

# **Lynn Lake Gold Project: Gordon Mine Plan Amendment Notice of Alteration / Notice of Change**

October 6, 2025

Prepared for:



**ALAMOS GOLD INC.**

Prepared by:

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Project/File:

111473084

# Notice of Alteration Form



File No. : 6074.00	Environment Act Licence No. : 3390
Legal name of the Licensee: Alamos Gold Inc.	
Name of the development: Lynn Lake Gold Project Gordon Gold Mine	
Category and Type of development per Classes of Development Regulation: Mining <span style="float: right;">Mines, other than pits and quarries</span>	
Licensee Contact Person: Mr. Colin Webster, Vice President Sustainability & External Affairs Mailing address of the Licensee: Brookfield Place, 181 Bay Street, Suite 3910 City: Toronto <span style="margin-left: 100px;">Province: ON</span> <span style="float: right;">Postal Code: M5J 2T3</span> Phone Number: (416) 770-3483 Fax: <span style="margin-left: 100px;">Email: CWebster@alamosgold.com</span>	
Name of proponent contact person for purposes of the environmental assessment (e.g. consultant): Ms. Karen Mathers, Senior Principal, Stantec Consulting Ltd.	
Phone: (204) 799-6159 Fax:	Mailing address: 500-311 Portage Avenue, Winnipeg MB R3B 2B9
Email address: karen.mathers@stantec.com	
Short Description of Alteration ( <i>max 90 characters</i> ): Change in Project components from the licensed Project	
Alteration fee attached: Yes: <input type="checkbox"/> No: <input checked="" type="checkbox"/>	
If No, please explain:	
Date: October 6, 2025	Signature: <div style="border: 1px solid red; width: 150px; height: 40px; background-color: black; display: inline-block;"></div> Printed name: Colin Webster
<p>A complete Notice of Alteration (<b>NoA</b>) consists of the following components:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> <b>Cover letter</b></li> <li><input checked="" type="checkbox"/> <b>Notice of Alteration Form</b></li> <li><input checked="" type="checkbox"/> <b>1 electronic copy of the NoA detailed report</b> (see "<a href="#">Information Bulletin - Alteration to Developments with Environment Act Licences</a>")</li> <li><input checked="" type="checkbox"/> <b>\$500 Application fee, if applicable</b> (Cheque, payable to the Minister of Finance)</li> </ul>	
<p><b>Submit the complete NoA to:</b>                  Director, Environmental Approvals Branch                  Environment and Climate Change                  Box 35, 14 Fultz Blvd                  Winnipeg MB R3Y 0L6  <a href="mailto:EABDirector@gov.mb.ca">EABDirector@gov.mb.ca</a>  <b>For more information:</b>                  Toll-Free: 1-800-282-8069                  Phone: 204-945-8321 Fax: 204-945-5229  <a href="https://www.gov.mb.ca/sd/permits_licenses_approvals/eal/licence/index.html">https://www.gov.mb.ca/sd/permits_licenses_approvals/eal/licence/index.html</a></p>	
<p><b>Note: Per Section 14(3) of the Environment Act, Major Notices of Alteration must be filed through submission of an <a href="#">Environment Act Proposal Form</a> (see "<a href="#">Information Bulletin – Environment Act Proposal Report Guidelines</a>")</b></p>	

## Executive Summary

As part of the Lynn Lake Gold Project (the Project), Alamos Gold Inc. (Alamos; 'the proponent') plans to operate the Gordon Gold Mine, (hereinafter referred to as the 'Gordon site') near the Town of Lynn Lake in northern Manitoba. The Gordon site is regulated under *Environment Act* Licence No. 3390 and the conditions stipulated therein (March 6, 2023) and a Decision Statement issued under the *Canadian Environmental Assessment Act, 2012* as documented by the Impact Assessment Agency of Canada (IAAC), dated March 5, 2023. The Decision Statement outlines conditions in relation to environmental effects that Alamos must comply with.

This Notice of Alteration (NOA)/Notice of Change (NOC) request has been prepared by Stantec Consulting Ltd. (Stantec) on behalf of Alamos and is submitted to both:

- Manitoba Environment and Climate Change (MECC) in support of a request for a NOA to Licence No. 3390. The Gordon site is considered a Class 2 Development under the Classes of Development Regulation (MR 164/88); and
- The IAAC to notify it of the change and request an amended Decision Statement in relation to the Lynn Lake Gold Project through submission of a NOC in accordance with conditions 2.16 and 2.17 of the federal Decision Statement.

Alamos understands that the above-noted approvals are required from both regulatory authorities prior to proceeding. This report documents the relevant portions of the currently licensed Gordon site, the proposed alterations, the potential environmental effects and planned mitigation measures associated with the proposed alterations, and description of any changes to the characterization of residual effects from what was presented in the Environmental Impact Statement (EIS; Stantec 2020a) and Environment Act Proposal (EAP) Report for the Gordon site (Stantec 2020b). The works proposed are instrumental to the planned construction works and future operation of the Gordon site.

