial track survey, camera trap survey, ground-based tracking survey, beaver lodge survey, and bat survey)
Socio-Economic Baseline	Review of desktop information
Soil and Terrain Baseline	Review of desktop information and collection of field data (i.e., soil and terrain inspections and aerial reconnaissance)
Vegetation Baseline	Review of desktop information and collection of field data (i.e., ground plot survey [vegetation type characterization], wetland classification, and rare plant survey)
Water Quality Baseline	Review of desktop information and collection of field data (i.e., field measurements and water sampling)

Other Project-specific studies that have been or are being undertaken include a Traditional Knowledge/Traditional Land and Resource Use study, a Transportation Assessment, and physical modelling (e.g., atmospheric dispersion, surface and groundwater flows).

The EIS will provide further details regarding the methods and results of studies completed in support of the Project.

## 4.1 OVERVIEW

The Project is located within a remote, rugged region of the Boreal Shield Ecozone. The General Project Area (see **Map 3, Appendix B**) supports peat-covered hummocky glacial deposits underlain by an expanse of Precambrian bedrock. The terrain consists of mostly hilly, fill veneered bedrock, with intervening low areas of organic terrain ranging from level to moderately sloping (0-15%). Topography slopes from a high of 450 m AMSL in the west and northwest to a low of 260 m AMSL in the southeast. Steep rocky ridges protrude 30 m to 60 m above lakes and peat-filled depressions. Surface water features and peat generally occupy the topographic lows. Soils in the region are thin, poorly drained, and acidic, with organic soils typical in bogs and peat plateaus, and discontinuous permafrost is widespread.

Contiguous tracts of boreal forest span the area with jack pine (*Pinus banksiana*) common in well-drained areas, and black spruce (*Picea mariana*) and tamarack (*Larix laricina*) species abundant in wetter areas. The area is home to diverse wildlife species such as beaver (*Castor canadensis*), moose (*Alces alces*), black bear (*Ursus americanus*), American marten (*Martes americana*), and a variety of migratory birds such as ring-necked duck (*Aythya collaris*), bald eagle (*Haliaeetus*

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*leucocephalus*), and Tennessee warbler (*Leiothlypis peregrina*). Numerous wetlands, lakes, rivers, and streams are found throughout the General Project Area due to impermeable bedrock and poorly drained soils. These waterbodies are a part of the Churchill River Watershed that drains into Hudson Bay to the east. Fish inhabiting the General Project Area include northern pike (*Esox lucius*), walleye (*Sander vitreus*), yellow perch (*Perca flavescens*), and brook stickleback (*Culaea inconstans*).

The General Project Area supports two communities: the Town of Lynn Lake and Black Sturgeon Falls Reserve. These communities are connected by PR 391 which runs southeast from Lynn Lake to Thompson, Manitoba.

The EA Study Team is not aware of any relevant regional environmental study that is being or has been conducted in the General Project Area. The EA Study Team is similarly not aware of any applicable plans pertaining to water use (including groundwater), resource management, or conservation.

## 4.2 ATMOSPHERIC ENVIRONMENT

### 4.2.1 Climate/Meteorology

The Project is in a climatic region characterized by short, cool summers and long, cold winters. Long-term climate data (1981-2010) from the Lynn Lake Airport monitoring station (Government of Canada 2016a) indicates that the mean annual air temperature is -3.2°C, ranging from an extreme maximum of 35°C (August 11, 1991) to an extreme minimum of -47 °C (December 19, 1989). The minimum and maximum monthly mean temperatures during 1981-2010 were -29°C for January and 22°C for June. There is an annual average of 98 frost-free days. On average, there are 141 days with precipitation per year with an average annual precipitation of 478 mm (318 mm as rain and 160 mm as snow-water-equivalent).

### 4.2.2 Air Quality

Baseline dustfall measurements at the Gordon and MacLellan sites are well below dustfall objectives from Ontario and British Columbia (Manitoba does not have a dustfall objective). Average particulate matter baseline concentrations (PM<sub>2.5</sub> and PM<sub>10</sub>) are also well below the Canada-Wide Standard for PM<sub>2.5</sub> (30 µg/m<sup>3</sup>) and the Manitoba *Ambient Air Quality Guideline* for PM<sub>10</sub> (50 µg/m<sup>3</sup>) (CCME 2011; MSD 2005) at the sites and Black Sturgeon Falls Reserve, although the presence of air emissions from forest fires biases this baseline (e.g., during June and early July 2015). Existing air quality is reflective of the remote location of the Project and the current lack of industrial activities in the area. Existing dust levels are attributed to traffic on unpaved roads and other human activities such as the use of wood stoves and open fires.

### 4.2.3 Ambient Sound

Isolated hourly sound levels (L<sub>eq</sub>) in a representative remote, unpopulated region of the General Project Area (i.e., Gordon site) were found to range between 22.7 decibel A-weighting (dBA) and

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39.1 dBA during the day and between 20.3 dBA and 41.7 dBA during the night. The baseline acoustic environment in remote areas is characterized by wind noise, occasional aircraft flyovers, vegetation rustling, wildlife (birds) and insect noise. Elevated noise levels observed at night are attributed to wildlife activity. The Lynn Lake Airport does not receive regularly scheduled commercial flights; however, aircraft flyovers from occasional air charter flights contribute to baseline ambient sound in remote regions of the General Project Area.

Isolated hourly  $L_{eq}$  results for a sparsely populated region of the General Project Area (i.e., Black Sturgeon Falls Reserve) ranged between 33.0 dBA and 46.6 dBA during the day and between 23.2 dBA and 45 dBA during the night. The acoustic environment in sparsely populated areas is characterized by local activities (vehicle traffic, as well as general and recreational human activity and children playing), occasional aircraft flyovers, vegetation rustling, dog barking, and wildlife and insects noise.

Noise monitoring in a representative rural area (i.e., the cottage area within Burge Lake Provincial Park located west of the MacLellan site) identified isolated hourly  $L_{eq}$  results ranging between 31.3 dBA and 49.5 dBA during the day and between 22.7 dBA and 43.3 dBA during the night. The acoustic environment in rural areas is characterized by residents' activities, local traffic, watersport and recreational activities, occasional aircraft flyovers, vegetation rustling, wildlife, insects, and water ripple noise. Additional human sources of baseline noise are also related to traffic along PR 391 (which traverses the southern portion of the MacLellan site).

### 4.2.4 Ambient Light

The ambient light environment within the General Project Area is typical of light levels in remote towns and villages at higher latitudes. Baseline measurements are consistent with other small towns and villages where light pollution is typically not a priority for control. Sky glow is routinely influenced by the presence of Aurora Borealis (i.e., northern lights).

Dark sky is available within a few kilometers of Lynn Lake and the Black Sturgeon Falls Reserve. The light that affects these communities is the light that is generated within them, not by the overlap of other sources, such as industry, outside of the urban areas.

## 4.3 WATER RESOURCES

### 4.3.1 Physiography

The General Project Area overlaps with the Paleoproterozoic Lynn Lake greenstone belt within the Churchill Structural Province of the Canadian Shield. The Lynn Lake greenstone belt is comprised of volcanic rocks of the Wasekwan Group, sedimentary rocks of the Sickle Group, and plutonic intrusions. Overburden geology is characterized as glaciolacustrine sediments overlying either bedrock or a discontinuous regional sand diamicton. Organic deposits were observed as a thin veneer with thicker accumulations observed in low lying areas. Isolated pockets of glaciofluvial sediments are also present.

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Within the vicinity of the Gordon site, the ground surface elevation ranges from about 320 m to 350 m AMSL. Near the MacLellan site, the ground surface elevation ranges from 325 m to 375 m AMSL with an overall slope to the southeast.

### 4.3.2 Surface Water Hydrology

The General Project Area lies within four subwatersheds of the broader Granville Lake Watershed: Hughes River, Lower Keewatin River, Lower Lynn River, and Cockeram Lake (**Maps 8 and 9, Appendix B**). The Hughes River Subwatershed contains large lakes such as Ellystan Lake, White Owl Lake, Swede Lake, Simpson Lake, Farley Lake, and Gordon Lake.

Surface water around the Gordon site drains southward into the Hughes River, via Swede and Ellystan lakes, which in turn discharge into Barrington River and Southern Indian Lake on the Churchill River. Around the MacLellan site, water flows south into the Keewatin River and southeast through Cockeram Lake and Sickle Lake before discharging into Granville Lake on the Churchill River, upstream of Southern Indian Lake.

Gordon Lake is located at the top end of the watershed and west of the historical mine area that formerly drained eastward to Farley Lake via Gordon Creek. As part of historical mining activities, a diversion channel was constructed between Gordon Lake and Farley Lake, north of the historical East and Wendy pits (see **Map 1, Appendix B**). East and Wendy Pits are flooded and are not directly connected to the diversion channel or Gordon or Farley lakes. The water level in Gordon and Farley lakes is maintained at pre-development levels due to the construction of control structures at the outlets as part of closure activities that occurred between 2007 and 2012.

The Keewatin River, Lynn River, Goldsand Lake, and Cockeram Lake are some of the largest waterbodies in the Lower Keewatin River, Lower Lynn River, and Cockeram Lake subwatersheds. The subwatershed on the west side of the MacLellan site flows towards the Keewatin River which ultimately converges with the Lynn River before entering Cockeram Lake.

Five lakes surround the proposed infrastructure at the MacLellan site, including Payne Lake (which drains into the Keewatin River) and Lobster, Minton, and two unnamed lakes (which drain into an unnamed river that ultimately discharges to Cockeram Lake in the south; see **Map 9, Appendix B**).

A shallow waterbody (East Pond) is located about 200 m east of the historical mine operational area (see **Map 2, Appendix B**) and drains via diffuse surface water discharge through a wetland area prior to becoming a defined channel which drains to the Keewatin River in the south. The Keewatin River flows southeast from Cockeram Lake, through Sickle Lake before discharging into Granville Lake on the Churchill River, upstream of Southern Indian Lake.

Evidence of beaver activity was noted throughout the General Project Area, particularly in streams and at lake outlets. In these areas, beaver dam construction has reduced flow and increased water levels upstream.

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### 4.3.3 Groundwater Hydrogeology

Bedrock in the General Project Area is typically covered by 2-4 m of overburden. Overburden consists of discontinuous glaciolacustrine sediments overlying either bedrock or a discontinuous regional glacial sand diamicton that overlies bedrock. Organic deposits are present as a thin veneer with thicker accumulations in low lying areas. Where glaciolacustrine sediments are absent, glacial sand diamicton is present at ground surface or underlying organic deposits. A series of bedrock valleys near the MacLellan site are present where overburden is greater than 28 m thick.

Groundwater flow in the General Project Area is strongly influenced by topography, which results in flow originating from topographically high areas to low areas. Measured groundwater levels vary from 314-326 m AMSL. Recharge is associated with the topographic high areas and discharges to surface water features within the topographic low areas.

Overall groundwater quality in the General Project Area meets the *Manitoba Provincial Water Quality Guidelines* (MPWQG) for drinking water and the *Canadian Drinking Water Quality Guidelines* (CDWQG) except for iron and manganese. These parameters are typically elevated in groundwater within northern areas where reducing groundwater conditions exist. With respect to drinking water guidelines, there is no clear difference in groundwater quality between areas associated with historical mine operations and background areas.

Background groundwater quality also meets the more stringent MPWQG for Aquatic Life (MPWQG-AL) and the CDWQG for the Protection of Freshwater Aquatic Life (CWQG-FAL) for all parameters except fluoride, iron, copper, aluminum, and arsenic. Within the historical mine operational areas, groundwater quality exceeds the MPWQG-AL and the CWQG-FAL for fluoride, free cyanide, uranium, selenium, zinc, copper, and iron.

### 4.3.4 Geochemistry

The preliminary geochemistry data indicate that future mine waste could have potential for ARD and ML. Mine rock from both sites contains potentially acid generating materials and shows moderate leaching potential for arsenic. Several tailings samples tested were also potentially acid generating, showing a high leaching potential for arsenic and a low leaching potential for metals including copper, iron, chromium, and lead.

## 4.4 AQUATIC ENVIRONMENT

### 4.4.1 Water Quality

Most of the lakes near the Gordon and MacLellan sites 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 (< 80 mg/L total dissolved solids), soft (hardness < 75 mg/L as CaCO<sub>3</sub>), and neutral to slightly acidic in pH. Some

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parameters (e.g., dissolved oxygen, pH, total phosphorus, aluminum, chromium, and iron) are naturally elevated and occasionally do not meet water quality guidelines.

At the outlet of Gordon Lake, the 2015 to 2017 dataset showed no notable changes in water quality from background conditions. This suggests that drainage from the inactive mine site (i.e., surface runoff from existing mine rock and overburden storage dumps and seepage from the adjacent former open pit) does not affect water quality in Gordon Lake. Water quality data indicate elevated levels of some metals and other ions (e.g., alkalinity, hardness, specific conductance, calcium, chloride, magnesium, potassium, sodium, sulphate, arsenic, copper, iron, nickel, and uranium) in the existing open pits and in Farley Lake compared to background concentrations in the Gordon site area, however, concentrations of these parameters were similar to background by Swede Lake, the next lake downstream from Farley Lake. In general, the Hughes River subwatershed, within which the Gordon site is located, has the following parameters in concentrations that exceed MSOG-FAL and/or CWQG-FAL: total and dissolved organic carbon, total phosphorus, iron, and aluminum. These exceedances are likely the result of lithology in the case of aluminum and sulphate, the presence of mineralized rock in the case of copper and nickel, and the proliferation of beaver dams, muskeg bogs, and low relief in the case of organic carbon.

The inactive MacLellan site does not appear to affect water quality in the Keewatin River, as there were no identifiable increased concentrations of water quality parameters between the sites upstream and downstream of the site (upstream of the Lynn River confluence). Sulphate and chloride concentrations and aluminum, copper, nickel, cadmium, cobalt and zinc concentrations were higher in Eldon Lake, the Lynn River, in the Keewatin River downstream of the Lynn River, and in Cockeram Lake (the first lake downstream of the inactive MacLellan mine site and the unrelated former East Tailings Management Area) than in other lakes and streams not downstream from these facilities, including the Keewatin River upstream from the Lynn River confluence. Mean copper, nickel, iron, and zinc concentrations were higher than CWQG-FAL in Eldon Lake, the Lynn River, and in Cockeram Lake. These exceedances are generally attributable to past mining activity near Lynn Lake. Other guideline exceedances in the MacLellan site area, including total phosphorus, iron, and aluminum, reflect background conditions.

### 4.4.2 Fish and Fish Habitat

Based on the results of field surveys conducted in 2015 and 2016, a total of 17 fish species are known to occur in the lakes and streams near the Project mine sites (**Table 4.2**). Small-bodied fish species are most prevalent in streams and small, shallow lakes including: brook stickleback (*Culaea inconstans*), ninespine stickleback (*Pungitius pungitius*), log perch (*Percina caprodes*), trout perch (*Percopsis omiscomaycus*), emerald shiner (*Notropis atherinoides*), spottail shiner (*Notropis hudsonius*), longnose dace (*Rhinichthys cataractae*), lake chub (*Couesius plumbeus*), and slimy sculpin (*Cottus cognatus*). Large-bodied fish species are more prevalent in larger, deeper lake and include: northern pike, walleye, yellow perch, lake whitefish (*Coregonus clupeaformis*), burbot (*Lota lota*), cisco (*Coregonus artedii*), white sucker (*Catostomus commersoni*), 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 General

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Project Area. Northern pike are the most widespread large-bodied species in the lakes of the General Project Area, while brook stickleback are the most widespread small-bodied species in the lakes and streams.

**Table 4.2 Fish Species Known to Occur in Waterbodies Near the Project Mine Sites**

Waterbody	Location	Fish Species Confirmed to be Present During Field Surveys Conducted in 2015 and 2016
<b>Gordon Site</b>		
Farley Lake	Adjacent and to the east (downstream) of proposed open pit ( <b>Maps 4 and 8, Appendix B</b> )	Northern pike, yellow perch, white sucker, and brook stickleback
Gordon Lake	Adjacent and to the west (upstream) of proposed open pit ( <b>Maps 4 and 8, Appendix B</b> )	White sucker and brook stickleback
<b>MacLellan Site</b>		
Cockeram Lake	South (downstream) of proposed mine infrastructure and PR 391 ( <b>Maps 5 and 9, Appendix B</b> )	Northern pike, walleye, yellow perch, lake whitefish, white sucker, trout perch, emerald shiner, spottail shiner, lake chub, log perch, and ninespine stickleback
Dot Lake	West of and across Keewatin River from proposed open pit ( <b>Map 5, Appendix B</b> )	Brook stickleback
East Pond	Adjacent to and between proposed open pit and proposed ore milling and processing plant (unnamed on <b>Map 5, Appendix B</b> )	Brook stickleback
Keewatin River	Adjacent and to the west of proposed mine infrastructure ( <b>Maps 5 and 9, Appendix B</b> )	Northern pike, yellow perch, lake whitefish, cisco, burbot, white sucker, longnose sucker, lake chub, longnose dace, trout perch, brook stickleback, and slimy sculpin
Lobster Lake	Northeast of proposed TMF ( <b>Map 9, Appendix B</b> )	Brook stickleback and northern pike
Minton Lake	South (downstream) of proposed TMF ( <b>Maps 5 and 9, Appendix B</b> )	Brook stickleback and northern pike
Payne Lake	North of proposed mine rock storage area and proposed TMF ( <b>Maps 5 and 9, Appendix B</b> )	Brook stickleback

No aquatic species of conservation concern (SOCC) have been documented or are expected in the General Project Area based on known fish species distributions, including those listed as *special concern*, *threatened*, or *endangered* under the federal SARA (Government of Canada 2016b), recommended for listing under SARA by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (2016), listed as *threatened* or *endangered* under Manitoba's *The*

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*Endangered Species and Ecosystems Act* (MB ESEA) (Government of Manitoba 2016), or listed as S1-S3 by the Manitoba Conservation Data Centre (MB CDC) (2015).

Most lakes in the General Project Area are shallow (< 3 m) with soft substrates (e.g., sand or muck). Hard substrates (e.g., boulders or cobbles) are less common but present in some locations. Aquatic vegetation and cover in the littoral zone is abundant in most of the lakes in the General Project Area.

The Gordon site is in the headwaters of the Hughes River watershed, and no large rivers flow through the study area. Farley Creek, the outlet of Farley Lake, is the largest stream potentially affected by the Project. Short cascades and a proliferation of beaver dams present seasonal or temporary barriers to fish passage in several of the streams near the Gordon site.

The Keewatin, Cockeram, and Lynn rivers and their tributaries connect the lakes near the MacLellan site. The Keewatin River is the largest river in the General Project Area, connecting Goldsand and Burge lakes upstream of the MacLellan site to Cockeram Lake downstream of the mine site. The Lynn River is a tributary to the Keewatin River upstream of Cockeram Lake.

Stream habitats are generally low gradient, interspersed with short cascades that do not generally create barriers to migration. Beavers are active in the General Project Area and their dams present seasonal or temporary barriers to fish passage on several tributaries to the rivers and lakes.

### 4.4.2.1 Fish Tissue

Metals concentrations in northern pike muscle and whole body tissues from the Gordon and MacLellan sites are generally below the MMER and Health Canada guidelines for protection of aquatic life and human consumption. This includes total mercury for which average concentrations were below the human health guideline of 0.5 µg/g (wet weight).

Concentrations of selenium in northern pike muscle and whole body tissues were approximately one order of magnitude lower than the 4 µg/g (wet weight) guideline used in British Columbia (BCMoe 2014).

### 4.4.3 Sediment Quality

Arsenic and chromium concentrations exceed federal or Manitoba sediment quality guidelines in Farley and Gordon lakes, respectively. Iron and aluminum concentrations were also elevated in Gordon and Farley lakes compared to upstream reference sites. Sediment metal concentrations were otherwise below guideline values at the Gordon site.

Elevated concentrations of chromium, copper, arsenic, and zinc that exceed federal and/or Manitoba sediment guidelines have been measured in sediment at the inflow of the Keewatin River into Cockeram Lake. This location is downstream of the MacLellan site, downstream of the former East Tailings Management Area (located on the banks of the Lynn River), and downstream of other historical mining activities and other anthropogenic influences from the Town of Lynn Lake. These data suggest past contamination of sediments in north Cockeram Lake. Other metals,

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for which no guidelines currently exist, such as aluminum and iron, were also elevated at several locations, including Goldsand Lake located upstream of the MacLellan site. This suggests some natural enrichment from the surrounding geology.

### 4.5 TERRESTRIAL ENVIRONMENT

#### 4.5.1 Terrain and Soils

The Project is located within the Churchill River Upland Ecoregion of the Boreal Shield Ecozone (Smith *et al.* 1998). It falls under the South Indian bedrock plateau subdivision of the Kazan Upland (Bostock 1970) which covers about 35,000 km<sup>2</sup> of mostly hilly, till veneered bedrock terrain, and intervening low areas of organic terrain (Klassen 1986). The General Project Area terrain ranges from level to moderately sloping, with most slopes ranging from 0 to 15%.

Within the Churchill River Upland Ecoregion, Dystric Brunisols are the dominant soils on sandy acidic till, while Gray Luvisols are dominant on well to imperfectly drained clay deposits (Smith *et al.* 1998). Granitic rock outcrops are co-dominant in the area. Appreciable areas of shallow and deep organic Mesisols, Fibrisols and Cryosols are associated with basin bogs, peat plateau and veneer bogs (Smith *et al.* 1998). Gray Luvisols, and to a lesser extent Static and Turbic Cryosols, are common on clayey lacustrine deposits along the Churchill River and around Southern Indian Lake, while Eutric Brunisols occur on silty fluvio-glacial ridges and on calcareous loamy till.

At the Gordon site, the dominant soils are well drained, coarse-textured Eluviated Dystric Brunisols of the Fay Lake soil series and very poorly drained Terric Fibric Organic Cryosols of the Wuskwatim soil series. At the MacLellan site, the dominant soils are imperfectly drained, coarse-textured Gleyed Eluviated Dystric Brunisols of the Hat Lake soil series and very poorly drained, Terric Fibric Organic Cryosols of the Wuskwatim soil series.

The Permafrost Distribution Map of Canada (Heginbottom *et al.* 1995) indicates that the Project is located within the sporadic to discontinuous permafrost zone, where permafrost is typically found in 10% to 50% of the land area.

#### 4.5.2 Vegetation and Wetlands

The Project is in the Boreal Shield Ecozone, Churchill River Upland Ecoregion, and Reindeer Lake Ecodistrict (Smith *et al.* 1998) which is characterized by black spruce-dominated forests on mineral soils and in poorly drained peatlands. Tamarack is typical on wetter peatland sites, while drier sites are forested white birch (*Betula papyrifera*), jack pine, and occasionally white spruce (*Picea glauca*). Jack pine stands occur on upland sites, while white birch is found throughout the Ecodistrict. Field surveys documented 200 plant species within the General Project Area (refer to Section 4.5.6 for discussion of SOCC).

Common dandelion (*Taraxacum officinale*) and quack-grass (*Elymus repens*) are considered noxious weeds in Manitoba and were observed in the General Project Area (Government of Manitoba 2015).

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The Project is in the High Boreal wetland region which is characterized by permafrost and non-permafrost wooded bogs and patterned fens (Halsey *et al.* 1997). An estimated 37% of the High Boreal wetland region is covered in wetlands, comprised of (in order of dominance): permafrost wooded bogs, wooded fens with internal lawns, patterned open fens, non-patterned open fens, and wooded fens with internal lawns, along with small percentages of swamps and marshes. Eleven wetland types have been recorded within the General Project Area.

### 4.5.3 Amphibians

Three species of amphibian have the potential to breed within the General Project Area: boreal chorus frog (*Pseudacris maculata*), wood frog (*Rana sylvatica*), and northern leopard frog (*Lithobates pipiens*). Baseline field surveys confirmed the presence of breeding habitat for boreal chorus and wood frogs; both are widely dispersed throughout the General Project Area. Although northern leopard frog's historical range includes the General Project Area, none were observed during baseline studies. SOCC are discussed in Section 4.5.6.

### 4.5.4 Birds

Based on the Manitoba Breeding Bird Atlas (MB BBA 2016), 198 bird species have the potential to breed in the General Project Area. Of these, 62 are waterbirds, four are upland game birds, 18 are raptors, and 114 are passerines (i.e., songbirds) or near-passerines (e.g., woodpeckers). Common waterbird species observed during baseline studies were mallard (*Anas platyrhynchos*), ring-necked duck, Canada goose (*Branta canadensis*), and common loon (*Gavia immer*). Common songbirds were swamp sparrow (*Melospiza Georgiana*), ruby-crowned kinglet (*Regulus calendula*), Tennessee warbler, dark-eyed junco (*Junco hyemalis*), and yellow-rumped warbler (*Setophaga coronate*). SOCC are discussed in Section 4.5.6.

### 4.5.5 Mammals

Baseline data indicates the General Project Area is home to American marten, American red squirrel (*Tamiasciurus hudsonicus*), beaver (*Castor canadensis*), black bear, Canadian lynx (*Lynx canadensis*), fisher (*Martes pennant*), grey wolf (*Canis lupus*), mink (*Neovison vison*), moose, red fox (*Vulpes vulpes*), river otter (*Lontra canadensis*), snowshoe hare (*Lepus americanus*), weasel (*Mustela sp.*), wolverine (*Gulo gulo*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), little brown myotis (*Myotis lucifugus*), various small rodents (e.g., voles). Moose and black bear are some of the important game species harvested by local resource users. SOCC are discussed in Section 4.5.6.

### 4.5.6 Species of Conservation Concern

SOCC are those species listed as *special concern*, *threatened*, or *endangered* under SARA (Government of Canada 2016b), recommended for listing under SARA by COSEWIC (2016), listed as *threatened* or *endangered* under MB ESEA (Government of Manitoba 2016), or ranked as S1-S3 by the MB CDC (2015).

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The General Project Area is located within the known range of 38 terrestrial SOCC (**Tables B.1 and B.2, Appendix C**): 23 plant, one amphibian, nine birds, and five mammal species.

Four of the 23 plant SOCC are known to occur within the General Project Area: quillwort (*Isoetes lacustris*), small water-lily (*Nymphaea tetragona*), northern woodsia (*Woodsia aplina*), and shrubby willow (*Salix arbusculoides*). None of the 23 plant SOCC are listed under SARA, nor are any of Manitoba's SARA-listed plant SOCC expected to occur based on the habitat types found in the General Project Area.

The historical range of northern leopard frog (listed as *special concern* under SARA) includes the General Project Area; however, there are no recent records of their presence and none were observed during baseline studies.

Of the nine bird SOCC, three are confirmed breeders in the area: common nighthawk (*Chordeiles minor*, listed as *threatened* under SARA and MB ESEA), olive-sided flycatcher (*Contopus cooperi*, listed as *threatened* under SARA and MB ESEA) and barn swallow (*Hirundo rustica*, listed as *threatened* by COSEWIC). Trumpeter swan (*Hirundo rustica*, listed as *endangered* under MB ESEA), horned grebe (*Podiceps auritus*, listed as *special concern* by COSEWIC), and rusty blackbird (*Euphagus carolinus*, listed as *special concern* under SARA) may occur based on the availability of suitable breeding habitat; however, yellow rail (*Coturnicops noveboracensis*, listed as *special concern* under SARA), short-eared owl (*Asio flammeus*, listed as *special concern* under SARA and *threatened* under MB ESEA), and bank swallow (*Riparia riparia*, listed as *threatened* by COSEWIC) are less likely to occur based on lack of suitable habitat in the General Project Area.

Two of the five mammal SOCC (i.e., little brown myotis, listed as *endangered* under SARA and MB ESEA, and wolverine, listed as *special concern* by COSEWIC) have been documented in the General Project Area. Northern myotis was not detected during bat baseline surveys, yet it has the potential to occur in the General Project Area due to the availability of suitable bat roosting and foraging habitat.

The General Project Area lies within the MSD Kamuchawie Caribou Management Unit. MSD has yet to delineate any boreal woodland caribou (*Rangifer tarandus caribou*, listed as *threatened* under MB ESEA and SARA) herd ranges or provide an estimate of herd size in this management unit (Manitoba Boreal Woodland Caribou Management Committee 2015; pers. comm. 2015a). There are, however, boreal woodland caribou herds delineated south of the General Project Area and south of the Churchill River (COSEWIC 2011).

The barren-ground caribou (*Rangifer tarandus groenlandicus*, listed as a *threatened* by COSEWIC) range extends to approximately 45 km north of the General Project Area (BQCMB n.d.). Discussions with local resource users and MSD, and results of previous studies (MinGold Resources Inc. 1989 and Tetra Tech 2013) indicate it is unlikely that boreal woodland or barren-ground caribou occur in the General Project Area (pers. comm. 2015a; pers. comm. 2015b; pers. comm. 2015c).

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Subsequent conversations with the Regional Director for MSD (Northeast Region which includes Lynn Lake) and the Beverly and Qamanirjuaq Caribou Management Board (BQCMB) Senior Biologist confirmed that the current caribou range does not extend near the Project area (including the regional assessment area that will be included in the EIS).

### 4.6 HUMAN AND SOCIO-ECONOMIC ENVIRONMENT

#### 4.6.1 Socio-Economic Context

There are two population centres in the General Project Area: the Town of Lynn Lake and Black Sturgeon Falls Reserve. The Town of Lynn Lake has approximately 650 residents (Lynn Lake Mayor and Council 2014; pers. comm. 2015d). The population of the Black Sturgeon Falls Reserve is 38, all of whom are among the 430 registered members of MCFN (INAC 2017). The Town of Lynn Lake was built in the mid-20th century, primarily to serve the mining industry. Since the closure of the Blackhawk mine, the region has sought to develop its tourism industry, which is based largely around fishing and hunting.

The Town of Lynn Lake is accessible by PRs 391, 394, 396, 397 and 399. PR 391 connects the Town of Lynn Lake and Black Sturgeon Falls Reserve with the Town of Leaf Rapids and City of Thompson. PR 391 also provides access to all-weather gravel access roads to both the Gordon and MacLellan sites. There is currently no rail service to the Town of Lynn Lake. The Lynn Lake Airport is accessed by fishing charters, RCMP, health services, and mining-related activities (pers. comm. 2015e).

The Town of Lynn Lake provides solid waste services for residents and businesses. Waste from the town and Black Sturgeon Falls Reserve is disposed at the Lynn Lake Landfill. Water for the town comes from West Lynn Lake. The water treatment plant has incurred operational problems that have led to water quantity and quality issues (pers. comm. 2015d). A Boil Water Advisory has been in effect for the Town of Lynn Lake since 2012 (MSD 2017).

MCFN operates its own water treatment plant and sewage lagoon on the Black Sturgeon Falls Reserve. Both were built recently and are in good working condition (pers. comm. 2015f). Hughes Lake is the source of drinking water supplies for MCFN's treatment plant.

Education services within the General Project Area are provided through Frontier School Division, Area 1, which provides both in-class teaching services as well as distance education for senior years and career programs (Frontier School Division n.d.). West Lynn Heights School serves the Town of Lynn Lake and Black Sturgeon Falls Reserve.

The General Project Area is in the service delivery area for the Northern Health Region. The Lynn Lake Hospital is in the Town of Lynn Lake. The hospital shares health care resources with the Leaf Rapids Health Centre. For medical emergencies and specialist appointments, residents are transported by medivac to Thompson or Winnipeg.

The Town of Lynn Lake has 24-hour emergency medical services with one ambulance capable of providing patient transport to the Thompson General Hospital. The Lynn Lake RCMP is responsible

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for initial search and rescue at the outset of an emergency, with a specialized search and rescue team deployed to follow up. Lynn Lake, Leaf Rapids, Thompson, South Indian Lake, Nelson House and Cross Lake have volunteer search and rescue teams. The Lynn Lake Fire Department is a volunteer-run service that serves both the Town of Lynn Lake and Black Sturgeon Falls Reserve (the MCFN has a fire truck but lacks trained operators).

### 4.6.2 Land Use

The Gordon and MacLellan sites are in a remote area approximately 37 km and 7 km northeast of the Town of Lynn Lake, respectively. The Black Sturgeon Falls Reserve is located approximately 12 km southwest of the Gordon site. The nearest known permanent, seasonal, or temporary residences to the Project are a:

- Trapper cabin located approximately 3.5 km southeast of the Gordon site, on the north shore of Swede Lake.
- Remote cottage located approximately 4.5 km southwest of the Gordon site, on the north shore of Simpson Lake.

The land use site in closest proximity to the MacLellan site is a landfill located approximately 3 km to the southwest.

Both mine sites are surrounded by vegetated land, forest cover, scattered lakes, watercourses, and wetlands, and located within areas of discontinuous permafrost cover.

The Town of Lynn Lake is the self-proclaimed 'Sportfishing Capital of Manitoba'. Outdoor recreation activities are popular with both residents and visitors to the region and include sportfishing, hunting, boating, swimming, camping, cross-country skiing, and snowmobiling (Lynn Lake Mayor and Council 2014). There are two provincial parks within 20 km of the Town of Lynn Lake: Burge Lake and Zed Lake. Sand Lakes Provincial Park is approximately 40 km north of the Gordon site.

There are several municipal recreation facilities in the Town of Lynn Lake; however, their use is limited by lack of proper operation and maintenance. The arena has the potential to support curling, skating and hockey in the winter, and basketball, volleyball, floor-hockey, roller-skating, and badminton during other months. There is also an unsupervised beach, a public library, and a mining museum that is open by appointment. The former Royal Canadian Legion Hall in the Town of Lynn Lake is privately owned and used as a gathering place (pers. comm. 2015d). There are no recreation facilities on the Black Sturgeon Falls Reserve (pers. comm. 2015f).

Municipal jurisdictions may adopt development plans and zoning by-laws to guide land use decisions within their respective boundaries. The following municipal development plan and zoning by-law apply to the Town of Lynn Lake:

- Town of Lynn Lake Development Plan No. 1329-2009.
- The Local Government District (LGD) of Lynn Lake By-law No. 675.

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The current Town of Lynn Lake Development Plan No. 1329-2009 identifies the MacLellan mine site as being designated a “Limited Development” area. Mineral exploration and development is encouraged in the Limited Development land use area under the Town of Lynn Lake Development Plan. There is no applicable development designation under a development plan for the Gordon mine site as it is located outside of municipal jurisdiction on unorganized Crown land.

Outside the built-up settlement area (townsite) of Lynn Lake, most of the land in the municipal boundary of the town is zoned as “LD – Limited Development District” under the LGD of Lynn Lake By-law No. 675, including the MacLellan mine site. Mining and quarrying are permitted uses in the Limited Development land use district under the By-law. There is no applicable zoning under a zoning by-law for the Gordon mine site as it is located outside of municipal jurisdiction on unorganized Crown land.

Provincial Land Use Policies (PLUPs) under the Provincial Planning Regulation No. 81/2011 reflect the provincial government's interest in land and resource use and sustainable development. The PLUPs apply to all lands subject to *The Planning Act* of Manitoba in the absence of adopted development plans. PLUPs are also given full consideration when undertaking planning activities and land use decision-making on Crown lands. Schedule 3 of the PLUPs include Policy Area 8: Mineral Resources, which expresses the provincial interest in mineral resources development.

### 4.6.3 Heritage Resources

The Gordon site was reviewed for heritage potential. The proposed ore and overburden stockpile locations were not considered to have high heritage resource potential based on predictive modelling undertaken, including extent of previous disturbance. Field assessments at this location did not record heritage resources.

Development within the MacLellan site is primarily located in areas that would have limited human activity given the nature of the terrain and general lack of navigable and potable water. Locations along the Keewatin River would have been more conducive for human occupation and resource harvesting. The one exception is the upland area where exposed quartz veins may have been quarried for stone tool manufacture. One such site was identified north of the proposed TMF and consisted of quartz flakes shallowly buried beneath the organic overburden. It is possible that additional sites are present at this and other upland locations. However, based on the site extent defined by shovel tests, these sites do not encompass a large area.

### 4.6.4 Current Use of Lands and Resources for Traditional Purposes by Indigenous Peoples

A Traditional Knowledge/Traditional Land and Resource Use (TK/TLRU) Study is currently underway (interview phase complete) in collaboration with MCFN. MCFN has one reserve, the Black Sturgeon Falls Reserve, which is the First Nation community located nearest to the Gordon (approximately 12 km) and MacLellan (approximately 24 km) sites.

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While there is current use of lands and resources for traditional purposes by Indigenous peoples in the General Project Area, details of the TK/TLRU Study cannot be discussed until released by MCFN. MCFN is considered likely to be affected by the Project due to the proximity of its Reserve to the Project, identified traditional activity areas, and in consideration of the water flow directions and predominant wind direction as shown on **Map 3** in **Appendix B**.

Desktop research was conducted regarding the current use of lands and resources for traditional purposes by the six other Indigenous communities identified in **Table 3.4** that have potential to be affected by or be interested in the Project to varying degrees (i.e., MCCN, MMF, BLFN, NCN, OPCN, PBCN, and MN-S). The findings of this desktop research are provided below for each community.

MCCN is considered likely to be affected by the Project based on its connection to MCFN and associated common identified traditional activity areas. The nearest MCCN reserve (i.e., Granville Lake Indian Settlement) is located approximately 70 km south of the Gordon site and approximately 77 km south of the MacLellan site. Elders from MCCN have been interviewed as part of the TK/TLRU Study currently underway with MCFN.

The MMF is considered likely to be affected by the Project due to its local presence in Lynn Lake (approximately 36 km southwest of the Gordon site and approximately 7 km southwest of the MacLellan site) and Leaf Rapids (approximately 60 km from the Gordon site and approximately 85 km from the MacLellan site). Given the proximity of these communities, members of the MMF are considered likely to carry out traditional activities near the Project.

BLFN has potential to be affected by or be interested in the Project based on their recent participation in the Northwest Co-operative Fisheries Limited (NWCFL), which is a commercial fishing co-op that serves the BLFN Brochet reserve as well as the following other First Nation communities in Northwest Manitoba (Government of Canada 2006):

- MCFN Black Sturgeon Falls Reserve in Manitoba
- MCCN Pukatawagan Reserve in Manitoba
- NCN Nelson House Reserve in Manitoba
- OPCN South Indian Lake Reserve in Manitoba
- PBCN Kinoosao-Thomas Clarke (Kinoosao) Reserve in Saskatchewan

The co-op's 143 members fish in over 48 lakes across the region. The last indication of activity in this co-op is 2007 (Government of Canada 2006). It may be that the commercial fishery reflects the subsistence fishery of participating communities. The NWCFL falls within the definition of current use for traditional purposes. Further investigation is required to determine which lakes are fished and by whom.

BLFN is an isolated community and there is a reliance on country foods (Northern Manitoba Food, Culture, and Community Fund 2014). A winter road connects the community to Lynn Lake and is the only ground link, which suggests that it may provide access to winter hunting and

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trapping opportunities in the General Project Area as well. A community summary (Centre for Indigenous Environmental Resources 2006) indicates that the users of the winter road include community members, hunters and trappers, among others.

The Treaty Land Entitlement (TLE) lands associated with BLFN are located in a separate upgradient watershed from the Project (see **Map 3, Appendix B**), thereby reducing opportunities for potential interactions with the Project.

NCN asserts that its people have rights across a wide region of Northern Manitoba that comprises their traditional territory, as well as their Nelson House Resource Management Area (RMA) that lies within the traditional territory (NCN 2012). NCN has potential to be affected by or be interested in the Project based on their recent participation in NWCFL. The connection with the General Project Area may be less frequent than for members of the PBCN Kinoosao reserve or MCFN based on the spatial extent of their Nelson House RMA, which is south and east of Lynn Lake (see **Map 3, Appendix B**). It is also more likely that their main service centres are Leaf Rapids and Thompson; NCN community members may therefore not travel to the General Project Area often. Further investigation will be required to determine if this is the case.

OPCN became an independent First Nation from NCN in 2005. OPCN and NCN have a shared history prior to 2005. OPCN has potential to be affected by or be interested in the Project due to their recent participation in NWCFL and the location of their TLE lands immediately upstream/upwind and approximately 40 to 50 km downstream/downwind of the Gordon site (see **Map 3, Appendix B**).

The OPCN reserves are on lakes identified by MCFN as traditional land use areas. MCFN is considered likely to be affected by the Project, and it is probable that the OPCN community members who live on these lakes would feel as affected in their traditional territory as do other Indigenous peoples who practice traditional harvesting on these lakes. Road connections suggest that Leaf Rapids is the likely service centre for OPCN's main residential community. From Leaf Rapids, there is ground access to the General Project Area via PR 391, which provides access to potential traditional harvesting areas for hunting, fishing, and plant gathering.

PBCN has potential to be affected by or interested in the Project based on their traditional territory (see **Map 3, Appendix B**), which extends along the Churchill River and Reindeer River (PBCN 2016), and their recent participation in the NWCFL.

The only all-season road that accesses the PBCN Kinoosao reserve (located approximately 100 km from the Gordon site and approximately 70 km from the MacLellan site) is PR 391, which PBCN community members use for travel to Lynn Lake and on to Leaf Rapids where the fish packing plant and suppliers are. It is possible that traditional land use activities such as hunting, fishing, and plant gathering may occur in the General Project Area as a normal part of travel by PBCN community members for commercial and supply purposes. Further investigation will be required to confirm this use.

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The nearest MN-S Métis local to the General Project Area is Sandy Bay #90 on the Churchill River in MN-S Eastern Region 1. The nearest local in MN-S Northern Region 1 is La Ronge #19. The Saskatchewan Guide for Treaty and Aboriginal Rights for Hunting and Fishing states that *“recognized individuals may exercise Métis Aboriginal rights ...within the Métis Harvesting Zone(s) in which their historic Métis community is located, and confined to the area within the Métis Harvesting Zone where members of the individual's historic community regularly used to hunt, fish and trap for food purposes”* (Government of Saskatchewan 2017). As Métis Harvesting Zone 1 borders with Manitoba, there is a potential for Métis traditional harvesting activities to occur up to the Saskatchewan border within the Granville Lake watershed.

## 5 POTENTIAL ENVIRONMENTAL INTERACTIONS AND SCOPING CONSIDERATIONS

**Table 5.1** provides an overview of potential Project-related changes to the environmental components identified under section 5 of CEEA 2012. It also identifies potential changes to components of the environment within federal jurisdiction (i.e., fish and fish habitat, aquatic species, and birds) and potential changes to the environment that would occur on federal or transboundary lands, as well as the potential effects of environmental changes on Indigenous peoples. It considers potential changes to the environment that are directly linked or necessarily incidental to federal decisions that enable the Project to proceed, and associated effects on health and socio-economic conditions, physical and cultural heritage, and resources of historical, archaeological, paleontological or architectural significance. In accordance with the *Environment Act Proposal Report Guidelines*, provincial EAs completed in Manitoba must describe the environmental and human health effects of the proposed development. Therefore, additional provincial requirements are also included in **Table 5.1**.

Potential environmental interactions are identified in **Table 5.1** based on a hypothetical scenario in which no mitigation or environmental management planning is applied. The last column in **Table 5.1** considers how these potential Project-related environmental interactions will be addressed in the EIS, which will present a more realistic scenario that includes proposed mitigation and environmental management measures to avoid, reduce or eliminate potential Project-related environmental effects. Section 6 outlines potential mitigation and environmental planning measures based on preliminary Project planning and design.