The proposed alterations encompasses a small increase to the mine tonnage (approximately 12%, due to a lower cutoff grade and adjustment to the open pit footprint) and modifications to the approved Gordon site layout, inclusive of the adjustment of footprints of several of the Project components, the removal of the development of the planned diversion ditch (no longer required), and the addition of one new Project component. The components that have been modified through engineering detailed design since the Project was approved include the mine rock storage area (MRSA), facility area (including buildings), ore and overburden stockpiles, and water management structures (sumps, collections ponds, discharge pipeline). The new Project component is the historical non-acid generating MRSA to the north of the open pit, proposed to be used as a source of construction borrow material (borrow source).

In accordance with the EIS and the EAP Report, the Project Development Area (PDA), encompasses the immediate area in which Project activities and components occur plus a buffer (between 30 and 50 metre [m], depending on the area) and is the anticipated area of direct physical disturbance associated with the construction and operation of the Project. Overall, the revised Gordon PDA (291.2 hectares [ha]) is slightly larger than what was assessed in the EIS by 21.8 ha (269.4 ha).



The approved EIS and EAP Report included assessments completed to meet regulatory requirements, including assessing project-specific environmental effects. The assessments focused on valued components (VCs), which are environmental components of certain value or interest to regulators, Indigenous Nations, and other parties and were identified based on the biophysical and socio-economic elements that would potentially be affected by the Project, including at the Gordon site. Biophysical and socio-economic VCs that could be affected through interactions of the environment and the proposed alterations were identified to scope the assessment. The rationale for selecting each VC and potential general interactions between the proposed alteration and the VCs remain as originally described in the EIS prepared for the Project (i.e., Gordon and MacLellan sites) and the EAP Report for the approved Gordon site. The VCs that were assessed as part of the EIS and EAP Report, are assessed as part of this NOA/NOC. The Project activities and components that are proposed to be altered as part of this NOA/NOC that may interact with the VCs are identified in the respective VC sections.

Potential interactions of the proposed alterations and the environment were evaluated with likely interactions examined to assess residual effects on the assumption of typical mitigation measures representative of best practices and previous construction methods employed at the Gordon site.

Based on information available to date and as presented in this NOA/NOC, residual effects of the proposed alterations are characterized using the same approach as presented in the EIS (Stantec 2020a) and the EAP Report (Stantec 2020b) for the following VCs:

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



*\*The proposed alterations will not result in additional adverse effects on vegetation and wetlands at the Gordon site and there is no change to the EIS (Stantec 2020a) and the EAP Report (Stantec 2020b) conclusions for vegetation and wetlands, however, the vegetation and wetlands LAA has changed from what was presented in the EIS and EAP Report because of groundwater drawdown and changes in the PDA. The vegetation and wetlands LAA is based on a 100 m buffer around the furthest expected groundwater drawdown contour, a 1 km buffer around the updated NOA/NOC PDA extent, and also a 1 km buffer around the PR 391 highway. The changes decrease the vegetation and wetlands LAA by 123.5 ha from that presented in the EIS and EAP Report.*

Based on information available to date and as presented in this NOA/NOC, residual effects characterizations in this NOA/NOC differ from the residual effects characterizations presented in the EIS (Stantec 2020a) and the EAP Report (Stantec 2020b) for the following VCs:

- Surface Water
- Fish and Fish Habitat

Results of the updated surface water balance model do not change the characterization of residual effects to surface water quantity (i.e., stream flows and lake levels) from those presented in the EIS. However, results of the updated surface water quality model do change the characterization of residual effects to surface water quality from those presented in the EIS. This is because of updates to the groundwater and surface water quality models that address the proposed alterations to the Gordon site for this NOA/NOC and the use of more stringent Federal Environmental Quality Guidelines (FEQGs; total iron only) resulted in changes to the magnitude and frequency of guideline exceedances, the location and timing of guideline exceedances, and two new parameters of potential concern (POPCs) compared with the EIS. With the exception of the following differences, the characterization of residual effects to surface water quality for this NOA/NOC are the same as the EIS.

- Negligible magnitude residual effects to surface water quality are predicted to occur in Gordon Lake, West Farley Lake, and East Farley Lake during construction in consideration of the proposed alterations. This is because, with the change to pump water in the existing pit lakes (East and Wendy pits) to the Hughes River instead of Farley Lake, there are no parameters predicted to exceed baseline concentrations by more than 20% and any provincial or federal water quality guideline in Gordon Lake, West Farley Lake, or East Farley Lake during construction.
- Moderate magnitude residual effects to surface water quality are predicted to occur during operation in consideration of the proposed alterations. This is because maximum nitrite concentrations are predicted to exceed baseline concentrations by more than 20% and the Canadian Water Quality Guidelines for Protection of Freshwater Aquatic Life (CWQG-FAL) in West Farley Lake during operation, but adverse effects to fish and other aquatic biota in West Farley Lake are not expected to occur because the assumptions used to predict nitrite concentrations in West Farley Lake are conservative and because the predicted nitrite concentrations are below the sub-lethal effect concentrations for the most abundant fish and benthic invertebrate species present in West Farley Lake.