The scope of the EIS will focus on the assessment of potential adverse environmental effects of the Project on the Valued Components (VCs) identified in the last column of **Table 5.1**. VCs are environmental attributes associated with the Project that are of special value or interest to Indigenous peoples, regulatory agencies, the Proponent, resource managers, scientists, key stakeholders, and/or the general public. "Environment" is defined to include not only ecological systems, but also human, social, cultural, and economic conditions that are affected by changes in the biophysical environment. VCs therefore include ecological, social, and economic systems that comprise the environment.

The potential environmental effects of Project activities and components will be assessed using a standard framework to facilitate assessment of each VC. Evaluation tables and matrices will be used to document the assessment. Residual Project-related environmental effects (i.e., those environmental effects that remain after the planned mitigation measures have been applied) will be characterized for each VC using standard criteria (i.e., magnitude, geographic extent, duration, frequency, reversibility, and context). The significance of residual Project-related environmental effects will then be determined based on standards or thresholds (i.e., significance rating criteria) for each VC.

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The scope of the assessment will also be defined by spatial and temporal boundaries. The spatial and temporal boundaries may vary among VCs, depending on the nature of potential environmental effects. The following generic boundaries will therefore be developed into VC-specific boundaries, where necessary, in the EIS:

- **Project Development Area (PDA):** The PDA encompasses the immediate area in which Project activities and components may occur and is the anticipated area of direct physical disturbance associated with construction and operation of the Project (i.e., the Project footprint). The PDA includes the access roads to be upgraded/constructed; the proposed open pits, mine rock storage areas, overburden stockpiles, and ore stockpiles at the Gordon and MacLellan sites; and the proposed TMF and ore milling and processing plant at the MacLellan site. The PDA does not include PR 391. The PDA is identical for each VC. The preliminary PDAs for the Gordon and MacLellan sites are shown on **Map 10** and **Map 11** in **Appendix B**, respectively.

**Local Assessment Area (LAA):** The LAA encompasses the area in which direct and indirect environmental effects from Project activities and components can be predicted or measured with a level of confidence that allows for assessment. It consists of the PDA and adjacent areas where Project-related environmental effects are reasonably expected to occur based on available information and professional judgement. The LAA is VC-specific.

- **Regional Assessment Area (RAA):** The RAA is the area that establishes the context for determining the significance of residual Project-related environmental effects. It is also the area within which residual environmental effects from Project activities and components may interact cumulatively with the residual environmental effects of other past, present, and future physical activities. The RAA encompasses both the PDA and the LAA, and is usually VC-specific.

The temporal boundaries for the Project to be assessed encompass all Project phases, including construction; operation; and decommissioning, reclamation, and closure. It is anticipated that Project activities will occur year-round.

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**Table 5.1 Potential Environmental Interactions with Project Activities**

Environmental Component(s) of Concern	Relevant Section(s) of CEAA 2012	Potential Environmental Interactions (Without Mitigation or Management)	How Potential Environmental Interactions will be Addressed in the EIS
Fish, Fish Habitat, and Aquatic Species	5(1)(a)(i) 5(1)(a)(ii)	<p>The Gordon and MacLellan sites contain several fish-bearing watercourses and waterbodies (refer to Section 4.4.2). Routine Project activities could result in changes to fish and fish habitat as defined in section 2(1) of the <i>Fisheries Act</i> due to the following potential interactions with the environment:</p> <ul style="list-style-type: none"> <li>• The Project has potential to adversely affect fish if Project-related hydrological and/or hydrogeological changes affect the quality or quantity of fish habitat.</li> <li>• Liquid discharges from the Project have potential to adversely affect fish habitat and fish health if they cause a reduction in water quality in receiving waters frequented by fish. Discharge or seepage of mining effluents has potential to cause changes to surface water and sediment quality that could potentially lead to indirect or direct effects on fish (i.e., toxicity, bioaccumulation, avoidance of area, alteration of planktonic and benthic communities). The exposure and weathering of some mine materials may also cause degradation of fish habitat due to acid generation and/or leaching of contaminants into waters frequented by fish.</li> <li>• Construction, excavation, and dewatering and/or infilling of waterbodies have potential to cause injury or mortality to fish.</li> <li>• Alterations to stream channels have potential to cause injury or mortality to fish, as well as to affect fish mobility and fish habitat.</li> <li>• If any blasting occurs near fish-bearing waters, shock waves from the detonation of explosives have potential to cause injury or mortality to fish.</li> </ul>	<ul style="list-style-type: none"> <li>• Potential Project-related environmental effects on fish and fish habitat will be assessed primarily in the context of the Fish and Fish Habitat VC, but will also be indirectly considered in the context of the Surface Water VC.</li> <li>• The assessment will include the identification of standard and VC-specific mitigation measures to reduce or eliminate Project-related environmental effects; characterization of residual Project-related environmental effects; and determination of the significance of residual Project-related environmental effects.</li> <li>• The EIS will also consider accidental events and assess the potential effects of an accidental spill or release to the environment on the Fish and Fish Habitat VC and Surface Water VC.</li> <li>• The assessment will be based on desktop information, the professional judgement of the EA Study Team, and the results of relevant environmental baseline studies carried out in support of the EIS, including associated baseline field data (e.g., Fish Habitat, Distribution, and Tissue Analysis; Benthos and Sediment; Water Quality; Hydrology; Hydrogeology; and Geochemistry technical data reports).</li> </ul>

**PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT**

**Table 5.1 Potential Environmental Interactions with Project Activities**

Environmental Component(s) of Concern	Relevant Section(s) of CEAA 2012	Potential Environmental Interactions (Without Mitigation or Management)	How Potential Environmental Interactions will be Addressed in the EIS
		<p>An accidental spill or release to the environment originating from a Project activity or component would have potential to result in changes to fish and fish habitat, including:</p> <ul style="list-style-type: none"> <li>• Injury, mortality, and/or reduced health for fish.</li> <li>• Reduced availability and quality of fish habitat (including water quality).</li> </ul> <p>Section 2(1) of SARA defines 'aquatic species' as comprising fish and marine plants as defined under sections 2(1) and 47 of the <i>Fisheries Act</i>, respectively. The Project is not expected to result in any changes to aquatic species as defined under SARA other than fish (i.e., the Project will not result in any changes to marine plants) due to the lack of any anticipated potential interaction between the Project and the marine environment. However, the potential Project-related changes to fish habitat identified above include potential changes to freshwater aquatic plants as components of fish habitat.</p>	
Migratory Birds	5(1)(a)(iii)	<p>The Gordon and MacLellan sites may provide habitat for various species of migratory birds (refer to Section 4.5.4). Routine Project activities could result in changes to migratory birds as defined in section 2(1) of MBCA due to the following potential interactions with the environment:</p> <ul style="list-style-type: none"> <li>• If conducted during the breeding bird season, site preparation activities (e.g., clearing and grubbing) have potential to cause injury or mortality to migratory birds, their nestlings, and their eggs, as well as to damage or destroy their nests. Project construction also has potential to result in alteration or loss of habitat for migratory birds.</li> </ul>	<ul style="list-style-type: none"> <li>• Potential Project-related environmental effects on migratory birds will be assessed primarily in the context of the Wildlife and Wildlife Habitat VC.</li> <li>• The assessment will include the identification of standard and VC-specific mitigation measures to reduce or eliminate Project-related environmental effects; characterization of residual Project-related environmental effects; and determination of the significance of residual Project-related environmental effects.</li> <li>• The EIS will also consider accidental events and will assess the potential effects of an</li> </ul>

**PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT**

**Table 5.1 Potential Environmental Interactions with Project Activities**

Environmental Component(s) of Concern	Relevant Section(s) of CEEA 2012	Potential Environmental Interactions (Without Mitigation or Management)	How Potential Environmental Interactions will be Addressed in the EIS
		<ul style="list-style-type: none"> <li>• Noise, vibration, and air emissions (e.g., dust) during Project construction and operation have potential to adversely affect habitat quality for migratory birds and could cause behavioural effects (e.g., avoidance/displacement).</li> <li>• Artificial night lighting during Project operation has potential to attract and/or disorient nocturnally migrating birds, and could cause an increased risk of injury or mortality from exhaustion and/or collisions with Project infrastructure. Any migratory birds attracted to the Project site by artificial night lighting could also be exposed to other threats such as predation or interactions with Project vehicles and equipment.</li> </ul> <p>An accidental spill or release to the environment originating from a Project activity or component would have potential to result in changes to migratory birds, including:</p> <ul style="list-style-type: none"> <li>• Injury, mortality, and/or reduced health for migratory bird species.</li> <li>• Reduced availability and quality of migratory bird habitat.</li> </ul> <p>The potential environmental effects described above for migratory birds could affect secure species as well as species at risk protected under SARA.</p>	<p>accidental spill or release to the environment on the Wildlife and Wildlife Habitat VC.</p> <ul style="list-style-type: none"> <li>• The assessment will be based on desktop information, the professional judgement of the EA Study Team, and the results of environmental baseline studies carried out in support of the EIS, including associated baseline field data (e.g., Birds, Acoustics, and Ambient Lighting technical data reports).</li> </ul>
Environmental Effects Occurring on Federal Lands	5(1)(b)(i)	The Project, located within the Province of Manitoba, will be situated on lands that are comprised of mining claims and provincially-issued leases held by and	<ul style="list-style-type: none"> <li>• Potential Project-related transboundary environmental effects on the atmospheric environment will be assessed primarily in the context of the Atmospheric Environment VC.</li> </ul>

**PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT**

**Table 5.1 Potential Environmental Interactions with Project Activities**

Environmental Component(s) of Concern	Relevant Section(s) of CEEA 2012	Potential Environmental Interactions (Without Mitigation or Management)	How Potential Environmental Interactions will be Addressed in the EIS
Transboundary Environmental Effects	5(1)(b)(ii)	<p>registered in the name of Carlisle, a wholly-owned subsidiary of Alamos (refer to Section 2.1).</p> <p>The Saskatchewan provincial border is located approximately 63 km west of the MacLellan site. This is the shortest distance between the Project and any transboundary lands.</p> <p>As shown on <b>Map 3</b> in <b>Appendix B</b>, the direction of surface water flow in and around the General Project Area is away from the Saskatchewan border, thereby reducing the potential for transboundary environmental effects on water.</p> <p>Hourly wind direction data from 2013 to 2014 were analyzed at ECCC station 5061645 (Lynn Lake). The prevailing wind direction primarily comes from the northwest and secondarily from the west (see <b>Map 3, Appendix A</b>). However, some exceptions occur during May and June when the prevailing winds arise from the east, as well as in September when the winds predominately come from the south. Atmospheric emissions associated with the Project are therefore considered generally unlikely to be transported into Saskatchewan to a measurable degree.</p> <p>With the exception of potential transboundary environmental effects on the atmospheric environment associated with Project-related emissions of criteria air contaminants and greenhouse gases, the Project is not expected to result in any changes to the environment that would occur on federal lands, in another province, or outside of Canada. An accidental spill or release to the environment originating from a Project activity or component would similarly not be expected to result in any</p>	<p>The EIS will not assess any other environmental effects occurring on federal or transboundary lands due to the lack of anticipated interaction between the Project and any other aspect of the environment on federal lands or outside of the Province of Manitoba.</p> <ul style="list-style-type: none"> <li>• The assessment will include the identification of standard and VC-specific mitigation measures to reduce or eliminate Project-related environmental effects; characterization of residual Project-related environmental effects; and determination of the significance of residual Project-related environmental effects.</li> <li>• The EIS will also consider accidental events and assess the potential effects of an accidental spill or release to the environment on the Atmospheric Environment VC.</li> <li>• The assessment will be based on desktop information, the professional judgement of the EA Study Team, and the results of relevant environmental baseline studies carried out in support of the EIS, including associated baseline field data (i.e., Air Quality technical data report). Air quality modelling to be conducted in support of the EIS will not include the modelling of acid deposition or speciated volatile organic compounds, as these are not considered to be pathways for Project-related environmental effects.</li> </ul>

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**Table 5.1 Potential Environmental Interactions with Project Activities**

Environmental Component(s) of Concern	Relevant Section(s) of CEAA 2012	Potential Environmental Interactions (Without Mitigation or Management)	How Potential Environmental Interactions will be Addressed in the EIS
		environmental effects occurring on federal or transboundary lands.	
Health and Socio-Economic Conditions for Indigenous and Non-Indigenous Peoples	5(1)(c)(i) 5(2)(b)(i)	<p>The Gordon and MacLellan sites have potential to be used by various Indigenous and non-Indigenous land and resource users (refer to Sections 4.6.2 and 4.6.4). Routine Project activities could result in the following changes to the environment that have potential to affect health and socio-economic conditions for Indigenous and non-Indigenous peoples:</p> <ul style="list-style-type: none"> <li>• Project activities and components have potential to affect the availability of lands and resources for commercial or recreational fishing and hunting/trapping activities and/or other recreational uses currently carried out by Indigenous and non-Indigenous peoples.</li> <li>• Project-related requirements and the influx of Project personnel could increase the demand for local services and infrastructure, thereby potentially affecting the quality or availability of these amenities for Indigenous and non-Indigenous residents of the Town of Lynn Lake and other surrounding communities.</li> <li>• The Project has potential to adversely affect human health if liquid discharges from the Project degrade the quality of drinking water resources or if Project-related hydrological and/or hydrogeological changes affect the quality or quantity of drinking water resources. A Boil Water Advisory has been in effect for the Town of Lynn Lake since 2012 (MSD 2017). Water for the town comes from West Lynn Lake, which is located approximately 38 km southwest of the Gordon site and approximately 7 km southwest of the</li> </ul>	<ul style="list-style-type: none"> <li>• Potential Project-related environmental effects on health and socio-economic conditions for Indigenous and non-Indigenous peoples will be assessed in the context of the following VCs: Labour and Economy, Community Services and Infrastructure, Land and Resource Use, Traditional Land and Resource Use, and Human Health.</li> <li>• The assessment will include the identification of standard and VC-specific mitigation measures to reduce or eliminate Project-related environmental effects; characterization of residual Project-related environmental effects; and determination of the significance of residual Project-related environmental effects.</li> <li>• The EIS will also consider accidental events and will assess the potential effects of an accidental spill or release to the environment on these VCs.</li> <li>• A Human Health and Ecological Risk Assessment (HHERA) will be undertaken as the Project progresses. The HHERA will be completed using standard risk assessment protocols. Calculations consistent with regulatory expectations and requirements will be completed and, where local receptor assumptions (e.g., land-use patterns, country food consumption rates, etc.) are unavailable, parameters recommended by Health Canada and ECCC will be used to characterize human</li> </ul>

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**Table 5.1 Potential Environmental Interactions with Project Activities**

Environmental Component(s) of Concern	Relevant Section(s) of CEAA 2012	Potential Environmental Interactions (Without Mitigation or Management)	How Potential Environmental Interactions will be Addressed in the EIS
		<p>MacLellan site. Drinking water for MCFN's Black Sturgeon Falls Reserve and the City of Thompson is sourced from Hughes Lake (located approximately 7 km southwest of the Gordon site and approximately 25 km southeast of the MacLellan site) and Burntwood River (located <math>\geq 150</math> km from the Project mine sites), respectively.</p> <ul style="list-style-type: none"> <li>• Air, noise, and light emissions from the Project have potential to disturb nearby human receptors and pose a nuisance.</li> <li>• Emission and dispersion of chemicals from Project activities have the potential to affect air quality, as well as soil and surface water quality (through deposition), which could potentially affect human health (e.g., through contamination of drinking water resources or species of fish, wildlife, or plants that are consumed by Indigenous or non-Indigenous peoples).</li> <li>• The Project is also expected to have economic benefits, including training, employment, and contracting opportunities, for Indigenous and non-Indigenous peoples.</li> <li>• The expenditures and employment associated with Project activities will affect local, regional, and provincial economic conditions through all phases of the Project. In addition to having positive economic effects, the Project could adversely affect labour and economy, for example by contributing to local or regional labour shortages or interacting negatively with the economic activities of other sectors, such as tourism or forestry.</li> </ul>	<p>and ecological receptor interactions with the local environment.</p> <ul style="list-style-type: none"> <li>• The assessment will be based on desktop information; the professional judgement of the EA Study Team; the results of the HHERA; the results of a Project-specific Transportation Impact Study; and the results of environmental baseline studies carried out in support of the EIS, including associated informant interviews and baseline field data (e.g., Socio-Economics, Acoustics, Air Quality, and Ambient Lighting technical data reports).</li> </ul>

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**Table 5.1 Potential Environmental Interactions with Project Activities**

Environmental Component(s) of Concern	Relevant Section(s) of CEAA 2012	Potential Environmental Interactions (Without Mitigation or Management)	How Potential Environmental Interactions will be Addressed in the EIS
Physical and Cultural Heritage, and Resources of Historical, Archaeological, Paleontological, or Architectural Significance for Indigenous and Non-Indigenous Peoples	5(1)(c)(ii) 5(1)(c)(iv) 5(2)(b)(ii) 5(2)(b)(iii)	<p>Archaeological and heritage resources have potential to occur on the Gordon and MacLellan sites (refer to Section 4.6.3). Routine Project activities could result in the following changes to the environment that have potential to affect the physical and cultural heritage of Indigenous or non-Indigenous peoples, and/or to affect any structure, site, or thing of historical, archaeological, paleontological or architectural significance to Indigenous or non-Indigenous peoples:</p> <ul style="list-style-type: none"> <li>Although the Project will be designed to avoid ground disturbance at sites where resources of cultural, historical, archaeological, paleontological, or architectural significance are known to be located, there is potential for Project-related ground disturbance (including excavation and blasting) to occur where previously unrecorded resources may be present. Such resources, if present, could be disturbed, damaged or destroyed by the Project.</li> </ul> <p>An accidental spill or release to the environment originating from a Project activity or component could result in changes to the environment that could affect physical and cultural heritage, or resources of historical, archaeological, paleontological, or architectural significance for Indigenous and non-Indigenous peoples.</p>	<ul style="list-style-type: none"> <li>Potential Project-related environmental effects on physical and cultural heritage, and resources of historical, archaeological, paleontological, or architectural significance for Indigenous and non-Indigenous peoples will be assessed in the context of the Heritage Resources VC.</li> <li>The assessment will include the identification of standard and VC-specific mitigation measures to reduce or eliminate Project-related environmental effects; characterization of residual Project-related environmental effects; and determination of the significance of residual Project-related environmental effects.</li> <li>The EIS will also consider accidental events and, will assess the potential effects of an accidental spill or release to the environment on the Heritage Resources VC.</li> <li>A Heritage Resources Impact Assessment (HRIA) was completed for the Project in 2012, and a Heritage Resources environmental baseline study, including a field program, was completed for the Project in 2015 in support of the EIS.</li> <li>The assessment will be based on desktop information, the professional judgement of the EA Study Team, the results of the HRIA, and the results of the Heritage Resources technical data report, including associated baseline field data.</li> </ul>
Current Use of Lands and	5(1)(c)(iii)	The Gordon and MacLellan sites have potential to be used for traditional purposes by Indigenous land and	<ul style="list-style-type: none"> <li>Potential Project-related environmental effects on the current use of lands and resources for</li> </ul>

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**Table 5.1 Potential Environmental Interactions with Project Activities**

Environmental Component(s) of Concern	Relevant Section(s) of CEAA 2012	Potential Environmental Interactions (Without Mitigation or Management)	How Potential Environmental Interactions will be Addressed in the EIS
Resources for Traditional Purposes by Indigenous Peoples		<p>resource users. The Project may therefore require access to, use or occupation of, or the exploration, development and production of lands and resources currently used for traditional purposes by Indigenous peoples.</p> <p>Routine Project activities could result in the following changes to the environment that have potential to affect the current use of lands and resources for traditional purposes by Indigenous peoples:</p> <ul style="list-style-type: none"> <li>• Project activities and components have potential to affect the availability of lands (including travel routes) and resources currently used by Indigenous peoples for traditional purposes such as fishing, hunting/trapping, and gathering.</li> <li>• The influx of Project personnel could increase the recreational demand for lands and resources that are currently used by Indigenous peoples for traditional purposes, thereby potentially affecting the quality or availability of these lands and resources for Indigenous peoples.</li> <li>• The Project has potential to adversely affect the quality or availability of fish species of traditional importance to Indigenous peoples (including species that are currently fished by Indigenous harvesters for traditional purposes) if liquid discharges from the Project degrade the quality of fish habitat.</li> <li>• Air, noise, and light emissions from the Project have potential to disturb wildlife species of traditional importance to Indigenous peoples and affect their movement, thereby potentially affecting their availability for current use by Indigenous peoples (e.g., hunting/trapping).</li> </ul>	<p>traditional purposes by Indigenous peoples will be assessed in the context of the Traditional Land and Resource Use VC.</p> <ul style="list-style-type: none"> <li>• The assessment will include the identification of standard and VC-specific mitigation measures to reduce or eliminate Project-related environmental effects; characterization of residual Project-related environmental effects; and determination of the significance of residual Project-related environmental effects.</li> <li>• The EIS will also consider accidental events and, in particular, will assess the potential effects of an accidental spill or release to the environment on the Traditional Land and Resource Use VC.</li> <li>• A Project-specific TK/TLRU Study is currently being completed in support of the EIS, with participation from Indigenous peoples in Lynn Lake, Pukatawagan, Winnipeg, and Regina.</li> <li>• The assessment will be based on desktop information, the professional judgement of the EA Study Team, the results of the TK/TLRU Study, and the results of the Socio-Economics and Heritage Resources technical data reports, including associated interviews and baseline field data.</li> </ul>

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**Table 5.1 Potential Environmental Interactions with Project Activities**