- Moderate magnitude residual effects to surface water quality are predicted to occur during the decommissioning/closure phase in consideration of the proposed alterations. This is because total iron concentrations are predicted to exceed baseline concentrations by more than 20% and the FEQG for total iron in Gordon Lake during closure, but adverse effects to fish and other aquatic biota in Gordon Lake are not expected to occur because the surface water quality model did not account for any reduction in total iron concentrations resulting from aeration of groundwater prior to pumping to Gordon Lake and because high dissolved organic carbon (DOC) concentrations in Gordon Lake are expected to attenuate sub-lethal toxicological effects to fish and other aquatic biota. The duration of the residual effect to surface water quality during decommissioning/closure is long-term because total iron concentrations are predicted to remain elevated in perpetuity in Gordon Lake post-closure.

Changes to the approved Gordon site and changes to the updated surface water quality model change the characterization of residual effects to fish habitat at the Gordon site. Due to the smaller changes in flow predicted in Farley Creek during construction and operation for this NOA/NOC, and because the flow reductions now predicted to occur in Farley Creek during decommissioning/closure are relatively small compared with the volume of water within the wetted channel of Farley Creek at any time, the magnitude of residual effects to fish habitat at the Gordon site is expected to be moderate (i.e., a measurable change in habitat area, monthly flows or lake surface area that is greater than the range of natural variability, but that does not affect the ability of fish to use the habitat to carry out one or more of their life processes).

Changes to the approved Gordon site and changes to the updated surface water quality model change the characterization of residual effects to fish health, growth, or survival at the Gordon site. Like in the EIS, fluoride and total phosphorus are also predicted to be POPCs in Gordon and Farley lakes for this NOA/NOC, but it is the identification of total iron as a POPC in Gordon Lake during closure and post-closure and nitrite as a POPC in Farley Lake during operation that has resulted in a change in the characterization of residual effects to fish health, growth, or survival for this NOA/NOC. If modelled water quality predictions in Gordon and Farley lakes are proven accurate by the Surface Water Management and Monitoring Plan (SWMMP) and no other mitigation measures are implemented, the magnitude of residual effects on fish health, growth, or survival would be expected to be moderate (i.e., a measurable change in the abundance, structure, or health metrics in focal fish populations that is greater than the range of natural variability but not large enough to affect the productivity of the focal fish populations). The geographic extent, duration, timing, frequency, reversibility, and ecological context of the residual effects on fish health, growth, or survival would be expected to remain unchanged from the EIS (i.e., local, long-term, applicable, multiple regular event, irreversible, and resilient, respectively).

Overall, the proposed alterations described in this NOA/NOC are not substantial, and changes to the characterization of residual effects are limited. All changes are either fully captured and mitigated under the existing management and monitoring plans or reflect removals (i.e., such as the elimination of the diversion channel) rather than additions. As such, while these changes may warrant administrative updates to the federal Decision Statement and the provincial Environment Act Licence No. 3390, they do not result in new or unmitigated impacts and therefore would not require additional conditions or changes to existing conditions requiring additional requirements.



Alamos remains committed to developing and operating the Project inclusive of the proposed alterations in a manner that provides environmental protection for VCs and long-term benefits for the region. The additional mitigation measures identified in Section 3.3, which are beyond those identified in the EIS (Stantec 2020a) and the EAP Report (Stantec 2020b) will be incorporated (change from Version 0 to Version 1) into the applicable Management and Monitoring Plans, which are living documents following approval of this NOA/NOC.

A draft of this NOA/NOC was shared to all Indigenous Nations involved in the Project. This NOA/NOC was also discussed with the Indigenous Nations participating in the Environmental Advisory Committee. No feedback has been received to date. If any feedback is received, Alamos will address it with the respective Indigenous Nation(s) and share this information with the Province and IAAC.



# Table of Contents

<b>Notice of Alteration Form</b> .....	<b>i</b>
<b>Executive Summary</b> .....	<b>ii</b>
<b>Acronyms / Abbreviations</b> .....	<b>x</b>
<b>1 Introduction</b> .....	<b>1</b>
1.1 Alteration Overview .....	1
1.2 The Proponent .....	2
1.3 Land Ownership and Mineral Rights.....	3
1.3.1 Existing Land Use .....	3
1.4 Previous Reports and Supporting Studies .....	3
1.5 Scope of the Assessment .....	4
1.5.1 Spatial and Temporal Boundaries .....	4
1.5.2 Assessment Approach .....	5
1.6 Engagement.....	5
1.7 Funding .....	7
<b>2 Alteration Description</b> .....	<b>8</b>
2.1 Purpose and Rationale.....	8
2.2 Existing Conditions.....	8
2.3 Proposed Alteration.....	8
2.4 Alteration Schedule .....	10
<b>3 Environmental Effects and Mitigation</b> .....	<b>11</b>
3.1 Project Interactions and Valued Components .....	11
3.2 Residual Effects Criteria.....	11
3.3 Assessment of Environmental Effects .....	12
3.3.1 Atmospheric Environment.....	12
3.3.2 Noise and Vibration.....	20
3.3.3 Groundwater .....	27
3.3.4 Surface Water .....	42
3.3.5 Fish and Fish Habitat .....	94
3.3.6 Vegetation and Wetlands .....	119
3.3.7 Wildlife and Wildlife Habitat .....	127
3.3.8 Labour and Economy .....	130
3.3.9 Community Services, Infrastructure, and Wellbeing.....	132
3.3.10 Land and Resource Use .....	134
3.3.11 Heritage Resources .....	137
3.3.12 Current Use of Lands and Resources for Traditional Purposes by Indigenous Peoples .....	139
3.3.13 Human Health .....	145
3.3.14 Indigenous Peoples .....	161
<b>4 Conclusion</b> .....	<b>171</b>
<b>5 References</b> .....	<b>175</b>



## List of Tables

Table 1.1	Valued Component Considered in the Environmental Impact Statement and Environmental Act Proposal Report .....	5
Table 1.2	Environmental Advisory Committee Meeting Details .....	6
Table 2.1	Gordon Site Feature Footprint Layout Changes .....	9
Table 2.2	Gordon Site Project Development Area Changes.....	9
Table 3.1	Definition of Terms Used to Characterize Residual Environmental Effects .....	11
Table 3.2	Applicable Guideline Criteria for Air Quality .....	14
Table 3.3	Comparison of Noise Effects – Gordon Site.....	24
Table 3.4	Comparison of Vibration Effects – Gordon Site .....	26
Table 3.5	Estimated Groundwater Discharge to Surface Water Features .....	34
Table 3.6	Predicted Groundwater Discharge Rates from Mine Rock Storage Areas and Ore Storage Areas to Receiving Environment. ....	39
Table 3.7	Simulated Average Monthly and Annual Streamflows at Model Node QF01.....	50
Table 3.8	Simulated Average Monthly and Annual Streamflows at Model Node QF02.....	51
Table 3.9	Simulated Average Monthly and Annual Streamflows at Model Node QF03.....	52
Table 3.10	Simulated Average Monthly and Annual Streamflows at Model Node QF05.....	53
Table 3.11	Simulated Average Monthly and Annual Streamflows at Model Node QF06.....	54
Table 3.12	Simulated Average Monthly and Annual Streamflows at Model Node QF07.....	55
Table 3.13	Simulated Average Monthly and Annual Streamflows at Model Node QF08.....	56
Table 3.14	Simulated Average Monthly and Annual Streamflows at Model Node Susan Outflow .....	57
Table 3.15	Simulated Average Monthly and Annual Streamflows at Model Node Hughes-us .....	58
Table 3.16	Simulated Average Monthly and Annual Streamflows at Model Node Hughes-mid .....	59
Table 3.17	Simulated Average Monthly and Annual Streamflows at Model Node Hughes-ds .....	60
Table 3.18	Simulated Average Monthly and Annual Water Levels at Gordon Lake .....	61
Table 3.19	Simulated Average Monthly and Annual Water Levels at Farley Lake .....	62
Table 3.20	Simulated Average Monthly and Annual Water Levels at Simpson Lake .....	63
Table 3.21	Simulated Average Monthly and Annual Water Levels at Swede Lake .....	64
Table 3.22	Simulated Average Monthly and Annual Water Levels at Ellystan Lake .....	65
Table 3.23	Comparison of Updated Water Balance Model Results with EIS Results – Monthly Streamflows .....	70
Table 3.24	Comparison of Updated Water Balance Model Results with EIS Results – Monthly Lake Levels .....	72
Table 3.25	Gordon Site Assessment Nodes .....	74
Table 3.26	Comparison of Parameters of Potential Concern Predicted in Receiving Environment at the Gordon Site for the Expected Case Between the EIS Model and Updated Model .....	79
Table 3.27	Predicted Fluoride Concentrations, by Phase, at Gordon Site Model Nodes Associated with Exceedances of Screening Criteria for the Expected and Upper-Case Scenarios .....	81
Table 3.28	Predicted Total Iron Concentrations, by Phase, at the Gordon Site Model Nodes Associated with Exceedances of Screening Criteria for the Expected and Upper-Case Scenarios .....	82
Table 3.29	Predicted Nitrite Concentrations, by Phase, at the Gordon Site Model Nodes Associated with Exceedances of Screening Criteria for the Expected and Upper-Case Scenarios .....	83
Table 3.30	Predicted Total Phosphorus Concentrations, by Phase, at the Gordon Site Model Nodes Associated with Exceedances of Screening Criteria for the Expected and Upper-Case Scenarios .....	84
Table 3.31	Comparison of Percentage Monthly and Annual Flow Changes in Farley Creek Between the Environmental Impact Statement and the Notice of Alteration/Notice of Change .....	110