Environmental Component(s) of Concern	Relevant Section(s) of CEAA 2012	Potential Environmental Interactions (Without Mitigation or Management)	How Potential Environmental Interactions will be Addressed in the EIS
		<ul style="list-style-type: none"> <li>Emission and dispersion of chemicals from Project activities have the potential to affect air quality, as well as soil and surface water quality (through deposition). Thus, the Project has potential to adversely affect the quality or availability of fish, wildlife, and plant species of traditional importance to Indigenous peoples (including species that are currently fished, hunted/trapped, and gathered by Indigenous peoples for traditional purposes) if the Project results in the degradation of their habitats or the contamination of these resources.</li> </ul> <p>An accidental spill or release to the environment originating from a Project activity or component would have potential to result in changes to the environment that could affect the current use of lands and resources for traditional purposes by Indigenous peoples.</p>	
Other Changes to the Environment Directly Related or Necessarily Incidental to a Federal Authority's Exercise of a Power or Performance of a Duty or Function in Support of the Project	5(2)(a)	<p>Various federal authorities may need to exercise a power or perform a duty or function to allow the Project to proceed (refer to Section 1.3.1). Routine Project activities could result in the following other changes to the environment directly related or necessarily incidental to a federal authority's exercise of a power or performance of a duty or function in support of the Project:</p> <ul style="list-style-type: none"> <li>If a licence, certificate, or permit from NRCan is required under the <i>Explosives Act</i>, the potential changes to the environment that would be directly related or necessarily incidental to this regulatory approval would be limited to the potential effects summarized above that could result from Project-related blasting.</li> </ul>	<ul style="list-style-type: none"> <li>Other potential changes to the environment directly related or necessarily incidental to a federal authority's exercise of a power or performance of a duty or function in support of the Project will be assessed in the context of the Fish and Fish Habitat and Wildlife and Wildlife Habitat VCs.</li> <li>The assessment will include the identification of standard and VC-specific mitigation measures to reduce or eliminate Project-related environmental effects; characterization of residual Project-related environmental effects; and determination of the significance of residual Project-related environmental effects.</li> <li>The EIS will also consider accidental events and, will assess the potential effects of an</li> </ul>

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**Table 5.1 Potential Environmental Interactions with Project Activities**

Environmental Component(s) of Concern	Relevant Section(s) of CEAA 2012	Potential Environmental Interactions (Without Mitigation or Management)	How Potential Environmental Interactions will be Addressed in the EIS
		<ul style="list-style-type: none"> <li>• If authorization from DFO is required under section 35(2) of the <i>Fisheries Act</i> for serious harm to fish that are part of a CRA fishery or that support a CRA fishery, the potential changes to the environment that would be directly related or necessarily incidental to this regulatory approval are limited to the potential effects summarized above with respect to fish and fish habitat, socio-economic conditions (i.e., potential Project-related effects on the abundance or distribution of commercially or recreationally important fish species), and Indigenous traditional use (i.e., potential Project-related effects on the abundance or distribution of traditionally important fish species).</li> <li>• If a permit from ECCC is required under section 19 of the <i>MBCA</i> for the collection of migratory birds, their nests, or their eggs, the potential changes to the environment that would be directly related or necessarily incidental to this regulatory approval would be limited to disturbance of migratory birds, their nests, or their eggs; potential injury or mortality of collected migratory birds; and potential damage or destruction of collected nests and eggs.</li> <li>• If a permit from ECCC or DFO is required under section 73(1) of <i>SARA</i> for engaging in activities affecting a <i>SARA</i>-listed aquatic and/or migratory bird species and/or their residences (e.g., nests), the potential changes to the environment that would be directly related or necessarily incidental to this regulatory approval would be limited to the potential effects summarized above with respect to fish, fish habitat, and migratory birds.</li> </ul>	<p>accidental spill or release to the environment on the Fish and Fish Habitat and Wildlife and Wildlife Habitat VCs.</p> <ul style="list-style-type: none"> <li>• The assessment will be based on desktop information, the professional judgement of the EA Study Team, and the results of relevant environmental baseline studies, including associated baseline field data (e.g., Fish Habitat, Distribution, and Tissue Analysis; Mammals; Birds; and Amphibians technical data reports).</li> </ul>

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**Table 5.1 Potential Environmental Interactions with Project Activities**

Environmental Component(s) of Concern	Relevant Section(s) of CEEA 2012	Potential Environmental Interactions (Without Mitigation or Management)	How Potential Environmental Interactions will be Addressed in the EIS
Environmental and Human Health Effects Under Provincial Jurisdiction	Not applicable	<p>In addition to the potential environmental and human health effects discussed above with respect to fish and fish habitat, migratory birds, health and socio-economic conditions, archaeological and heritage resources, and Indigenous traditional use (many of which fall under both federal and provincial jurisdiction), routine Project activities also have potential to result in the following other environmental effects under provincial jurisdiction:</p> <ul style="list-style-type: none"> <li>• Site preparation activities (e.g., clearing and grubbing) have potential to cause injury or mortality to provincially regulated non-migratory birds, their nestlings and their eggs, as well as to damage or destroy their nests. Provincially regulated small mammals and amphibians may also be susceptible to potential injury or mortality during site preparation activities. Project construction also has potential to result in alteration or loss of habitat for provincially regulated non-migratory birds and other provincially regulated wildlife in general.</li> <li>• Site preparation activities (e.g., clearing and grubbing) will cause mortality to provincially regulated plants and have potential to cause alteration or loss of wetland habitat.</li> <li>• Noise, vibration, and air emissions (e.g., dust) during Project construction and operation have potential to adversely affect habitat quality for provincially regulated non-migratory birds and other provincially regulated wildlife, and could cause behavioural effects (e.g., avoidance/displacement).</li> </ul>	<ul style="list-style-type: none"> <li>• Potential Project-related environmental and human health effects under provincial jurisdiction will be assessed in the context of the following VCs: Atmospheric Environment, Groundwater, Surface Water, Fish and Fish Habitat, Vegetation and Wetlands, Wildlife and Wildlife Habitat, Labour and Economy, Community Services and Infrastructure, Land and Resources Use, Heritage Resources, Traditional Land and Resource Use, and Human Health.</li> <li>• The assessment will include the identification of standard and VC-specific mitigation measures to reduce or eliminate Project-related environmental effects; characterization of residual Project-related environmental effects; and determination of the significance of residual Project-related environmental effects.</li> <li>• The EIS will also consider accidental events and will assess the potential effects of an accidental spill or release to the environment on these VCs.</li> <li>• The assessment will be based on desktop information; the professional judgement of the EA Study Team; the results of the HHERA, HRIA, and TK/TLRU Study; and the results of the various environmental baseline studies identified above for each environmental component of concern in this table, including associated interviews and/or baseline field data. The assessment will also consider the results of additional relevant environmental baseline studies, including associated baseline</li> </ul>

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**Table 5.1 Potential Environmental Interactions with Project Activities**

Environmental Component(s) of Concern	Relevant Section(s) of CEAA 2012	Potential Environmental Interactions (Without Mitigation or Management)	How Potential Environmental Interactions will be Addressed in the EIS
		<ul style="list-style-type: none"> <li>• The Project has potential to cause an increased risk of injury or mortality for provincially regulated non-migratory birds and other provincially regulated wildlife due to collisions with Project vehicles.</li> <li>• Artificial night lighting during Project operation has potential to attract and/or disorient nocturnally active provincially regulated non-migratory birds, and could cause an increased risk of injury or mortality from exhaustion and/or collisions with Project infrastructure. Non-migratory birds attracted to the Project site by artificial night lighting, if any, could also be exposed to other threats such as predation or interactions with Project vehicles and equipment. Other provincially regulated nocturnal wildlife (e.g., bats) may also be susceptible to potential effects from artificial night lighting.</li> <li>• Project-related solid and liquid wastes have potential to attract provincially regulated non-migratory birds and other provincially regulated wildlife, where they may be exposed to threats such as predation or interactions with Project vehicles and equipment.</li> <li>• Open pit mining during the operational phase of the Project has potential to affect groundwater quantity (i.e., groundwater discharge levels and discharge to surface water features), flow, and quality. The exposure and weathering of some mine materials may result in acid generation and/or leaching of contaminants causing degradation of surface water runoff and groundwater quality.</li> </ul>	<p>field data not identified above (i.e., Vegetation and Soil and Terrain technical data reports).</p>

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**Table 5.1 Potential Environmental Interactions with Project Activities**

Environmental Component(s) of Concern	Relevant Section(s) of CEAA 2012	Potential Environmental Interactions (Without Mitigation or Management)	How Potential Environmental Interactions will be Addressed in the EIS
		<ul style="list-style-type: none"> <li>• Deposition of chemicals of potential concern from dust onto soil from Project activities has the potential to affect soil quality and surface water quality. This change in soil quality can directly affect ecological receptors that interact either directly or indirectly with this soil. The change in chemical concentrations in soil may alter their concentrations in vegetation, and prey species. These changes in media concentrations disseminate through the food web, and can potentially produce effects in organisms that ingest these media.</li> <li>• Discharges and runoff from Project operations may release chemicals of potential concern into surface water and groundwater. A change in surface water quality may affect ecological receptors that use surface water from the LAA as a source of drinking water.</li> </ul> <p>An accidental spill or release to the environment originating from a Project activity or component could result in environmental effects under provincial jurisdiction, including many of those discussed above with respect to fish and fish habitat, migratory birds, health and socio-economic conditions, archaeological and heritage resources, and Indigenous traditional use, as well as:</p> <ul style="list-style-type: none"> <li>• Injury, mortality, and/or reduced health for provincially regulated non-migratory birds and other provincially regulated wildlife.</li> <li>• Reduced availability and quality of habitat for provincially regulated non-migratory birds and other provincially regulated wildlife.</li> </ul>	

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**Table 5.1 Potential Environmental Interactions with Project Activities**

Environmental Component(s) of Concern	Relevant Section(s) of CEAA 2012	Potential Environmental Interactions (Without Mitigation or Management)	How Potential Environmental Interactions will be Addressed in the EIS
		The potential environmental effects described above for birds and other wildlife, fish, and vegetation could affect secure species as well as SOCC protected under provincial legislation.	

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The VCs proposed in **Table 5.2** have been selected in consideration of:

- The interactions discussed in **Table 5.1**.
- Regulatory guidance and requirements.
- Issues raised by regulatory agencies, Indigenous groups, key stakeholders, and the public.
- Technical aspects of the Project (i.e., the nature and extent of Project components and activities).
- Existing environmental conditions in the study area and interconnections between the biophysical and socio-economic environment.
- Experience and lessons learned from similar mining projects.
- The professional judgment of the EA Study Team.

**Table 5.2** provides the rationale for selection of the proposed VCs.

**Table 5.2 Rationale for Selection of Proposed Valued Components**

Proposed Valued Component	Rationale for Selection
Atmospheric Environment	<p>Potential Project-related effects on atmospheric environment for the purposes of this assessment include changes to air quality and greenhouse gases. The atmospheric environment has been selected as a VC in consideration of regulatory requirements, the potential sensitivity of human health to air quality, potential effects on enjoyment of property (e.g., nuisance effects resulting from effects on air quality), and the potential deposition of air contaminants in soil, vegetation, and water as pathways to humans and wildlife.</p> <p>Project-related acoustic and light emissions will be addressed as factors potentially affecting the Wildlife and Wildlife Habitat, Land and Resource Use, and Traditional Land and Resource Use VCs.</p>
Surface Water	<p>Surface water and groundwater have been selected as VCs because they are critical in the hydrologic cycle and the life function of human and non-human biota. Surface water supports industrial, commercial and recreational uses, has cultural value and is subject to regulated discharge limits (water quality criteria). Groundwater is important to maintaining ecological habitats by supporting streamflow and wetlands. Surface water and groundwater may be assessed as separate VCs in the EIS.</p>
Groundwater	
Wildlife and Wildlife Habitat	<p>Wildlife and wildlife habitat have been selected as a VC because of their potential to interact with Project activities and because they are considered by the proponent, the public, Indigenous communities, the scientific community, and government agencies to have ecological, aesthetic, recreational, economic, and cultural importance. For the purposes of this assessment the term 'wildlife' refers to birds, mammals, and amphibians, and includes SOCC.</p>

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**Table 5.2 Rationale for Selection of Proposed Valued Components**

Proposed Valued Component	Rationale for Selection
Fish and Fish Habitat	Fish and fish habitat have been selected as a VC for assessment because fish and their habitats are key indicators of fisheries sustainability and productivity. This VC includes fish that are part of a CRA fishery and fish that support a CRA fishery (e.g. prey species including invertebrates), as defined in the <i>Fisheries Act</i> . Fish habitat means waters on which fish depend directly or indirectly to carry out their life processes. These include spawning, nursery, rearing, migration and feeding areas. These habitats are described in terms of their physical, chemical, and biological attributes including water quality, sediment quality, substrate composition, aquatic plant communities and benthic invertebrate communities.
Vegetation and Wetlands	Vegetation and wetland communities encompass the vegetated state of the natural environment. These communities are classified as ecosite community types, where assessment of classification includes dominant vascular plants, soil type(s), climatic, and hydrological conditions that support them. Vegetation and wetlands have been selected as a VC for assessment because of their critical role in supporting biodiversity and traditional use by Indigenous communities, as well as their contributions to ecosystem services at a local and regional landscape.
Labour and Economy	Labour and economy includes local and regional economy, employment, and business. Labour and economy have been included as a VC for assessment because employment and business support the economic livelihoods of local and Indigenous residents, and provide associated social benefits related to employment and income.
Community Services and Infrastructure	Community services and infrastructure includes housing and temporary accommodations, health and emergency services, recreation and entertainment services and infrastructure, and provincial and municipal services and infrastructure. Community services and infrastructure have been selected as a VC for assessment because the in-migration of Project workers and their families, Project-related business growth, and Project activities will increase demands for community services and infrastructure during the construction and operation phases, which has the potential to exceed present capacities.
Land and Resource Use	Land and resource use has been included as a VC for assessment because of its contribution to the quality of life and the livelihoods of local stakeholders.
Heritage Resources	Heritage resources are human and natural resources created by activities from the past that remain to inform present and future societies of that past. Heritage resources include archaeological, architectural and historical, and paleontological resources. Heritage resources have been selected as a VC to meet regulatory requirements and in recognition of the interest of provincial and federal agencies who are responsible for the effective management of these resources and potentially affected Indigenous communities and stakeholders that have an interest in the preservation and management of heritage resources related to their history and culture.

**Table 5.2 Rationale for Selection of Proposed Valued Components**

<b>Proposed Valued Component</b>	<b>Rationale for Selection</b>
Traditional Land and Resource Use	Traditional land and resource use has been selected as a VC because of the potential for the Project to affect traditional activities, sites and resources identified by Indigenous communities.
Human Health	Human health has been selected as a VC because of the inherent importance to the wellbeing of humans and the natural environment, and regulatory requirements.

## 6 POTENTIAL MITIGATION AND ENVIRONMENTAL MANAGEMENT MEASURES

Potential mitigation and environmental management measures to be considered in relation to this project are presented in **Table 6.1** 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).

**Table 6.1 Potential Mitigation and Environmental Management Measures to be Considered (Subject to Further Refinement)**

Valued Component	Mitigation Measures/Environmental Management Measures
Atmospheric Environment	<ul style="list-style-type: none"> <li>• Design for enclosure of mill feed storage area and use of dust collection/control systems (e.g., baghouse or equivalent and protective covers) at crushing plant to reduce potential dust emissions during ore transfer and crushing activities</li> <li>• Design for use of wet scrubbers (or equivalent) to control emissions from Project facilities, where feasible</li> <li>• Design for control of fugitive dust emissions from roads, material handling, and storage areas/stockpiles through measures such as:               <ul style="list-style-type: none"> <li>○ application of dust suppressants (e.g., water)</li> <li>○ use of surfactants (as a contingency)</li> <li>○ dust sweeping</li> <li>○ gravel application</li> <li>○ truck wheel washing stations</li> <li>○ enclosure of dust sources</li> </ul> </li> <li>• Design for limitation of vehicle speeds</li> <li>• Design for administrative controls, including a no idling policy to reduce emissions from vehicles and mobile equipment</li> <li>• Design for adherence to applicable Transport Canada emission requirements for new mobile equipment on-site. Tier 4 emissions standards are anticipated to come into effect in 2018. Alamos will look to acquire equipment that meets the new standard where available and feasible.</li> <li>• Plan for maintenance of on-site roads in good condition, with regular inspections to monitor any loose dust on the roads</li> <li>• Plan for use of dust suppressants (e.g., water) during situations that have an increased potential to generate airborne dust</li> <li>• Plan for effective and timely equipment maintenance to keep mining equipment in good working condition</li> <li>• Plan for development and implementation of Project-specific environmental management plans and monitoring programs, including an Air Quality Management Plan and a GHG Management Plan</li> </ul>

**Table 6.1 Potential Mitigation and Environmental Management Measures to be Considered (Subject to Further Refinement)**

Valued Component	Mitigation Measures/Environmental Management Measures
Surface Water	<ul style="list-style-type: none"> <li>• Design for mine plan footprint within existing watershed/subwatersheds</li> <li>• Design for limitation of construction footprint (i.e., PDA) to the extent practical</li> <li>• Design for use of standard management practices throughout the Project, including drainage control during excavation and open pit dewatering</li> <li>• Design for diversion of runoff away from open pits through perimeter grading</li> <li>• Design for recycling of contact water for ore processing</li> <li>• Design of the mine rock storage areas and TMF to reduce the amount of infiltration, thereby reducing the recharge and loading to groundwater</li> <li>• Design for use of perimeter berms and runoff and contact-water collection ditches around the overburden storage areas, ore stockpiles, and mine rock storage areas to collect overland flow and toe seepage, intercept shallow groundwater flow, and divert non-contact water away from Project components.</li> <li>• Design of contact-water collection ditches:               <ul style="list-style-type: none"> <li>○ to convey a 1:100-year storm event</li> <li>○ with positive gradients to limit standing water, maintain positive flow and act as interception ditches for groundwater</li> </ul> </li> <li>• Design of contact-water collection ponds:               <ul style="list-style-type: none"> <li>○ to contain (without discharge) flows resulting from a 1:100-year storm event</li> <li>○ to provide on-site storage of local runoff with the necessary size and residence times to provide sediment removal to meet the MMER effluent TSS criterion of 15 mg/L</li> <li>○ with active water storage that considers ice thickness during winter</li> <li>○ with inlet and outlet structures configured to reduce inlet velocity and scour, and meet sedimentation requirements</li> <li>○ with outlet structures designed with subsurface inlets to mitigate against chemical stratification in ponds, thermal heating of discharge, and ice blockage of outlets</li> </ul> </li> </ul>
Groundwater	<ul style="list-style-type: none"> <li>• Design of the TMF dam to maintain sufficient water storage to contain flows resulting from a 1:100-year storm event and collect dam runoff and seepage in downstream collection ditches, with pumping back to the TMF pond</li> <li>• Design for sectioning off of TMF pond to allow for clarification and treatment of reclaim water prior to recirculation back to the mill</li> <li>• Design for collection, storage and reuse of contact water (runoff and seepage), only discharging excess water after reuse and treatment as necessary</li> <li>• Design of water management facilities to collect and treat (as required) surplus 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 MMER (amended), prior to discharge to the environment</li> <li>• Design for cyanide detoxification within the mill using the Air/SO<sub>2</sub> oxidation process resulting in the degradation of cyanide and precipitation of metals to the extent practical</li> </ul>

**Table 6.1 Potential Mitigation and Environmental Management Measures to be Considered (Subject to Further Refinement)**

Valued Component	Mitigation Measures/Environmental Management Measures
	<ul style="list-style-type: none"> <li>• Design for maintenance of existing drainage patterns with the use of properly designed and engineered culverts</li> <li>• Design for maintenance of access roads by periodically regrading and ditching to improve water flow, reduce erosion and manage vegetation growth</li> <li>• Plan for inspection of culverts periodically and removal of accumulated material and debris upstream and downstream of the culverts to prevent erosion, flooding, habitat damage, property damage and mobilization of sediment</li> <li>• Plan for implementation of dust suppression measures for exposed ground areas of the PDA, to reduce atmospheric deposition to surface water</li> <li>• Plan for implementation of progressive erosion and sediment control measures</li> <li>• Plan for implementation of progressive rehabilitation (e.g., placement of a vegetated soil cover) to reduce infiltration into the mine rock storages areas and TMF by increasing evapotranspiration capacity, thereby reducing the amount of water and loading to groundwater and improvements to groundwater quality</li> <li>• Plan for open pit filling at closure to return groundwater levels to baseline conditions</li> <li>• Plan for development and implementation of Project-specific environmental management plans and monitoring programs, including a Surface Water Monitoring and Management Plan, Groundwater Monitoring Plan, an 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</li> </ul>
Wildlife and Wildlife Habitat	<ul style="list-style-type: none"> <li>• Design for limitation of construction footprint (i.e., PDA) to the extent practical</li> <li>• Design of water management ditches to allow wildlife to cross unharmed</li> <li>• Design for provision of amphibian underpasses (e.g., culverts) where pre-disturbance surveys within the PDA identify locations where potential amphibian breeding and dispersal habitats are intersected by access or on-site roads</li> <li>• Design for use of down-lighting, a technique of directing night lighting downward, to reduce light effects on wildlife adjacent to the PDA</li> <li>• Design for maintenance of a 30-m naturally-vegetated buffer around wetlands, waterbodies, and watercourses</li> <li>• Design for restriction of unauthorized access to habitat adjacent to the PDA</li> <li>• Design for provision of low areas in the ploughed snow banks of access and on-site roads, where practical, to facilitate wildlife movements across and out of road corridors</li> <li>• Design for scheduling vegetation clearing and site preparation activities outside the breeding period for migratory birds. If activities that could result in incidental take cannot be avoided, Alamos will develop and implement a Project-specific Bird Nest Mitigation Plan that outlines how risk of incidental take will be managed in</li> </ul>

**Table 6.1 Potential Mitigation and Environmental Management Measures to be Considered (Subject to Further Refinement)**