Table 3.32	Land Cover Classes in the Gordon PDA and LAA.....	123
Table 3.33	Wetlands Potentially Affected by Groundwater Drawdown during Construction and Operation in the LAA.....	124
Table 3.34	Modelled Maximum Ground-level Concentrations from Gordon Site Operation.....	151
Table 3.35	Maximum Human Health Risks Associated with Inhalation Exposures from Gordon Site Operation.....	152
Table 3.36	Receptor Locations where Concentration Ratios of NO <sub>2</sub> Are Greater than Benchmark (CR > 1.0).....	153
Table 3.37	Receptor Locations where Concentration Ratios of Particulate Matter Are Greater than Benchmark (CR > 1.0).....	154
Table 3.38	Comparison of Surface Water Concentration to Drinking Water Guidelines .....	157
Table 3.39	Changes in Model Concentrations at Swede Lake – Project Case .....	159
Table 3.40	Indigenous Health Conditions Effect Pathways .....	166
Table 3.41	Indigenous Socio-Economic Conditions Effect Pathways.....	167
Table 3.42	Indigenous Physical and Cultural Heritage Effects Pathways.....	168

## List of Figures

Figure 3.1	Water Balance and Water Quality Model Nodes.....	49
Figure 3.2	Conceptual Site Model for the Human Health Risk Assessment .....	149

## List of Appendices

### Appendix A Maps

Map 1	General Location of Gordon Site
Map 2	NOA Footprint Files - Gordon site
Map 3	EIS Footprint (PDA) - Gordon site
Map 4	Area of Potential Indirect Wetland Affects from Groundwater Drawdown - Gordon Site

### Appendix B Summary of Light Modelling Results for the Lynn Lake Gold Project Revised 2023 Mine Design

### Appendix C Summary of Air Dispersion Model Results for the Lynn Lake Gold Project Revised 2023 Mine Design

### Appendix D Lynn Lake Gold Project – Noise and Vibration Impact Assessment Update

### Appendix E Groundwater Gordon Site – Groundwater Model Report

### Appendix F Lynn Lake Gold Project: Gordon Water Balance and Water Quality Model Update for the Notice of Alteration / Notice of Change

### Appendix G Surface Water Quality Figures



## Acronyms / Abbreviations

°C	degrees Celsius
%	percent
%HA	percent highly annoyed
<	less than
>	greater than
≤	less than or equal to
µg/m <sup>3</sup>	microgram per cubic metre
AAQC	Ambient Air Quality Criteria
AEMP	Aquatic Effects Monitoring Plan
Alamos; 'the proponent'	Alamos Gold Inc.
ANFO	ammonium-nitrate fuel oil
AQMMP	Air Quality Management and Monitoring Plan
BC MOE	British Columbia Ministry of Environment
BMP	Best Management Practice
CAAQS	Canadian Ambient Air Quality Standards
CAC	criteria air contaminants
Carlisle	Carlisle Goldfields Limited
CCME	Canadian Council of Ministers of the Environment
CEMI	Centre for Excellence in Mining Innovation
CCREM	Canadian Council of Resource and Environment Ministers
CEA Agency	Canadian Environmental Assessment Agency
CEAA 2012	<i>Canadian Environmental Assessment Act, 2012</i>
CEMI	Centre for Excellence in Mining Innovation
CFIA	Canadian Food Inspection Agency
CO	carbon monoxide
COPC	chemical of potential concern
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CR	concentration ratio
CSM	conceptual site model



**Lynn Lake Gold Project: Gordon Mine Plan Amendment Notice of Alteration / Notice of Change**

Acronyms / Abbreviations

October 6, 2025

CWQG-FAL	Canadian Water Quality Guidelines for Protection of Freshwater Aquatic Life
d/y	days per year
dB	decibel
dBA	A-weighted decibel
dBL	linear decibel
DFO	Fisheries and Oceans Canada
DOC	dissolved organic carbon
DPM	diesel particulate matter
EA	environmental assessment
EAC	Environmental Advisory Committee
EAP	Environment Act Proposal
ECCC	Environment and Climate Change Canada
EEM	environmental effects monitoring
EIS	Environmental Impact Statement
ESEA	<i>Endangered Species and Ecosystems Act</i>
FDS	final discharge point
FEQG	Federal Environmental Quality Guidelines
FTA	Federal Transit Administration
g/m <sup>2</sup>	grams per square metre
g/m <sup>2</sup> /30-day	grams per square metre per 30-day period
GCDWQ	Guidelines for Canadian Drinking Water Quality
GDP	gross domestic product
GHG	greenhouse gas
GMMP	Groundwater Management and Monitoring Plan
Gordon site	Gordon Gold Mine
h/y	hour per year
ha	hectare
HADD	harmful alteration, disruption, or destruction
HC <sub>5</sub>	hazardous concentration
HCN	hydrogen cyanide
HCRPP	Heritage and Cultural Resources Protection Plan
HH	human health



## Lynn Lake Gold Project: Gordon Mine Plan Amendment Notice of Alteration / Notice of Change

Acronyms / Abbreviations

October 6, 2025

HHRA	human health risk assessment
HQ	hazard quotient
HRB	Historic Resources Branch
HRIA	Heritage Resource Impact Assessment
Hz	Hertz
IAAC	Impact Assessment Agency of Canada
IBA	Impact Benefit Agreement
in/s	inch per second
IR	Information Request
kg	kilogram
km	kilometre
km/h	kilometres per hour
km <sup>2</sup>	square kilometre
L/s	litres per second
LAA	Local Assessment Area
L <sub>d</sub>	daytime equivalent sound level
L <sub>dn</sub>	day-night average sound level
L <sub>eq</sub>	equivalent sound level
L <sub>n</sub>	nighttime equivalent sound level
LFN	low frequency noise
LLGP, the Project	Lynn Lake Gold Project
m	metre
m/s	metres per second
m <sup>3</sup> /d	cubic metres per day
m <sup>3</sup> /s	cubic metres per second
MacLellan site	MacLellan Gold Mine
MAD	mean annual discharge
MB CDC	Manitoba Conservation Data Centre
MDMER	Metal and Diamond Mining Effluent Regulation
MECC	Manitoba Environment and Climate Change
MECP	Manitoba Environment, Climate and Parks
mg/L	milligram per litre



MHHL	Manitoba Health and Healthy Living
MHSAL	Manitoba Health Seniors and Active Living
MINR	Manitoba's Department of Indigenous and Northern Relations
mm	millimetre
mm/s	millimetre per second
MNL	mitigation noise level
MRSA	mine rock storage area
ms	milliseconds
MSD	Manitoba Sustainable Development
Mt	million tonne(s)
MWQSOG	Manitoba Water Quality Standards, Objectives, and Guidelines
MWQSOG-FAL	Manitoba Water Quality Standards, Objectives, and Guidelines for Protection of Freshwater Aquatic Life
NO	nitrous oxide
NO <sub>2</sub>	nitrogen dioxide
NOA	Notice of Alteration
NOC	Notice of Change
OEHHA	Office of Environmental Health Hazard Assessment
OMECP	Ontario Ministry of Environment, Conservation, and Parks
OSA	ore storage area
PAH	polycyclic aromatic hydrocarbon
PDA	Project Development Area
PM <sub>10</sub>	particulate matter less than 10 microns
PM <sub>2.5</sub>	particulate matter less than 2.5 microns
POPC	parameter of potential concern
ppb	parts per billion
PPV	peak particle velocity
PR	Provincial Road
RAA	Regional Assessment Area
rms	root mean square
SAR	species at risk
SARA	<i>Species at Risk Act</i>



SO <sub>2</sub>	sulphur dioxide
SOCC	Species of Conservation Concern
SSD	Species Sensitivity Distribution
Stantec	Stantec Consulting Ltd.
SWMMP	Surface Water Management and Monitoring Plan
the Project	Lynn Lake Gold Project
TIA	Tailings Impoundment Areas
TK	traditional knowledge
TMR	technical modelling report
TRV	toxicological reference values
TSP	total suspended particulate
TSS	total suspended solids
UCLM	upper confidence limit of the mean
US EPA	United States Environmental Protection Agency
VC	valued component
VdB	Vibration Velocity in Decibel Scale
VOC	volatile organic compounds
VWMP	Vegetation and Weed Management Plan
WHO	World Health Organization



# 1 Introduction

## 1.1 Alteration Overview

As part of the Lynn Lake Gold Project (the Project), Alamos Gold Inc. (Alamos; ‘the proponent’) plans to operate the Gordon Gold Mine, (hereinafter referred to as the ‘Gordon site’) near the Town of Lynn Lake in northern Manitoba (Map 1, Appendix A). Alamos is seeking approval to proceed with proposed alterations to the approved Gordon site. The proposed alterations include modifications to the open pit, mine rock storage area (MRSA), ore and overburden stockpiles, facility area (including buildings), and water management structures (i.e., sumps, collections ponds, discharge pipeline). The proposed alterations also include the addition of the historical non-acid generating MRSA, which will be used as a construction borrow source, and the removal of the previously planned adjustments to the diversion ditch, which is no longer required. The proposed alterations are further described in Section 2.

The Gordon site is regulated under *Environment Act* Licence No. 3390 and the conditions stipulated therein (March 6, 2023) and a Decision Statement issued under the *Canadian Environmental Assessment Act, 2012* as documented by the Impact Assessment Agency of Canada (IAAC), dated March 5, 2023. The Decision Statement outlines conditions in relation to environmental effects that Alamos must comply with.

Provincially, Section 14(1) of *The Environment Act* requires a proponent to notify the Director (for Class 1 and 2 developments) if the proponent intends to alter a licensed development so that it no longer conforms to licence conditions or has the potential to change the environmental effects (Manitoba Environment, Climate and Parks (MECP 2022; now Manitoba Environment and Climate Change [MECC]). The key consideration for assessing a proposed alteration and preparing and submitting a Notice of Alteration (NOA) from what was assessed in the environmental assessment (EA) phase is the significance of the environmental and human health effects as a result of the proposed alteration and whether there is sufficient detail to allow the Director to determine whether the effects of the proposed alteration are significant, insignificant, or nonexistent (MECP 2022).