Valued Component	Mitigation Measures/Environmental Management Measures
	<p>accordance with ECCC guidance. This plan would be developed in consultation with ECCC and provincial agencies.</p> <ul style="list-style-type: none"> <li>• Design for implementation of road safety measures (e.g., speed control and signage) to reduce wildlife road mortality at potential wildlife crossings throughout the PDA</li> <li>• Plan for flagging 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)</li> <li>• Plan for retention of 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 birds and bats. 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., marten).</li> <li>• Plan for maintenance of the PDA in a manner that reduces the risk that wildlife will encounter potential hazards, such as ropes, wires and holes</li> <li>• Plan for maintenance of vegetation cover along the boundaries of high activity areas (e.g., access roads) to reduce sensory (noise and visual) disturbance</li> <li>• Plan for control of the growth of vegetation around collection ponds and the TMF, and consideration of additional mitigation measures (e.g., fencing) if monitoring identifies concerns regarding wildlife use of these features</li> <li>• Plan for reporting of the discovery of occupied habitat features (e.g., active dens) during all Project phases to the Wildlife Branch of MSD for direction on follow-up actions</li> <li>• Plan for provision of wildlife awareness and safety training to Project personnel and contractors and requiring Project personnel and contractors working in the PDA to relay wildlife sightings to other workers as soon as possible (e.g., by radio)</li> <li>• Plan for avoidance of situations that can lead to the creation of problem wildlife (e.g., through management of wildlife attractants such as food wastes, roadside wildlife carcasses, and vegetation).</li> <li>• Plan for reporting of garbage-, other attractant-, or traffic-related wildlife incidents, encounters, or interactions to the Wildlife Branch of MSD for direction on follow-up actions</li> <li>• Plan for development and implementation of Project-specific environmental management plans and monitoring programs, including a Project-specific Wildlife Monitoring and Management Plan</li> <li>• Plan for implementation of any additional mitigation measures outlined for the Vegetation and Wetlands VC and/or Land and Resource Use VC</li> </ul>
Fish and Fish Habitat	<ul style="list-style-type: none"> <li>• Design for limitation of construction footprint (i.e., PDA) to the extent practical to minimize loss of fish habitat and disturbance of riparian areas</li> <li>• Design for installation of culverts so as to prevent the creation of barriers to fish movement, and maintenance of bankfull channel functions and habitat functions. These measures include:</li> </ul>

**Table 6.1 Potential Mitigation and Environmental Management Measures to be Considered (Subject to Further Refinement)**

Valued Component	Mitigation Measures/Environmental Management Measures
	<ul style="list-style-type: none"> <li>○ embedment</li> <li>○ re-instatement of low flow channel and native substrates</li> <li>○ proper sizing</li> <li>○ maintenance of adequate channel slope</li> <li>• Design for avoidance of in-water work during applicable DFO restricted activity timing windows. The DFO timing windows for Northern Manitoba restrict in-water work from April 15 to June 30 in waterbodies inhabited by spring spawning species (e.g., northern pike, walleye, yellow perch) and from September 1 to May 15 for waterbodies inhabited by fall spawning fish (e.g., lake whitefish)</li> <li>• Design for limitation of the duration of all in-water work to the extent practical and conducting in-stream work during periods of lower flow (i.e., summer, fall, or winter), to the extent practical, to allow work in water to be isolated from flows and to avoid wet, windy, and rainy periods that may increase erosion and sedimentation</li> <li>• Design for undertaking all in-water activities, or installation of associated in-water structures, such that interference with fish passage, reduction in channel width, or reduction in flows is limited</li> <li>• Design for planning of activities and works in waterbodies such that loss or disturbance to aquatic habitat is limited and sensitive habitats are avoided to the extent practical</li> <li>• Design for activities near water such that materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, or other chemicals do not enter the waterbody</li> <li>• Design for treating and handling building material used in water in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish</li> <li>• Plan for prompt stabilization of shorelines/banks disturbed by activities associated with the Project to prevent erosion and/or sedimentation, preferably through revegetation with native species appropriate for the site</li> <li>• Design for qualified environmental professional to confirm that applicable permits for relocating fish are obtained and to capture fish trapped within an isolated/enclosed area at the work site and relocate them to an appropriate location in the same waters</li> <li>• Design for avoidance of use of explosives in or near water where possible, and compliance with DFO's <i>Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters</i> (Wright and Hopky 1998) if blasting is undertaken near fish-bearing waters</li> <li>• Design of sewage treatment plant and water management facilities to treat effluent to levels that will not be acutely toxic in the effluent, will not have chronic toxicity outside the mixing zone, and will meet applicable federal and provincial guidelines outside the mixing zone</li> <li>• Design for pipeline intake and outlet structures to prevent entrainment or impingement of fish and to prevent scour erosion</li> <li>• Design for water intake structures in accordance with DFO's <i>Freshwater Intake End-of-Pipe Fish Screen Guideline</i> (DFO 1995)</li> <li>• Design for detoxification of cyanide (used to process the ore and extract gold) in effluent prior to discharge to TMF</li> <li>• Design for limitation of access to waterbodies and banks to protect riparian vegetation and limit bank erosion</li> </ul>

**Table 6.1 Potential Mitigation and Environmental Management Measures to be Considered (Subject to Further Refinement)**

Valued Component	Mitigation Measures/Environmental Management Measures
	<ul style="list-style-type: none"> <li>• Design for use of temporary crossing structures or other practices to cross streams or waterbodies with steep and highly erodible banks and beds (e.g., dominated by organic materials and silts)</li> <li>• Design for operation of machinery on land (above the high-water mark), on ice, or from a floating barge whenever possible, in a manner that limits disturbance to the banks and bed of the waterbody</li> <li>• Plan for maintenance of equipment to be used in water in a clean condition, free of fluid leaks and aquatic invasive species</li> <li>• Plan for washing, refueling, and servicing machinery and storing fuel and other materials for the machinery in such a way as to prevent deleterious substances from entering the water</li> <li>• Plan for development and implementation of Project-specific environmental management plans and monitoring programs, including a Surface Water Monitoring and Management Plan, an Erosion and Sediment Control Plan, a Fish Habitat Offsetting Plan, and development of Emergency Response and Spill Prevention and Contingency Plans for implementation in the event of an accident or malfunction</li> <li>• Plan for development and implementation of a Project-specific Explosives Management Plan to reduce risk of lethal or sub-lethal effects on fish, changes in bank stability and composition, and sedimentation</li> <li>• Plan for implementation of any additional mitigation measures outlined for the Surface Water VC.</li> </ul>
Vegetation and Wetlands	<ul style="list-style-type: none"> <li>• Design for restriction of general site clearing activities to the PDA</li> <li>• Design for limitation of the extent of grubbing and clearing of shrubs and herbaceous species where possible</li> <li>• Design for maintenance of 30-m natural buffers around wetlands and riparian zones, where possible</li> <li>• Design for limitation of construction activities in wetland areas to reduce potential environmental effects of disturbance (e.g., erosion and sedimentation, introduction or spread of exotic or invasive vascular plant species)</li> <li>• Design for implementation of erosion and sedimentation control measures</li> <li>• Design for use of clean, coarse fill material for grading to reduce the risk of introducing or spreading exotic or invasive plant species</li> <li>• Design for stabilization and revegetation of mine rock storage areas</li> <li>• Plan for implementation of erosion protection measures until vegetative cover is established</li> <li>• Plan for implementation of revegetation program following the removal of infrastructure, equipment and materials mine components not required during closure</li> <li>• Plan for incorporation of plant species of interest to Indigenous communities into the Closure Plan, where appropriate and technically feasible</li> <li>• Plan for development and implementation of Project-specific environmental management plans and monitoring programs, including a Vegetation Management Plan, Weed Management Plan, Surface Water Monitoring and Management Plan, Erosion and Sediment Control Plan, and development of Emergency Response and Spill</li> </ul>

**Table 6.1 Potential Mitigation and Environmental Management Measures to be Considered (Subject to Further Refinement)**

Valued Component	Mitigation Measures/Environmental Management Measures
	<p>Prevention and Contingency Plans for implementation in the event of an accident or malfunction</p> <ul style="list-style-type: none"> <li>• Plan for implementation of any additional mitigation measures outlined for the Atmospheric Environment VC for the mitigation of potential dust emissions, thereby reducing the potential effects of dust deposition on vegetation and wetlands</li> </ul>
Labour and Economy	<ul style="list-style-type: none"> <li>• Design to maximize potential positive effects by:               <ul style="list-style-type: none"> <li>○ posting of job qualifications in advance and identifying available training programs and providers so that local and Indigenous residents can acquire the necessary skills and qualify for potential Project-related employment,</li> <li>○ posting of 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, and</li> <li>○ working with local communities to develop training programs oriented to Project operational needs.</li> </ul> </li> <li>• Design for completion of all timber removal in accordance with <i>The Forest Act</i> of Manitoba</li> <li>• 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</li> </ul>
Community Services and Infrastructure	<ul style="list-style-type: none"> <li>• Design for mandatory safety orientations for all new employees</li> <li>• Design for control of access to the PDA through the use of a security gate and guard house, and by employing on-site security staff</li> <li>• Design for site security services to help limit demands on the local police system</li> <li>• Design for having emergency response measures in place for a timely and effective response to fires, and containment within the PDA</li> <li>• Design for presence of mine rescue vehicles and trained paramedics at the Gordon and MacLellan sites to reduce demands on emergency response services</li> <li>• Design for careful control of all flammable material (such as fuels and explosives) on-site</li> <li>• Design for training of Project personnel in fuel handling, equipment maintenance, and fire prevention and response measures</li> <li>• Design consideration of security in the Project accommodations strategy</li> <li>• Design for implementation of work schedules for Project construction workers (12 hours per day, seven days per week) to deter workers from accessing community recreation services and facilities outside of working hours during a shift</li> <li>• Design for 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 infrastructure and services</li> <li>• Design for use of diesel generators to meet electricity demand at the Gordon site to mitigate potential effects on the local power supply</li> <li>• Plan for consultation with local emergency providers so that roles and responsibilities are understood, and that the necessary resources required to respond are in place</li> </ul>

**Table 6.1 Potential Mitigation and Environmental Management Measures to be Considered (Subject to Further Refinement)**

Valued Component	Mitigation Measures/Environmental Management Measures
	<ul style="list-style-type: none"> <li>• Plan for maintenance of fire prevention and suppression systems on-site, including water supplies, sprinklers, fire extinguishers and other firefighting equipment</li> <li>• Plan for workforce education to encourage healthy lifestyle choices, sensitivity training and strict enforcement of Alamos' health and safety policies will also help mitigate adverse social effects. 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.</li> <li>• Plan for access to Employee Assistance Program for Project personnel, and requirement for pre-employment physicals</li> <li>• Plan for development of cooperative protocols with responsible agencies to deal with access of Project personnel to emergency and other medical services</li> <li>• Plan for 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</li> <li>• Project planning and management strategies, including in-design mitigation measures and environmental protection measures (e.g., development and implementation of Project-specific Emergency Response and Spill Prevention and Contingency Plans) will reduce the likelihood of accidents and potential fires to as low a level as is reasonably practical</li> </ul>
Land and Resource Use	<ul style="list-style-type: none"> <li>• Design for obtaining all necessary patent claims, mining leases, licences of occupation and staked claims in areas that are overlapped by the Project</li> <li>• Design for use of signage around the perimeter of the PDA to alert local land and resource users of the presence of the Project and its facilities</li> <li>• Design for use of only as much lighting as is necessary for safe and efficient Project activities, use of directional light fixtures to avoid the transmission of light outside of the PDA and positioning of portable lighting equipment to limit visibility at nearby receptors to the extent feasible</li> <li>• Design for installation of noise mitigation measures (e.g., muffler systems) on construction and other mobile equipment, and proper maintenance of equipment</li> <li>• Design for completion of all timber removal in accordance with <i>The Forest Act of Manitoba</i></li> <li>• Design for engagement of local land and resource users (e.g., recreational harvesters), affected tenure holders (e.g., trappers, bait harvesters, and guide outfitters), 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</li> <li>• Design for engagement of local boaters to address navigation issues as well as access and safety issues related to navigation along watercourses affected by the Project, including consultation regarding the need to provide marked portages to circumvent obstructions</li> <li>• 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</li> </ul>

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**Table 6.1 Potential Mitigation and Environmental Management Measures to be Considered (Subject to Further Refinement)**

Valued Component	Mitigation Measures/Environmental Management Measures
	<ul style="list-style-type: none"> <li>• Design for prohibition of workers from engaging in recreational land and resource at in the PDA during all Project phases</li> <li>• Design for selection of equipment and/or design of acoustical enclosures to limit overall noise emissions</li> <li>• Design for prohibition of employees from bringing firearms or fishing gear to site to limit competition for wildlife and fish species of value to land and resource users</li> <li>• Plan for consideration of land and resource uses during preparation of the Closure Plan</li> <li>• Plan for communication of Project activities, locations and timing throughout construction, operation and closure to affected land and resource users, interest groups, the provincial government, and local authorities leading up to construction and throughout the life of the Project.</li> </ul>
Heritage Resources	<ul style="list-style-type: none"> <li>• Design for heritage professional with experience in historical documentation to perform any historical documentation activities that may be required</li> <li>• Design for reputable salvage organization to undertake any salvage of architectural and/or historical resources that may be required</li> <li>• Plan for training of staff in the recognition of basic archaeological artifacts such as Indigenous material culture, and Euro-Canadian material culture and also on the potential and documented historic use and occupation of the PDA and LAA</li> <li>• Plan for implementation of the following procedures in the event of a suspected archaeological discovery:               <ul style="list-style-type: none"> <li>○ immediate notification of the Historic Resources Branch of MSCH and cessation of all Project-related ground disturbance within a 20-m radius of where the suspected archaeological resources is found, pending further direction from the Historic Resources Branch</li> <li>○ retention of a licensed archaeologist approved or designated by the Historic Resources Branch to conduct further investigation if required (in consultation with the Historic Resource Branch)</li> </ul> </li> <li>• Plan for implementation of the following procedures in the event of the discovery of suspected human remains:               <ul style="list-style-type: none"> <li>○ immediate notification of the Historic Resources Branch of MSCH and cessation of all Project-related ground disturbance within a 20-m radius of where the suspected human remains are found, pending further direction from the Historic Resources Branch</li> <li>○ leaving the remains and any associated artifacts in place and undisturbed until the arrival of personnel designated by the Historic Resources Branch as appropriately qualified to take further action with respect to the exhumation and removal of human remains and associated artifacts</li> </ul> </li> </ul>
Traditional Land and Resource Use	<ul style="list-style-type: none"> <li>• Design for implementation of one or more of the following mitigation measures for plant harvesting sites within the PDA:               <ul style="list-style-type: none"> <li>○ avoidance through Project design</li> <li>○ avoidance through timing of Project activities and potential scheduling of construction during periods of least effect</li> <li>○ signage</li> </ul> </li> </ul>

**Table 6.1 Potential Mitigation and Environmental Management Measures to be Considered (Subject to Further Refinement)**

Valued Component	Mitigation Measures/Environmental Management Measures
	<ul style="list-style-type: none"> <li>○ incorporation of plant species of interest to Indigenous communities and groups into rehabilitation plans where appropriate and technically feasible</li> <li>○ implementation of the mitigation measures outlined for the Vegetation and Wetlands VC and Land and Resource Use VC</li> <li>● Design for implementation of one or more of the following mitigation measures for fishing sites within the PDA:               <ul style="list-style-type: none"> <li>○ avoidance through Project design</li> <li>○ avoidance through timing of Project activities and potential scheduling of construction during periods of least effect</li> <li>○ signage</li> <li>○ implementation of the mitigation measures outlined for the Fish and Fish Habitat VC and Land and Resource Use VC</li> </ul> </li> <li>● Design for implementation of one or more of the following mitigation measures for hunting and trapping sites within the PDA: mitigation may include one or more of the following measures:               <ul style="list-style-type: none"> <li>○ avoidance through Project design;</li> <li>○ avoidance through timing of Project activities and potential scheduling of construction during periods of least effect</li> <li>○ signage</li> <li>○ implementation of the mitigation measures outlined for the Wildlife and Wildlife Habitat VC and Land and Resource Use VC</li> </ul> </li> <li>● Design for implementation of one or more of the following mitigation measures for spiritual or cultural sites (including trails and travelways, sacred areas, communal gathering areas and habitation sites) within the PDA:               <ul style="list-style-type: none"> <li>○ avoidance through Project design</li> <li>○ avoidance through timing of Project activities and potential scheduling of construction during periods of least effect</li> <li>○ signage</li> <li>○ detailed recording and mapping; in partnership with community representatives, a decision is then made about the relative importance of the site and, if warranted, how to maintain and control access</li> </ul> </li> <li>● Design for incorporation of plant species of interest to Indigenous communities into the Closure Plan, where appropriate and technically feasible</li> <li>● Plan for consideration of mitigation measures proposed by Indigenous communities and groups</li> <li>● Plan for ongoing engagement with Indigenous communities and groups regarding their concerns, mitigation of potential Project effects on traditional land and resource use, and potential monitoring</li> <li>● Plan for development and implementation of Project-specific environmental management and monitoring plans, and discussion with Indigenous communities and groups regarding these plans.</li> </ul>
Human Health	<ul style="list-style-type: none"> <li>● Plan for implementation of any required mitigation measures outlined for the Atmospheric Environment, Surface Water, Groundwater, Fish and Fish Habitat, and Vegetation and Wetlands VCs</li> </ul>

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## PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT

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2015b. MCFN member and local resource user. Conversation with Environmental Biologist, Stantec Consulting Ltd., Winnipeg, Manitoba, April 14, 2015.

2015c. Local resource user and outfitter. Conversation with Environmental Biologist, Stantec Consulting Ltd., Winnipeg, Manitoba, April 13, 2015.

2015d. Chief Administrative Officer, Town of Lynn Lake, Manitoba. Email to Socio-economic Analyst, Stantec Consulting Ltd., Montreal, Québec, August 18, 2015.

2015e. Manager, Lynn Lake Hospital and Leaf Rapids Health Center, Manitoba. Telephone call with Socio-economic Analyst, Stantec Consulting Ltd., Montreal, Québec, August 19, 2015.

2015f. Chief, Marcel Colomb First Nation, Manitoba. Telephone call with Socio-economic Analyst, Stantec Consulting Ltd., Montreal, Québec, September 8, 2015.

**PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT**

## APPENDIX A: CONCORDANCE TABLE

## PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT

**Table of Concordance with Information Requirements for the Description of a Designated Project under the *Canadian Environmental Assessment Act, 2012***

Clause	Requirement	Section(s) in Project Description
<b>Prescribed Information for the Description of a Designated Project Regulations (SOR/2012-148)</b>		
<b>1.0 General Information and Contact(s)</b>		
1	The name of the Project	1
1	The nature of the Project	1.1 and 2
1	The proposed location of the Project	1.1 and 2.1
2	The proponent's name and contact information and the name and contact information of their primary representative for the purpose of the description of the Project	1.2
3	A description of and the results of any consultations undertaken with any jurisdictions and other parties including Aboriginal peoples and the public	3
4(a)	Other relevant information, including the environmental assessment and regulatory requirements of other jurisdictions	1.3
4(b)	Information concerning any environmental study that is being or has been conducted of the region where the Project is to be carried out.	4.1
<b>2.0 Project Information</b>		
5	A description of the Project's context and objectives	1.1
6	The provisions in the schedule to the <i>Regulations Designating Physical Activities</i> describing the Project in whole or in part.	1.3.1
7	A description of the physical works that are related to the Project including their purpose, size, and capacity.	2.3
8	The anticipated production capacity of the Project and a description of the production processes to be used, the associated infrastructure and any permanent or temporary structures.	2.3
9	A description of all activities to be performed in relation to the Project.	2.3 and 2.5
10	A description of any solid, liquid, gaseous or hazardous waste that is likely to be generated during any phase of the Project and of plans to manage those wastes.	2.6
11	A description of the anticipated phases of and the schedule for the Project's construction, operation, decommissioning, and abandonment.	2.4 and 2.5

## PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT

**Table of Concordance with Information Requirements for the Description of a Designated Project under the *Canadian Environmental Assessment Act, 2012***

Clause	Requirement	Section(s) in Project Description
<b>3.0 Project Location Information</b>		
12	A description of the Project's location, including:	1.1 and 2.1
12(a)	<ul style="list-style-type: none"> <li>▪ Geographic coordinates</li> </ul>	2.1
12(b)	<ul style="list-style-type: none"> <li>▪ Site maps produced at an appropriate scale to determine the Project's overall location and the spatial relationship of the Project components</li> </ul>	Appendix B
12(c)	<ul style="list-style-type: none"> <li>▪ The legal description of land to be used for the Project, including the title, deed or document and any authorization relating to a water lot</li> </ul>	2.1
12(d)	<ul style="list-style-type: none"> <li>▪ The Project's proximity to any permanent, seasonal or temporary residences</li> </ul>	4.6.2
12(e)	<ul style="list-style-type: none"> <li>▪ The Project's proximity to reserves, traditional territories as well as lands and resources currently used for traditional purposes by Aboriginal peoples</li> </ul>	3.3.1 and 4.6.4
12(f)	<ul style="list-style-type: none"> <li>▪ The Project's proximity to any federal lands</li> </ul>	1.3.1
<b>4.0 Federal Involvement</b>		
13	A description of any financial support that federal authorities are, or may be, providing to the Project	1.3.1
14	A description of any federal land that may be used for the purpose of carrying out the Project	1.3.1
15	Any federal legislative or regulatory requirements that may be applicable including a list of permits, licence or other authorizations that may be required to carry out the Project.	1.3.1
<b>5.0 Environmental Effects</b>		
16	A description of the physical and biological setting	4
17(a)	A description of any changes that may be caused, as a result of carrying out the Project, to fish as defined in section 2 of the <i>Fisheries Act</i> and fish habitat as defined in subsection 34(1) of that Act	5
17(b)	A description of any changes that may be caused, as a result of carrying out the Project, to aquatic species, as defined in subsection 2(1) of the <i>Species at Risk Act</i>	5
17(c)	A description of any changes that may be caused, as a result of carrying out the Project, to migratory birds, as	5

## PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT

**Table of Concordance with Information Requirements for the Description of a Designated Project under the *Canadian Environmental Assessment Act, 2012***

Clause	Requirement	Section(s) in Project Description
	defined in subsection 2(1) of the <i>Migratory Birds Convention Act, 1994</i>	
18	A description of any changes to the environment that may occur, as a result of carrying out the Project, on federal lands, in a province other than the province in which the Project is proposed to be carried out or outside of Canada	5
19	Information on the effects on Aboriginal peoples of any changes to the environment that may be caused as a result of carrying out the Project, including effects on health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.	5
20	Summary of the information required under section 1 to 19	Project Description Summary Document
<b>Guide to Preparing a Description of a Designated Project under the <i>Canadian Environmental Assessment Act, 2012</i> (March 2015)</b>		
<b>1.0 General Information and Contact(s)</b>		
1.1	Describe the nature of the designated project, and proposed location (2–3 paragraphs; note that additional location details are to be provided in section 3).	1.1
1.2	<b>Proponent Information</b>	1.2
1.2.1	Name of the designated project.	1
1.2.2	Name of the proponent.	1.2
1.2.3	Address of the proponent.	1.2
1.2.4	Chief Executive Officer or equivalent (include name, official title, email address and telephone number).	1.2
1.2.5	Principal contact person for purposes of the project description (include name, official title, email address and telephone number).	1.2
1.3	Provide a list of any jurisdictions and other parties including Aboriginal groups and the public that were consulted during the preparation of the project description. (A description of the result of any	3

## PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT

**Table of Concordance with Information Requirements for the Description of a Designated Project under the *Canadian Environmental Assessment Act, 2012***

Clause	Requirement	Section(s) in Project Description
	consultations undertaken is to be provided in sections 6 and 7).	
1.4	Provide information on whether the designated project is subject to the environmental assessment and/or regulatory requirements of another jurisdiction(s).	1.3
1.5	Provide information on whether the designated project will be taking place in a region that has been the subject of a regional environmental study. Proponents are advised to contact the Agency during the preparation of the project description for information regarding any regional environmental studies that may be relevant.	4.1
<b>2.0 Project Information</b>		
2.1	Provide a general description of the project, including the context and objectives of the project. Indicate whether the designated project is a component of a larger project that is not listed in the <i>Regulations Designating Physical Activities</i> .	1.1
2.2	Indicate the provisions in the schedule to the <i>Regulations Designating Physical Activities</i> that describe the designated physical activities that are proposed to be carried out as part of the designated project.	1.3.1
2.3	<b>Components and Activities</b> Provide a description of the components associated with the designated project, including:	2.3
2.3.1	The physical works associated with the designated project (e.g., large buildings, other structures, such as bridges, culverts, dams, marine transport facilities, mines, pipelines, power plants, railways, roads, and transmission lines) including their purpose, approximate dimensions, and capacity. Include existing structures or related activities that will form part of or are required to accommodate or support the designated project.	2.3
2.3.2	Anticipated size or production capacity of the designated project, with reference to thresholds set out in the <i>Regulations Designating Physical Activities</i> , including a description of the production processes to be used, the associated infrastructure, and any permanent or temporary structures. The production capacity does not refer to the planned production capacity of a project but	1.3.1 and 2.3

**PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT**

**Table of Concordance with Information Requirements for the Description of a Designated Project under the *Canadian Environmental Assessment Act, 2012***

Clause	Requirement	Section(s) in Project Description
	the maximum production capacity based on the project's design and operating conditions.	
2.3.3	If the designated project or one component of the designated project is an expansion, describe the size and nature of the expansion with reference to the thresholds set out in the <i>Regulations Designating Physical Activities</i> .	1.3.1 and 2.3
2.3.4	<p>A description of the physical activities that are incidental to the designated project. In determining such activities, the following criteria shall be taken into account:</p> <ul style="list-style-type: none"> <li>▪ nature of the proposed activities and whether they are subordinate or complementary to the designated project;</li> <li>▪ whether the activity is within the care and control of the proponent;</li> <li>▪ if the activity is to be undertaken by a third party, the nature of the relationship between the proponent and the third party and whether the proponent has the ability to “direct or influence” the carrying out of the activity;</li> <li>▪ whether the activity is solely for the benefit of the proponent or is available for other proponents as well; and,</li> <li>▪ the federal and/or provincial regulatory requirements for the activity.</li> </ul> <p>Should an EA be required for the designated project, the Agency will take these criteria into consideration in determining the activities that are incidental to the designated project.</p>	2.3
2.4	<p><b>Emissions, Discharges and Waste</b></p> <p>Provide a description of any waste that is likely to be generated during any phase of the designated project and plans to manage that waste, including the following:</p>	2.6
2.4.1	Sources of atmospheric contaminant emissions during the designated project phases (focusing on criteria air contaminants and greenhouse gases, or other non-criteria contaminants that are of potential concern) and location of emissions.	2.3 and 2.6.1
2.4.2	Sources and location of liquid discharges.	2.3 and 2.6.2

## PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT

**Table of Concordance with Information Requirements for the Description of a Designated Project under the *Canadian Environmental Assessment Act, 2012***

Clause	Requirement	Section(s) in Project Description
2.4.3	Types of wastes and plans for their disposal (e.g., landfill, licenced waste management facility, marine waters, or tailings containment facility).	2.3 and 2.6.3
2.5	<b>Construction, Operation, Decommissioning and Abandonment Phases and Scheduling</b> Provide a description of the timeframe in which the development is to occur and the key project phases, including the following:	2.4 and 2.5
2.5.1	Anticipated scheduling, duration and staging of key project phases, including preparation of the site, construction, operation, decommissioning and abandonment.	2.4 and 2.5
2.5.2	Main activities in each phase of the designated project that are expected to be required to carry out the proposed development (e.g., activities during site preparation or construction might include, but are not limited to, land clearing, excavating, grading, de-watering, directional drilling, dredging and disposal of dredged sediments, infilling, and installing structures).	2.3 and 2.5
<b>3.0 Project Location</b>		
3.1	Provide a description of the designated project's location including:	1.1 and 2.1
3.1.1	Coordinates (i.e. longitude/latitude using international standard representation in degrees, minutes, seconds) for the centre of the facility or, for a linear project, provide the beginning and end points.	2.1
3.1.2	Site map/plan(s) depicting location of the designated project components and activities. The map/plan(s) should be at an appropriate scale to help determine the relative size of the proposed components and activities.	Appendix B
3.1.3	Map(s) at an appropriate scale showing the location of the designated project components and activities relative to existing features, including but not limited to: <ul style="list-style-type: none"> <li>▪ watercourses and waterbodies with names where they are known;</li> <li>▪ linear and other transportation components (e.g., airports, ports, railways, roads, electrical power transmission lines and pipelines);</li> </ul>	Appendix B

## PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT

**Table of Concordance with Information Requirements for the Description of a Designated Project under the *Canadian Environmental Assessment Act, 2012***

Clause	Requirement	Section(s) in Project Description
	<ul style="list-style-type: none"> <li>▪ other features of existing or past land use (e.g., archaeological sites, commercial development, houses, industrial facilities, residential areas, and any waterborne structures);</li> <li>▪ location of Aboriginal groups, settlement land (under a land claim agreement) and, if available, traditional territory;</li> <li>▪ federal lands including, but not limited to National parks, National historic sites, and reserve lands;</li> <li>▪ nearby communities;</li> <li>▪ permanent, seasonal, or temporary residences;</li> <li>▪ fisheries and fishing areas (i.e., Aboriginal, commercial, and recreational);</li> <li>▪ environmentally sensitive areas (e.g., wetlands, and protected areas, including migratory bird sanctuary reserves, marine protected areas, National Wildlife areas, and priority ecosystems as defined by Environment Canada); and,</li> <li>▪ provincial and international boundaries.</li> </ul>	
3.1.4	Photographs of work locations to the extent possible.	1.1
3.1.5	Proximity of the designated project to: <ul style="list-style-type: none"> <li>▪ any permanent, seasonal, or temporary residences;</li> <li>▪ traditional territories, settlement land (under a land claim agreement) as well as lands and resources currently used for traditional purposes by Aboriginal peoples; and,</li> <li>▪ any federal lands.</li> </ul>	1.3.1, 2.1, 3.3.1, 4.6.2 and 4.6.4
3.2	<b>Land and Water Use</b> To the extent that is known at this time, describe the ownership and zoning of land and water that may be affected by the project, including the following:	2.1, 4.6.2
3.2.1	Zoning designations.	4.6.2
3.2.2	Legal description of land to be used (including information on sub-surface rights) for the designated project, including the title, deed or document and any authorization relating to a water lot.	2.1
3.2.3	Any applicable land use, water use (including groundwater), resource management or conservation plans applicable to or near the project site. Include	4.1

## PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT

**Table of Concordance with Information Requirements for the Description of a Designated Project under the *Canadian Environmental Assessment Act, 2012***

Clause	Requirement	Section(s) in Project Description
	information on whether such plans were subject to public consultation.	
3.2.4	Describe whether the designated project is going to require access to, use or occupation of, or the exploration, development and production of lands and resources currently used for traditional purposes by Aboriginal peoples.	5
4.1	Describe if there is any proposed or anticipated federal financial support that federal authorities are, or may be, providing to support the carrying out of the designated project.	1.3.1
4.2	Describe any federal lands that may be used for the purpose of carrying out the designated project. This is to include any information on any granting of interest in federal land (i.e., easement, right of way, or transfer of ownership).	1.3.1
4.3	Provide a list of any federal permits, licences or other authorizations that may be required to carry out of the project.	1.3.1
5.0	<p>The information to be provided in this section is meant to be a brief assessment of the environmental interactions of the project. A detailed examination of the potential environmental effects of the project does not need to be included in the project description. If the proponent is of the opinion that the designated project is not likely to cause adverse environmental effects, it must provide evidence to support its view.</p> <p>Using existing knowledge and available information provide an overview of the following:</p>	5
5.1	A description of the physical and biological setting, including the physical and biological components in the area that may be adversely affected by the project (e.g., air, fish, terrain, vegetation, water, wildlife, including migratory birds, and known habitat use).	4
5.2	<p>A description of any changes that may be caused as a result of carrying out the designated project to:</p> <p>(a) fish and fish habitat, as defined in the <i>Fisheries Act</i>;</p> <p>(b) marine plants, as defined in the <i>Fisheries Act</i>; and,</p> <p>(c) migratory birds, as defined in the <i>Migratory Birds Convention Act, 1994</i>.</p>	5

**PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT**

**Table of Concordance with Information Requirements for the Description of a Designated Project under the *Canadian Environmental Assessment Act, 2012***

Clause	Requirement	Section(s) in Project Description
5.3	A description of any changes to the environment that may occur, as a result of carrying out the designated project, on federal lands, in a province other than the province in which the project is proposed to be carried out, or outside of Canada.	5
5.4	A description of the effects on Aboriginal peoples of any changes to the environment that may be caused as a result of carrying out the designated project, including effects on health and socio-economic conditions, physical and cultural heritage, the current use of lands and resources for traditional purposes, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.	5
6.0	<p>Experience has shown that engagement by proponents with Aboriginal groups early in the planning and design phases of a proposed project can benefit all concerned. By learning about Aboriginal interests and concerns and identifying ways to avoid or mitigate potential impacts, proponents can build these considerations into their project design, thereby improving project design and reducing the potential for future project delays and increased costs.</p> <p>Provide the following information to the extent that it is available or applicable:</p>	3
6.1	A list of Aboriginal groups that may be interested in, or potentially affected by, the designated project.	3.3.1
6.2	<p>A description of the engagement or consultation activities carried out to date with Aboriginal groups, including:</p> <ul style="list-style-type: none"> <li>▪ names of Aboriginal groups engaged or consulted to date with regard to the designated project;</li> <li>▪ date(s) each Aboriginal group was engaged or consulted; and,</li> <li>▪ means of engagement or consultation (e.g., community meetings, mail or telephone).</li> </ul>	3.3.2
6.3	An overview of key comments and concerns expressed by Aboriginal groups identified or engaged to date, including any responses provided to these groups.	3.3.2
6.4	A consultation and information-gathering plan that outlines the ongoing and proposed Aboriginal engagement or consultation activities, the general schedule for these activities and the type of information	3.3.3

## PROJECT DESCRIPTION – LYNN LAKE GOLD PROJECT

**Table of Concordance with Information Requirements for the Description of a Designated Project under the *Canadian Environmental Assessment Act, 2012***

Clause	Requirement	Section(s) in Project Description
	to be exchanged and collected (or, alternatively, an indication of why such engagement or consultation is not required).	
	The proponent is encouraged to provide background information on Aboriginal groups' potential or established Aboriginal or treaty rights. The proponent is also encouraged to provide information on the impact area of the designated project and how it overlaps with uses by Aboriginal groups that have potential or established Aboriginal or treaty rights.	3.3.1 and 4.6.4
7.0	Provide the following information to the extent that it is available or applicable:	3.1 and 3.2
7.1	An overview of key comments and concerns expressed to date by stakeholders and any responses that have been provided.	3.1.2 and 3.2.2
7.2	An overview of any ongoing or proposed stakeholder consultation activities.	3.1.3 and 3.2.3
7.3	A description of any consultations that have occurred with other jurisdictions that have environmental assessment or regulatory decisions to make with respect to the project.	3.1
<b>8.0 Summary of the Project Description</b>		
	Proponents are to include as part of the project description a standalone section that summarizes the information identified in Sections 1 to 7 of this Guide. Under CEAA 2012, the Agency is required to consult the public on a summary of the project description that has to be posted on the Agency's Internet site in both of Canada's official languages as required under the <i>Official Languages Act</i> . As a result, to be in a position to initiate the screening phase in a timely manner, the summary is to be prepared and submitted to the Agency in both English and French.	Project Description Summary Document

## APPENDIX B: MAPS

PRELIMINARY



**Historical Mine Infrastructure**

-  Existing Access Road
-  Existing Infrastructure Associated with Historical Mine



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 14N
  2. Base features provided by the Government of Manitoba and the Government of Canada.
  3. Imagery: SPOT-7 imagery, BlackBridg Gemoatics Corp., July 2015.



Project Location: Gordon Site, Lynn Lake, Manitoba 11440362  
 Prepared by AC on 2017-06-16  
 Technical Review by AF on 2017-06-16

Client/Project: LYNN LAKE GOLD PROJECT  
 PROJECT DESCRIPTION

Map No. 1

Title: **Historical Mine - Gordon Site**

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PRELIMINARY



**Historical Mine Infrastructure**

- Existing Access Road
- ▭ Existing Infrastructure Associated with Historical Mine



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 14N
  2. Base features provided by the Government of Manitoba and the Government of Canada.
  3. Imagery: SPOT-7 imagery, BlackBridg Geoatics Corp. July 2015.



Project Location: MacLellan Site, Lynn Lake, Manitoba  
 11440362  
 Prepared by AC on 2017-06-16  
 Technical Review by AF on 2017-06-16

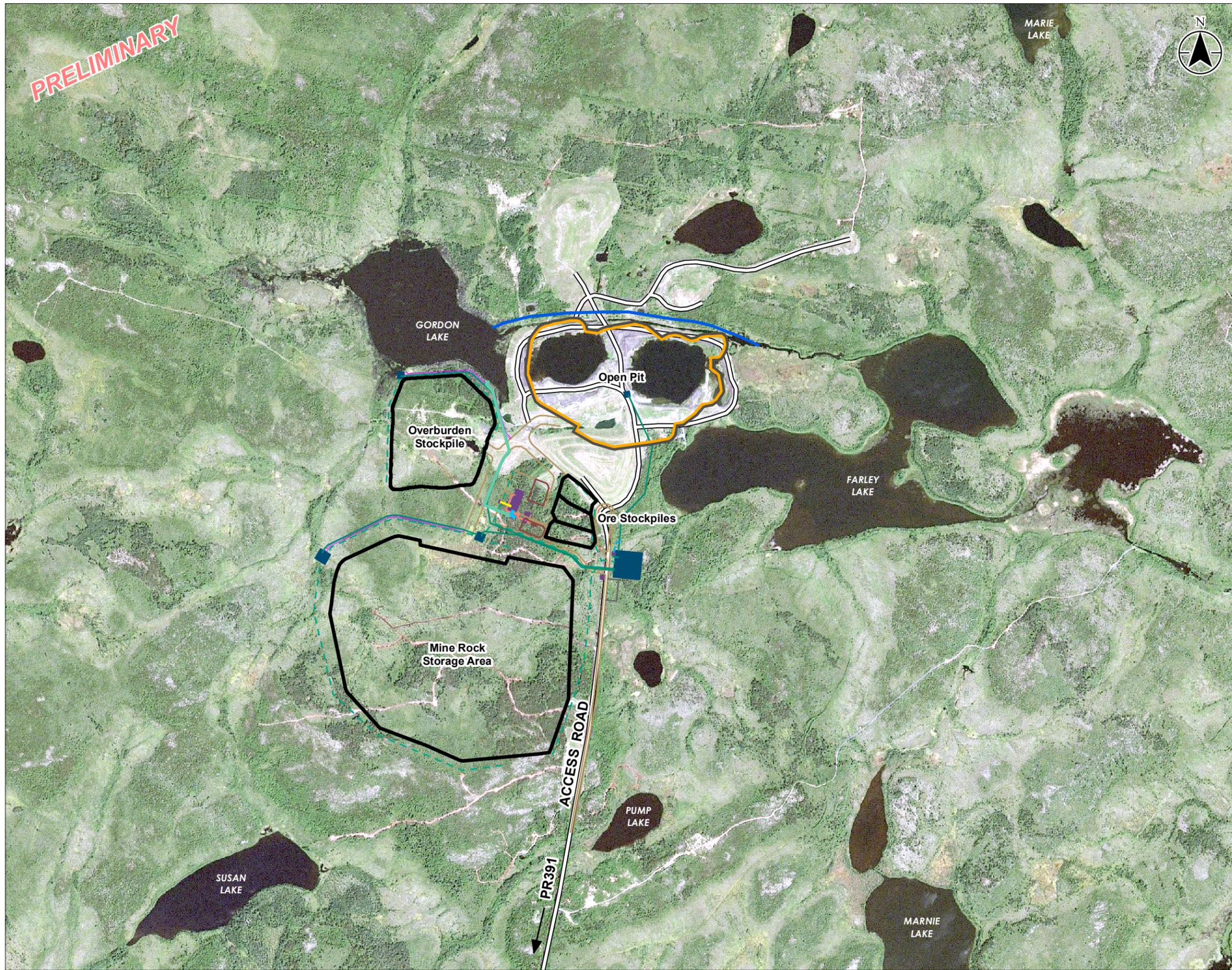
Client/Project: LYNN LAKE GOLD PROJECT  
 PROJECT DESCRIPTION

Map No.: 2

Title: **Historical Mine - MacLellan Site**



**PRELIMINARY**



- Project Components and Infrastructure**
- Potential Open Pit
  - Potential Infrastructure
  - Building
  - Collection Pond
- Site Access**
- Proposed Site Access Road
  - Drainage Road
- Other Infrastructure**
- Construction Temporary Facility
  - Parking
  - Diversion Ditch
  - Fresh Water Pipe
  - Sewer
  - Potable Water
  - Drainage Ditch - Clean water
  - Drainage Ditch - Potentially Contaminated
  - Drainage Pipe
  - Fire Water

- Landbase**
- Existing Access Road



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

Project Location: Gordon Site, Lynn Lake, Manitoba  
 11440362  
 Prepared by AC on 2017-06-20  
 Technical Review by KM on 2017-06-20