Federally, per the following Decision Statement conditions, Alamos is required to prepare and submit a Notice of Change (NOC) to IAAC for the proposed alteration (as a separate parallel filing):

### *Change to the Designated Project*

*2.16 If the Proponent is proposing to carry out the Designated Project in a manner other than described in condition 1.8, the Proponent shall notify the Agency in writing in advance of carrying out those proposed activities. As part of the notification, the Proponent shall provide:*

*2.16.1 a description of the proposed change(s) to the Designated Project and the environmental effects that may result from the change(s);*

*2.16.2 any modified or additional measure to mitigate any environmental effect that may result from the change(s) and any modified or additional follow-up requirement; and*



*2.16.3 an explanation of how, taking into account any modified or additional mitigation measure referred to in condition 2.16.2, the environmental effects that may result from the change(s) may differ from the environmental effects of the Designated Project identified during the environmental assessment.*

*2.17 The Proponent shall submit to the Agency any additional information required by the Agency about the proposed change(s) referred to in condition 2.16, which may include the results of consultation with Indigenous groups and relevant authorities on the proposed change(s) and environmental effects referred to in condition 2.16.1 and the modified or additional mitigation measures and follow-up requirements referred to in condition 2.16.2.*

This NOA/NOC request has been prepared by Stantec Consulting Ltd. (Stantec) on behalf of Alamos and is submitted to both:

- MECC in support of a request for a NOA to Licence No. 3390. The Gordon site is considered a Class 2 Development under the Classes of Development Regulation (MR 164/88); and
- The IAAC to notify it of the change and request an amended Decision Statement in relation to the Lynn Lake Gold Project through submission of a NOC.

Alamos understands that the above-noted approvals are required from both regulatory authorities prior to proceeding.

This NOA/NOC report (the report) documents the relevant portions of the currently licensed Gordon site, the proposed alterations, and the potential environmental effects and planned mitigation measures associated with the proposed alterations. The works proposed will be instrumental to the planned construction works and future operation of the Gordon site. Important to note is that while construction of the Lynn Lake Gold Project commenced in February 2025, no work has been undertaken at the Gordon site at this time. Construction of the Gordon Gold Mine in relation to *Environment Act* Licence No. 3390 and the federal Decision Statement is anticipated to begin in January 2026.

## **1.2 The Proponent**

For the purposes of development licensing, the proponent is Alamos. For further information regarding the Gordon site please contact the following:

Mr. Colin Webster  
Vice President Sustainability & External Affairs  
Alamos Gold Inc.  
Brookfield Place, 181 Bay Street, Suite 3910  
Toronto, ON M5J 2T3  
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This NOA/NOC request was prepared by Stantec Consulting Ltd (Stantec). The local contact is: Ms. Karen Mathers, M.Sc., P.Geo. FGC, PMP.

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## **1.3 Land Ownership and Mineral Rights**

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

Alamos is the current holder of the rights to those historical mining claims and mineral leases. Since approval of the Lynn Lake Gold Project (LLGP) in March 2023, Alamos has transferred further relevant mineral claims to leases at the Gordon site.

### **1.3.1 Existing Land Use**

The Gordon site formerly operated as a two-pit open pit gold mine between 1996 and 1999. After closure in 1999, the Gordon site underwent a reclamation process and currently continues to consist of a 15-kilometres (km) gravel access road, a bridge across the Hughes River on the access road, two MRSAs and two overburden storage areas that have been capped, and two water-filled open pits. All buildings and above-ground infrastructure have been removed. The present-day condition of the Gordon site is as described in the Environmental Impact Statement (EIS; Stantec 2020a) and the Environment Act Proposal (EAP) Report for the Gordon site (Stantec 2020b) as no construction activities have commenced and there have been no other changes to the Gordon site. Construction of the Gordon Gold Mine in relation to *Environment Act* Licence No. 3390 and the federal Decision Statement is anticipated to begin in January 2026. No work will be conducted in areas outside the current approved PDA until this NOA/NOC is approved.

## **1.4 Previous Reports and Supporting Studies**

The Project (including the Gordon and MacLellan sites) was subject to an EA prepared under *The Environment Act* as well as the *Canadian Environmental Assessment Act, 2012*. An EIS for the Lynn Lake Gold Project (Stantec 2020a) and an EAP Report for the Gordon site (Stantec 2020b) were prepared. The Environmental Approvals Branch of MECC issued a licence for the Gordon site (Licence No. 3390) on March 6, 2023. A federal Decision Statement was also issued for the Project (Gordon and MacLellan sites) subject to conditions on March 5, 2023.