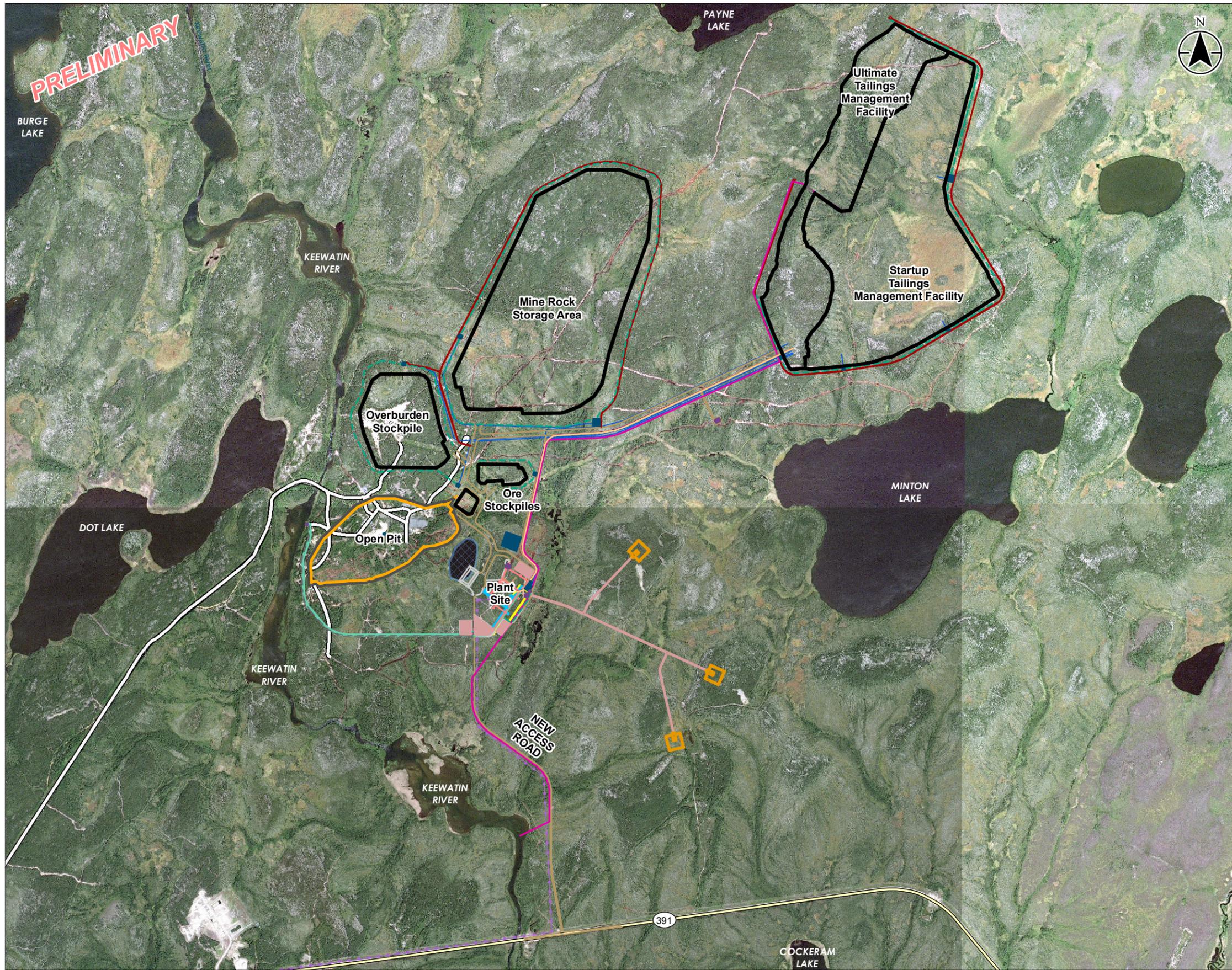
Client/Project: LYNN LAKE GOLD PROJECT  
 PROJECT DESCRIPTION

Map No.: **4**

Title: **Preliminary General Arrangement of Project Infrastructure - Gordon Site**

G:\GIS\Project\Folder\11440362\_A\GIS\Project\Description\Map4\_PreliminaryArrangement\_Gordon\_20170616.mxd Revised: 2017-06-22 by: cccmccmcc

**PRELIMINARY**



**Project Infrastructure**

- Potential Open Pit
- Potential Infrastructure
- Construction Temporary Facility
- Collection Pond
- Building
- Infilled Waterbody
  
- Site Access**
- Potential Access Road
- Water Supply Road
- Drainage Sumps Access Road
  
- Other Infrastructure**
- TMF - Internal Dyke
- Construction Temporary Facility
- Potential Borrow Source
- Pad and Parking
- Drainage Ditch - Potentially Contaminated
- Drainage Pipe
- Fire Water
- Fresh water Pipe
- Pond
- Power Supply
- Reclaim Pipeline
- Sewer
- Tailings Pipeline
- Water Treatment Pipeline
- Potable Water

**Landbase**

- Existing Access Road
- Provincial Road



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

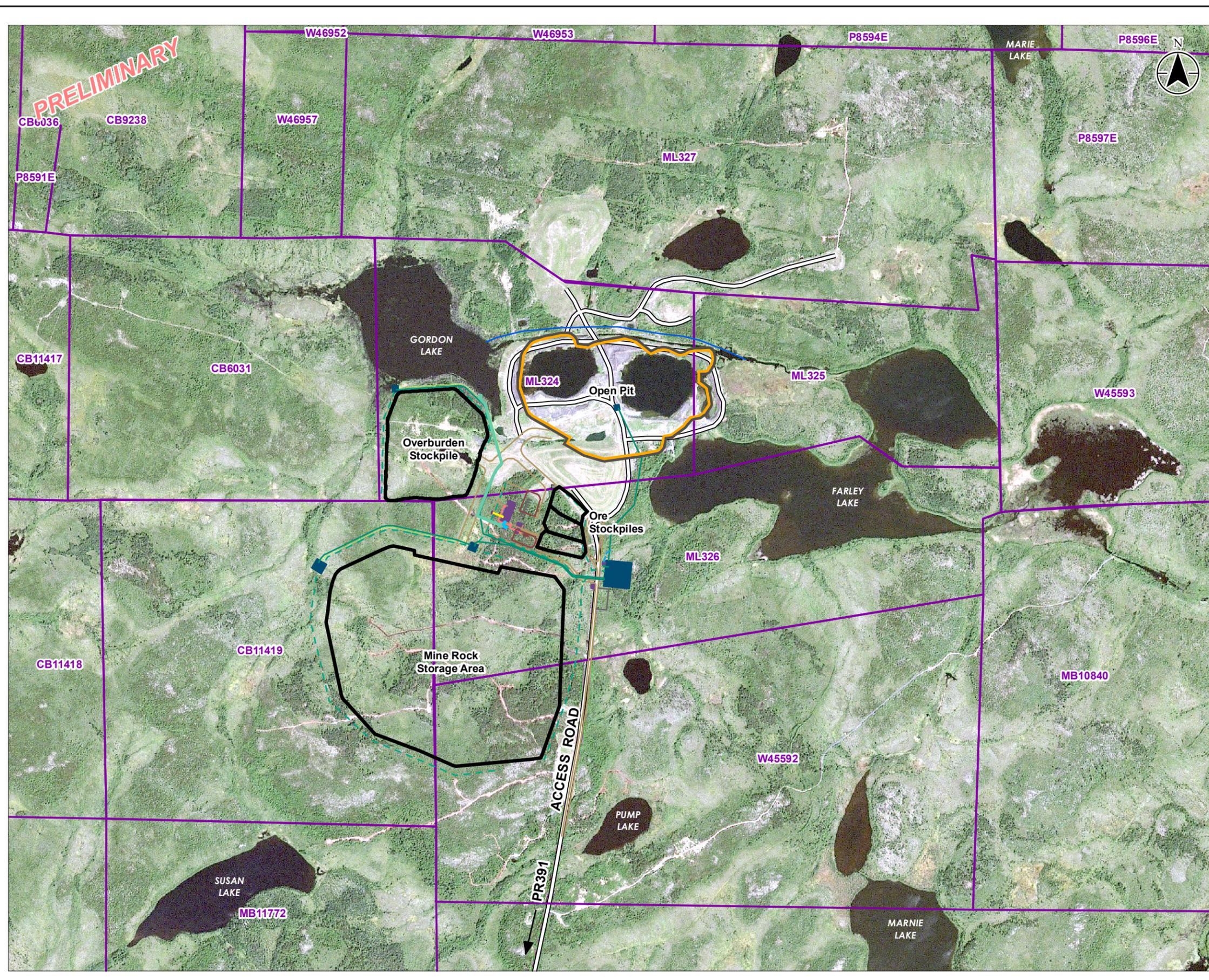
Project Location: MacLellan Site, Lynn Lake, Manitoba. Project ID: 11440362. Prepared by AC on 2017-06-20. Technical Review by KM on 2017-06-20.

Client/Project: LYNN LAKE GOLD PROJECT  
PROJECT DESCRIPTION

Map No.: **5**

Title: **Preliminary General Arrangement of Project Infrastructure - MacLellan Site**

G:\GIS\Project\11440362\Auriferous\Project\Description\Map06\_MineralClaims\_Gordon\_20170616.mxd - Revised: 2017-06-22 by: ccmadachio



- Project Components and Infrastructure**
- Potential Open Pit
  - Potential Infrastructure
  - Building
  - Collection Pond
- Site Access**
- Proposed Site Access Road
  - Drainage Road
- Other Infrastructure**
- Construction Temporary Facility
  - Parking
  - Diversion Ditch
  - Freshwater Pipe
  - Sewer
  - Potable Water
  - Drainage Ditch - Clean water
  - Drainage Ditch - Potentially Contaminated
  - Drainage Pipe
  - Fire Water

- Mining Claim Information**
- Mineral/Mining Claims and Leases
  - Mineral Lease

- Landbase**
- Existing Access Road



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

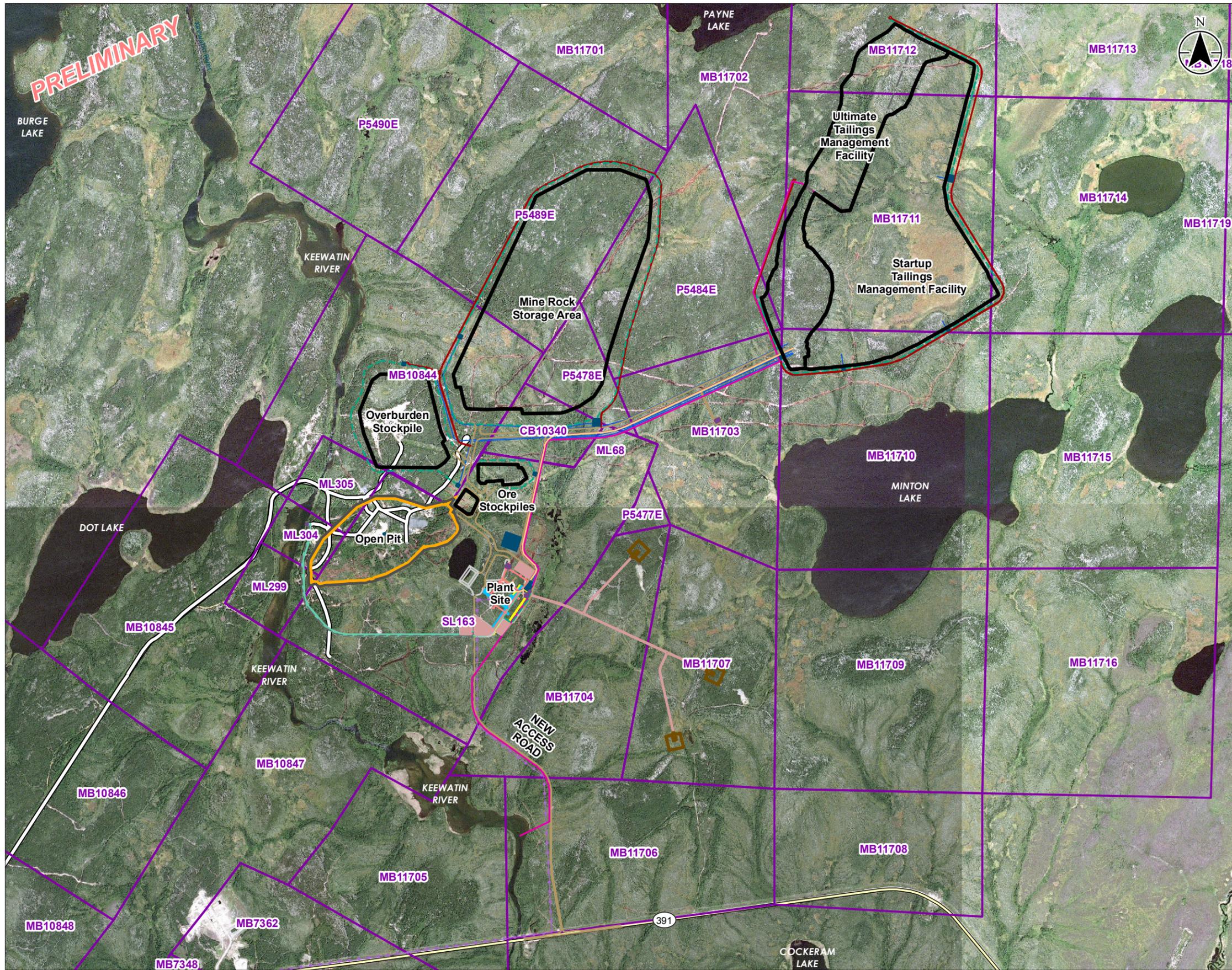
Project Location: Gordon Site, Lynn Lake, Manitoba. 11440362  
 Prepared by AC on 2017-06-20  
 Technical Review by KM on 2017-06-20

Client/Project: LYNN LAKE GOLD PROJECT  
 PROJECT DESCRIPTION

Map No.: 6

Title: Mineral/Mining Claims and Leases - Gordon Site

**PRELIMINARY**



**Project Infrastructure**

- Potential Open Pit
  - Potential Infrastructure
  - Construction Temporary Facility
  - Collection Pond
  - Building
- Site Access
- Potential Access Road
  - Water Supply Road
  - Drainage Sumps Access Road
- Other Infrastructure
- TMF - Internal Dyke
  - Construction Temporary Facility
  - Potential Borrow Source
  - Pad and Parking
  - Drainage Ditch - Potentially Contaminated
  - Drainage Pipe
  - Fire Water
  - Fresh water Pipe
  - Pond
  - Power Supply
  - Reclaim Pipeline
  - Sewer
  - Tailings Pipeline
  - Water Treatment Pipeline
  - Potable Water

**Mining Claim Information**

- Mineral/Mining Claims and Leases
- Mineral Lease

**Landbase**

- Existing Access Road
- Provincial Road



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 14N
  2. Base features provided by the Government of Manitoba and the Government of Canada.
  3. Imagery: SPOT-7 imagery, BlackBridg Geoimatics Corp. July 2015.

Project Location: MacLellan Site, Lynn Lake, Manitoba 11440362  
 Prepared by AC on 2017-06-20  
 Technical Review by KM on 2017-06-20

Client/Project: LYNN LAKE GOLD PROJECT  
 PROJECT DESCRIPTION

Map No. 7

Title: Mineral/Mining Claims and Leases - MacLellan Site

G:\\_Project\_Folder\11440362\_Aurifer\Project\_Description\Map7\_MineralClaims\_MacLellan\_20170616.mxd - Revised: 2017-06-22 by: acmacpho

**PRELIMINARY**



**Project Components and Infrastructure**

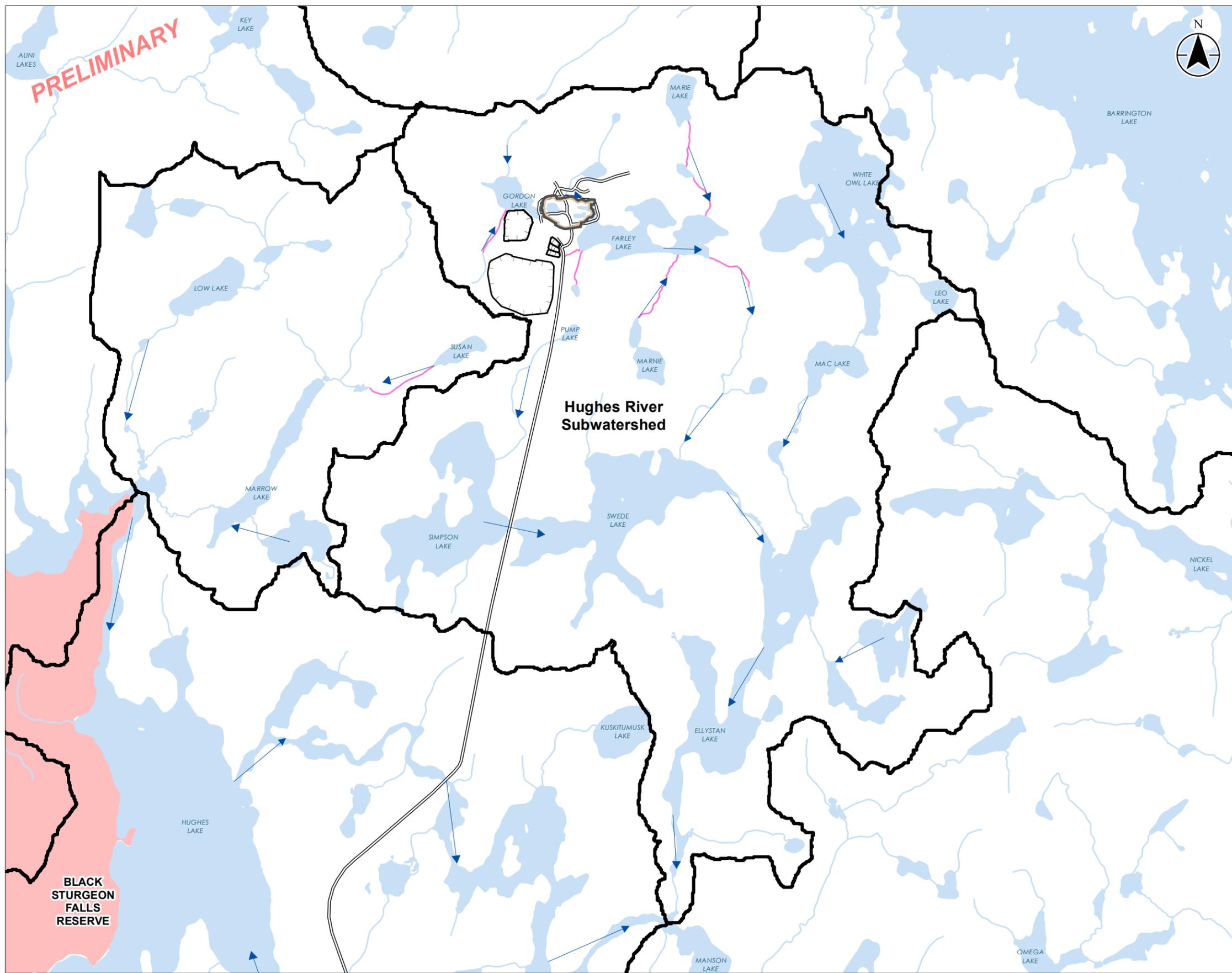
-  Potential Open Pit
-  Potential Infrastructure

**Study Area**

-  Surface Water Flow Direction
-  Fish-bearing Channel
-  Subwatersheds

**Landbase**

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



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 14N
  2. Base features provided by the Government of Manitoba and the Government of Canada.

Project Location: Gordon Site, Lynn Lake, Manitoba 11440362

Client/Project: LYNN LAKE GOLD PROJECT PROJECT DESCRIPTION

Map No. **8**

Title: **Surface Water Movement and Subwatersheds - Gordon Site**

G:\GIS\Project\_Folder\11440362\_Auriferous\Project\_Description\Map8\_Subwatersheds\_Gordon\_20170616.mxd - Revised: 2017-06-22 By: ccambalita

**PRELIMINARY**



**Project Components and Infrastructure**

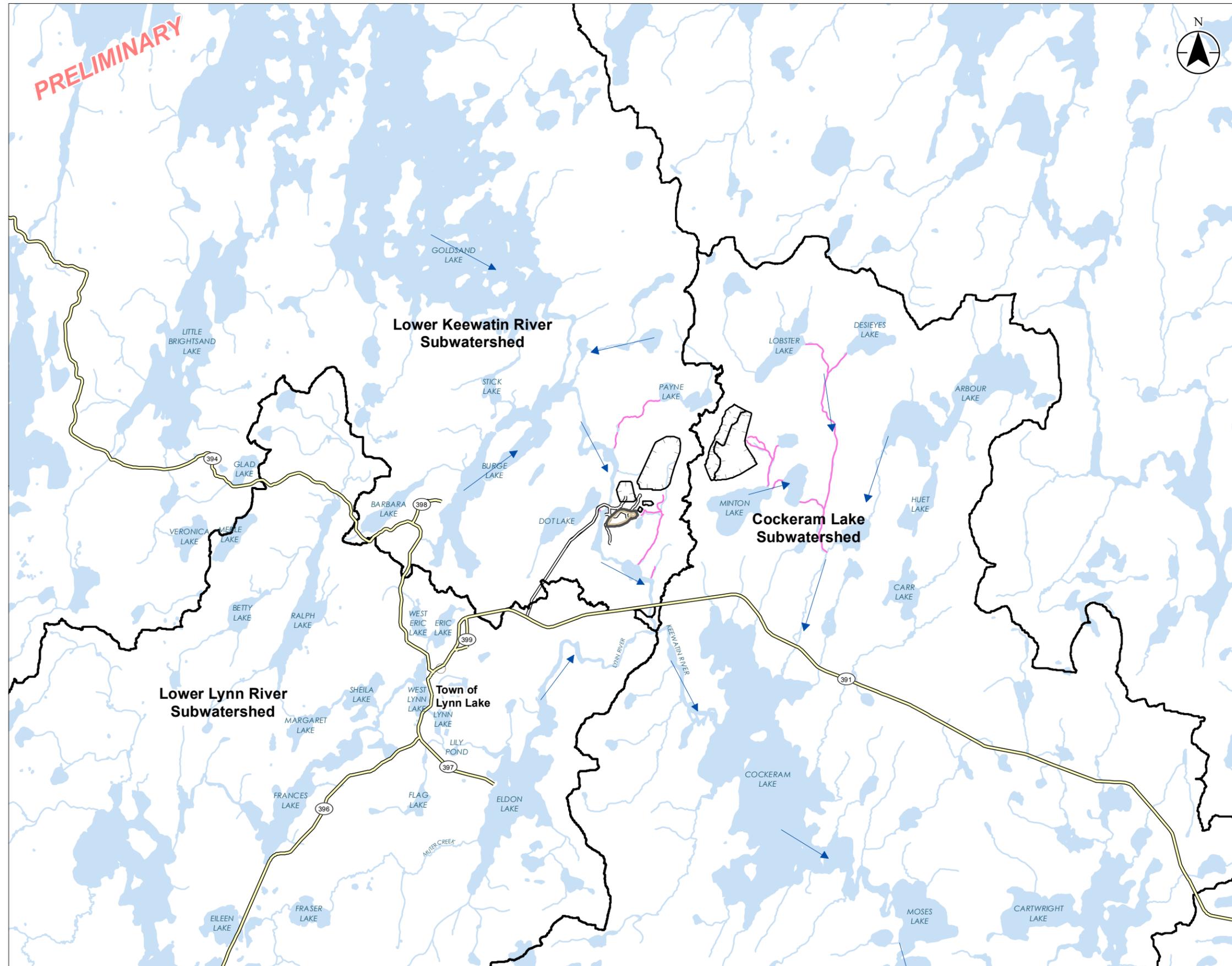
-  Potential Open Pit
-  Potential Infrastructure

**Study Area**

-  Surface Water Flow Direction
-  Fish-bearing Channel
-  Subwatersheds

**Landbase**

-  Existing Access Road
-  Provincial Road
-  Watercourse
-  Waterbody



- Notes**
1. Coordinate System: NAD 1983 UTM Zone 14N
  2. Base features provided by the Government of Manitoba and the Government of Canada.

Project Location	11440362
MacLellan Site	
Lynn Lake, Manitoba	

Prepared by AC on 2017-06-20  
 Technical Review by KM on 2017-06-20

Client/Project

**LYNN LAKE GOLD PROJECT  
PROJECT DESCRIPTION**

Map No.

**9**

Title

**Surface Water Movement and  
Subwatersheds - MacLellan Site**

G:\\_GIS\_Projects\Folder\11440362\Subwatersheds\Map9\_Subwatersheds\_MacLellan\_20170616.mxd Revised: 2017-06-22 By: ccommes@stb

**PRELIMINARY**



**Project Components and Infrastructure**

- |                                    |   |
|------------------------------------|---|
| Potential Project Development Area | Parking                                   |
| Potential Open Pit                 | Diversion Ditch                           |
| Potential Infrastructure           | Fresh Water Pipe                          |
| Building                           | Sewer                                     |
| Collection Pond                    | Potable Water                             |
| Proposed Site Access Road          | Drainage Ditch - Clean water              |
| Drainage Road                      | Drainage Ditch - Potentially Contaminated |
| Construction Temporary Facility    | Drainage Pipe                             |
|                                    | Fire Water                                |

**Site Access**

- |                      |
|----------------------|
| Existing Access Road |
| Provincial Road      |
| First Nation Reserve |
| Waterbody            |
| Watercourse          |

**Notes**

- Coordinate System: NAD 1983 UTM Zone 14N
- Base features provided by the Government of Manitoba and the Government of Canada.

Project Location: Gordon Site, Lynn Lake, Manitoba  
 111473000  
 Prepared by AC on 2017-06-20  
 Technical Review by KM on 2017-06-20

**Client/Project**

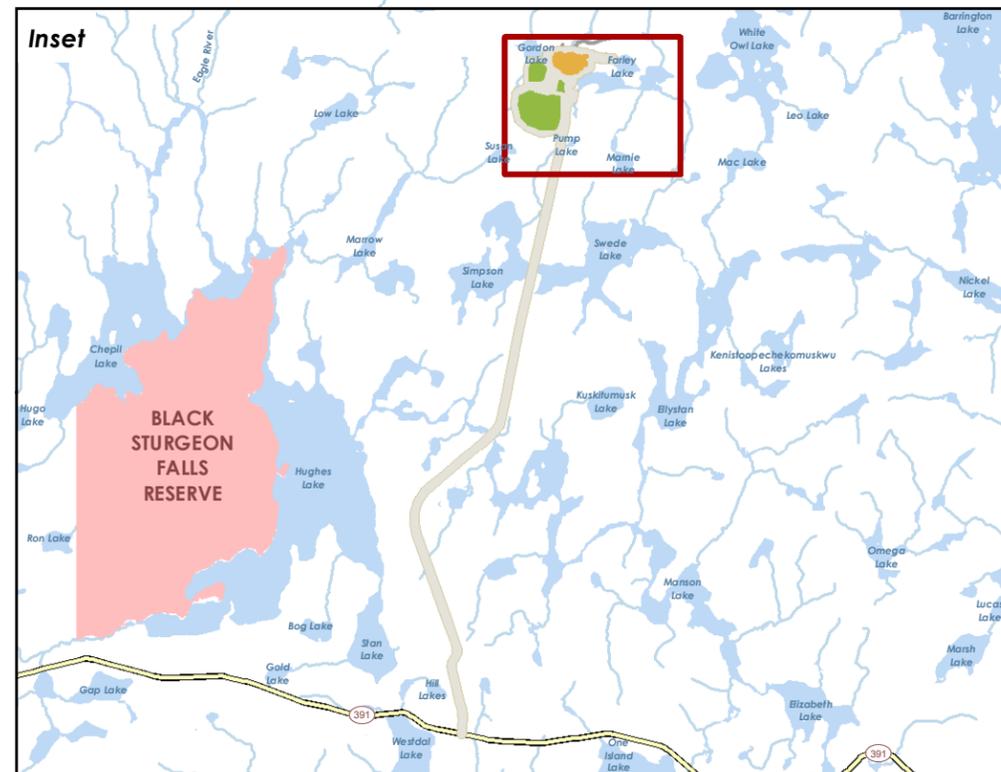
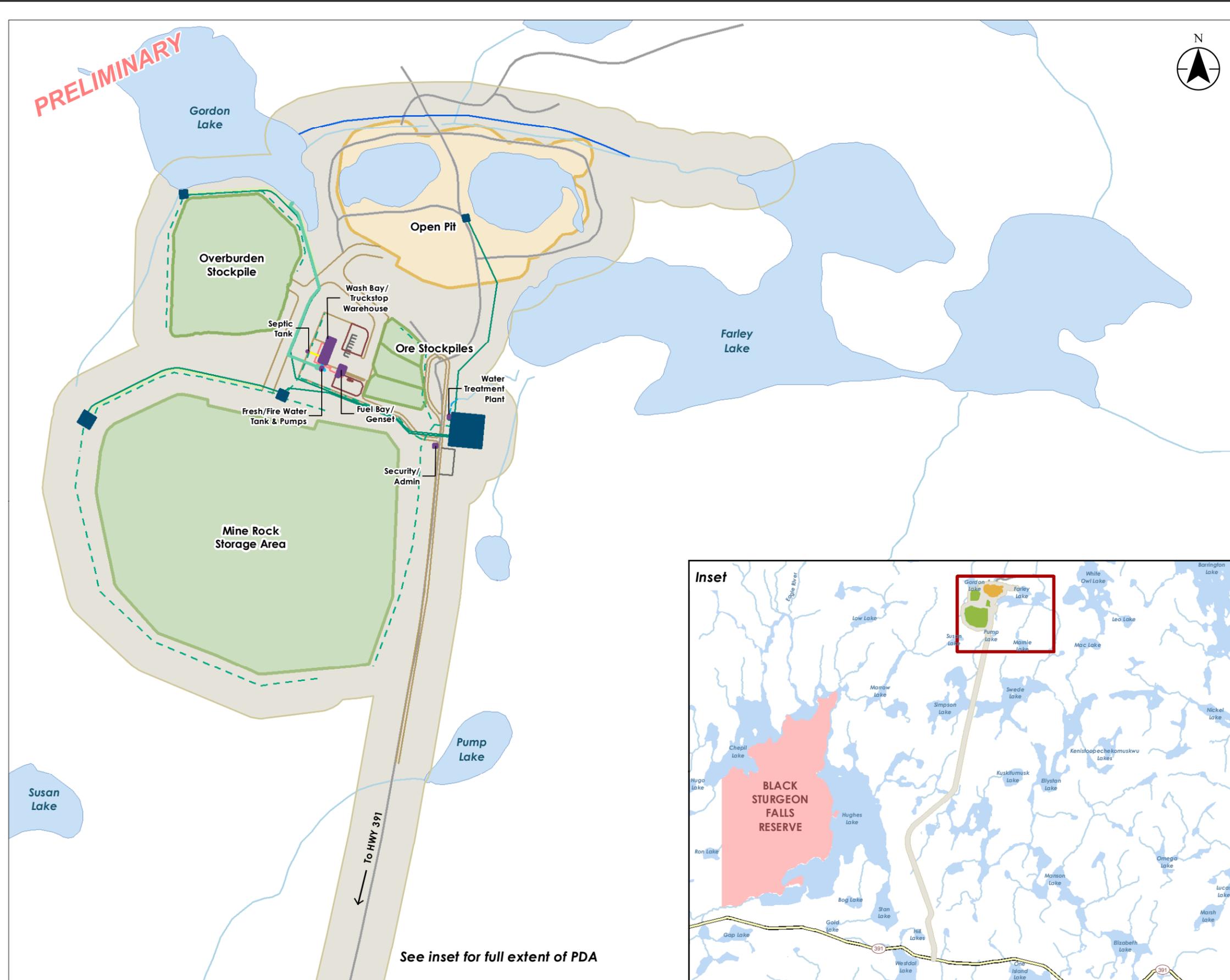
LYNN LAKE GOLD PROJECT  
 PROJECT DESCRIPTION

**Map No.**

**10**

**Title**

**Preliminary General Arrangement of Project Infrastructure - Gordon Site**



See inset for full extent of PDA

**PRELIMINARY**



**Project Components and Infrastructure**

- |                                    |   |
|------------------------------------|---|
| Potential Project Development Area | Potential Borrow Source                   |
| Potential Infrastructure           | Pad and Parking                           |
| Potential Open Pit                 | Drainage Ditch - Potentially Contaminated |
| Construction Temporary Facility    | Drainage Pipe                             |
| Collection Pond                    | Fire Water                                |
| Building                           | Freshwater Pipe                           |
| Infilled Waterbody                 | Pond                                      |
| <b>Site Access</b>                 |   |
| Potential Access Road              | Power Supply                              |
| Water Supply Road                  | Reclaim Pipeline                          |
| Drainage Sumps Access Road         | Sewer                                     |
| <b>Other Infrastructure</b>        |   |
| TMF - Internal Dyke                | Tailings Pipeline                         |
| Construction Temporary Facility    | Water Treatment Pipeline                  |
|                                    | Potable Water                             |

**Landbase**

- Provincial Road
- Existing Access Road
- Waterbody



- Notes**
- Coordinate System: NAD 1983 UTM Zone 14N  
Base features provided by the Government of Manitoba and the Government of Canada.

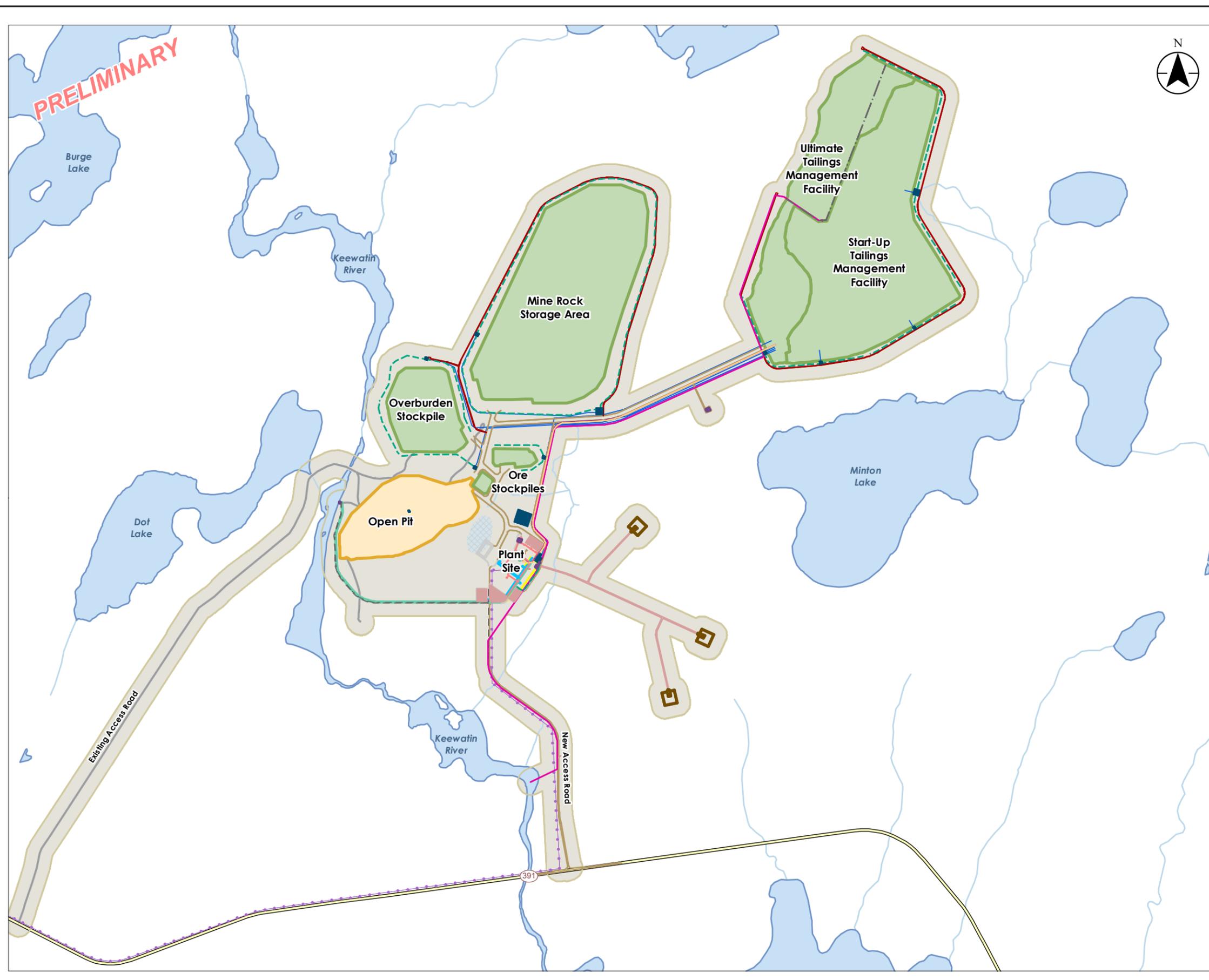
Project Location: MacLellan Site, Lynn Lake, Manitoba  
 111473000  
 Prepared by AC on 2017-06-20  
 Technical Review by KM on 2017-06-20

Client/Project: LYNN LAKE GOLD PROJECT  
 PROJECT DESCRIPTION

Map No.: **11**

Title: **Preliminary General Arrangement of Project Infrastructure - MacLellan Site**

G:\GIS\Project\_Folder\111440293\_Auriferous\Project\_Description\Map11\_PreliminaryDevelopment\_MacLellan\_20170618.mxd, Revised: 2017-06-22 By: ccambabito



**APPENDIX C: TABLES OF SPECIES OF CONSERVATION  
CONCERN WITHIN THE GENERAL PROJECT AREA**

**Table C.1 Plant Species of Conservation Concern with Potential to Occur in the Churchill River Upland Ecoregion<sup>1</sup>**

Common Name	Scientific Name	SARA <sup>2</sup>	COSEWIC <sup>3</sup>	ESEA <sup>4</sup>	MB CDC <sup>5</sup>	Observed in the General Project Area by Tetra Tech (2013)	Observed During Project-specific Baseline Studies (2015-2016)
Arethusa	<i>Arethusa bulbosa</i>	--	--	--	S2	--	--
Spatulate moonwort	<i>Botrychium spathulatum</i>	--	--	--	S1	--	--
Reed grass	<i>Calamagrostis lapponica</i>	--	--	--	S2?	--	--
Long-fruited sedge	<i>Carex michauxiana</i>	--	--	--	S2	--	--
Few-fruited sedge	<i>Carex oligosperma</i>	--	--	--	S3?	--	--
Few-flowered sedge	<i>Carex pauciflora</i>	--	--	--	S3	--	--
Fragrant shield fern	<i>Dryopteris fragrans</i>	--	--	--	S3S4	--	--
Northern oak fern	<i>Gymnocarpium jessoense</i>	--	--	--	S3S4	--	--
Limestone oak fern	<i>Gymnocarpium robertianum</i>	--	--	--	S1	--	--
Quillwort	<i>Isoetes lacustris</i>	--	--	--	S2	✓	--
Moor rush	<i>Juncus stygius</i> var. <i>americanus</i>	--	--	--	S1?	--	--
Wahlenberg's wood-rush	<i>Luzula wahlenbergii</i>	--	--	--	S2?	--	--
Bog adder's-mouth	<i>Malaxis paludosa</i>	--	--	--	S1	--	--
Small water-lily	<i>Nymphaea tetragona</i>	--	--	--	S2	✓	--
Round-leaved bog orchid	<i>Platanthera orbiculata</i>	--	--	--	S3	--	--
Pallas buttercup	<i>Ranunculus pallasii</i>	--	--	--	S2	--	--
White beakrush	<i>Rhynchospora alba</i>	--	--	--	S3?	--	--
Northern woodsia	<i>Woodsia alpina</i>	--	--	--	S1	✓	--
Smooth woodsia	<i>Woodsia glabella</i>	--	--	--	S2	--	--
Oregon cliff fern	<i>Woodsia oregana</i> ssp. <i>cathcartiana</i>	--	--	--	S1	--	--
Shrubby willow	<i>Salix arbusculoides</i>	--	--	--	S3	--	✓
NOTES:							

**Table C.1 Plant Species of Conservation Concern with Potential to Occur in the Churchill River Upland Ecoregion<sup>1</sup>**

Common Name	Scientific Name	SARA <sup>2</sup>	COSEWIC <sup>3</sup>	ESEA <sup>4</sup>	MB CDC <sup>5</sup>	Observed in the General Project Area by Tetra Tech (2013)	Observed During Project-specific Baseline Studies (2015-2016)
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<sup>1</sup> Source: MB CDC 2015  
<sup>2</sup> *Species at Risk Act* Registry (Government of Canada 2016b)  
<sup>3</sup> *Committee on the Status of Endangered Wildlife in Canada* species database (COSEWIC 2016)  
<sup>4</sup> *The Endangered Species and Ecosystems Act* of Manitoba (Government of Manitoba 2016)  
<sup>5</sup> Manitoba Conservation Data Centre rankings (MB CDC 2015) are as follows:  
S = Province-wide status  
1 = Very rare throughout its range or in the province (5 or fewer occurrences. May be very vulnerable to extirpation).  
2 = Rare throughout its range or in the province (6 to 20 occurrences). May be vulnerable to extirpation).  
3 = Uncommon throughout its range or in the province (21 to 100 occurrences).  
S## = Range of uncertainty about the exact rarity of the species.  
B = Breeding status of a migratory species.  
? = Inexact or uncertain

**Table C.1 Wildlife Species of Conservation Concern with Potential to Occur in the General Project Area<sup>1</sup>**

Common Name	Scientific Name	SARA <sup>2</sup>	COSEWIC <sup>3</sup>	ESEA <sup>4</sup>	MB CDC <sup>5</sup>	Observed in the General Project Area by Tetra Tech (2013)	Observed During Project-specific Baseline Studies (2015-2016)
<b>Amphibians</b>							
Northern Leopard Frog	<i>Lithobates pipiens</i>	Special Concern	Special Concern	--	S4	--	--
<b>Mammals</b>							
Little brown myotis	<i>Myotis lucifugus</i>	Endangered	Endangered	Endangered	S2N, S5B	--	✓
Northern myotis	<i>Myotis septentrionalis</i>	Endangered	Endangered	Endangered	S3S4N, S4B	--	--
Wolverine	<i>Gulo gulo</i>	--	Special Concern	--	S3S4	--	✓
Barren ground caribou	<i>Rangifer tarandus groenlandicus</i>	--	Threatened	--	S5N	--	--
Boreal woodland caribou	<i>Rangifer tarandus caribou</i>	Threatened	Threatened	Threatened	S3S4	--	--
<b>Birds</b>							
Trumpeter swan	<i>Cygnus buccinator</i>	--	--	Endangered	S1B	✓	--
Horned grebe	<i>Podiceps auritus</i>	-Special Concern-	Special Concern	--	S4B	--	--
Yellow rail	<i>Coturnicops noveboracensis</i>	Special Concern	Special Concern	--	S2S3B	--	--
Short-eared owl	<i>Asio flammeus</i>	Special Concern	Special Concern	Threatened	S2S3B	--	--
Common nighthawk	<i>Chordeiles minor</i>	Threatened	Threatened	Threatened	S3B	--	✓
Olive-sided flycatcher	<i>Contopus cooperi</i>	Threatened	Threatened	Threatened	S3B	✓	✓
Bank swallow	<i>Riparia riparia</i>	--	Threatened	--	S5B	--	--
Barn swallow	<i>Hirundo rustica</i>	--	Threatened	--	S4B	✓	✓
Rusty blackbird	<i>Euphagus carolinus</i>	Special Concern	Special Concern	--	S4B	✓	--
NOTES:							

**Table C.1 Wildlife Species of Conservation Concern with Potential to Occur in the General Project Area<sup>1</sup>**

Common Name	Scientific Name	SARA <sup>2</sup>	COSEWIC <sup>3</sup>	ESEA <sup>4</sup>	MB CDC <sup>5</sup>	Observed in the General Project Area by Tetra Tech (2013)	Observed During Project-specific Baseline Studies (2015-2016)
<p><sup>1</sup> Source: Environment Canada 2015; Environment Canada 2013; Carey <i>et al.</i> 2003</p> <p><sup>2</sup> <i>Species at Risk Act</i> Registry (Government of Canada 2016b)</p> <p><sup>3</sup> <i>Committee on the Status of Endangered Wildlife in Canada</i> species database (COSEWIC 2016)</p> <p><sup>4</sup> <i>The Endangered Species and Ecosystems Act</i> of Manitoba (Government of Manitoba 2016)</p> <p><sup>5</sup> Manitoba Conservation Data Centre rankings (MB CDC 2015) are as follows:</p> <p>S = Province-wide status</p> <p>1 = Very rare throughout its range or in the province (5 or fewer occurrences. May be very vulnerable to extirpation).</p> <p>2 = Rare throughout its range or in the province (6 to 20 occurrences). May be vulnerable to extirpation).</p> <p>3 = Uncommon throughout its range or in the province (21 to 100 occurrences).</p> <p>S#S# = Range of uncertainty about the exact rarity of the species.</p> <p>B = Breeding status of a migratory species.</p> <p>N = Non-breeding status of a migratory species.</p>							