## 1.5 Scope of the Assessment

### 1.5.1 Spatial and Temporal Boundaries

#### 1.5.1.1 Spatial Boundaries

For the purposes of this NOA/NOC, the Project Development Area (PDA) for the Gordon site refers to the immediate area that Project activities and components occur in, plus a buffer, and is the anticipated area of direct physical disturbance (Map 2, Appendix A).

The Local Assessment Area (LAA) and Regional Assessment Area (RAA) spatial boundaries for this NOA/NOC are consistent with the various identified valued component (VC) spatial boundaries as previously defined (Stantec 2020a and 2020b).

- The LAA for the Gordon site encompasses the area in which environmental effects (direct or indirect) associated with the Project can be predicted or measured for assessment. The LAA encompasses the PDA and is selected in consideration of the geographic extent of effects (Stantec 2020a and 2020b).
- The RAA for the Gordon site is the area established for context for the determination of significance of project-specific effects. The RAA encompasses both the PDA and LAA and is VC-specific (Stantec 2020a and 2020b).

#### 1.5.1.2 Temporal Boundaries

For the purposes of this NOA/NOC, the temporal boundaries consist of the following Project phases:

- Construction (i.e., site preparation, physical construction/equipment installation, pre-production, and commissioning) is expected to take approximately 3 years to complete (Year -3, Year -2, Year -1). Some limited pre-production may occur during this period. Project construction activities will be carried out concurrently at the Gordon and MacLellan sites.
- Operation (i.e., ore and mine rock extraction, processing, and waste management) will follow construction and is expected to take approximately 7 years to complete (Years 1 to 7). Mining operation is expected to commence at the Gordon and MacLellan sites in Year 1. Mining at the Gordon site will be undertaken for 5 years (i.e., during Years 1 to 5). Management of stockpiles at the Gordon site is expected to occur for an additional two years (i.e., during Years 6 and 7) after active mining.
- Decommissioning/closure will begin at the cessation of operation at the Gordon site. Progressive rehabilitation is expected to occur during the final years of operation. Closure is scheduled to begin in Year 6 at the Gordon site and is expected to take approximately 5 years to complete. Closure will be followed by post-closure, which is the time period during which active reclamation measures are complete, but monitoring is still required. The expected duration for post-closure will match the duration of open pit filling. Permanent closure will occur when the site is stable, and monitoring is no longer required.



## 1.5.2 Assessment Approach

The approved EIS and EAP Report (Stantec 2020a and 2020b) included assessments completed to meet regulatory requirements, including assessing project-specific environmental effects. The assessments focused on VCs, which are environmental components of certain value or interest to regulators, Indigenous Nations, and other parties and were identified based on the biophysical and socio-economic elements that would potentially be affected by the Project, including at the Gordon site. The VCs considered are listed in Table 1.1.

*Table 1.1 Valued Component Considered in the Environmental Impact Statement and Environmental Act Proposal Report*

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

The approved EIS and EAP Report (Stantec 2020a and 2020b) included assessments of the effects of the Project on the VCs, and characterized the effects in terms of direction, magnitude, geographic extent, frequency, duration, reversibility, and context according to the terms provided (Stantec 2020a and 2020b). The environmental effects of the proposed alterations will be mitigated as described in the EIS and EAP Report. This NOA/NOC presents an updated assessment of the proposed alterations to consider whether there are changes to the conclusions of the EIS and EAP Report (Stantec 2020a 2020b).

## 1.6 Engagement

The Gordon site is located on unoccupied Provincial Crown land within an area that is a former mine site. As previously noted, construction at the Gordon site has not yet started. In relation to the proposed alterations (see Section 2), details were discussed during the past Environmental Advisory Committee meetings detailed in Table 1.2.



**Lynn Lake Gold Project: Gordon Mine Plan Amendment Notice of Alteration / Notice of Change**

Section 1: Introduction

October 6, 2025

*Table 1.2 Environmental Advisory Committee Meeting Details*

<b>EAC Meeting</b>	<b>Attending Indigenous Nations</b>
Meeting #1 – October 23, 2023 (virtual)	Manitoba Métis Federation, Nisichawayasihk Cree Nation, Marcel Colomb First Nation, Mathias Colomb Cree Nation, O-Pipon-Na-Piwin Cree Nation, Métis Nation – Saskatchewan
Meeting #2 – January 22, 2024 (virtual)	Marcel Colomb First Nation, Manitoba Métis Federation, Peter Ballantyne Cree Nation, Métis Nation Saskatchewan, O-Pipon-Na-Piwin Cree Nation
Meeting #3 – April 22, 2024 (virtual)	Marcel Colomb First Nation, Métis Nation Saskatchewan
Meeting #4 – August 12, 2024 (virtual)	Marcel Colomb First Nation, Métis Nation Saskatchewan, O-Pipon-Na-Piwin Cree Nation, Nisichawayasihk Cree Nation
Meeting #5 – October 21, 2024 (virtual)	Marcel Colomb First Nation, Métis Nation Saskatchewan
Meeting #6 – January 20, 2025 (virtual)	Marcel Colomb First Nation, Métis Nation Saskatchewan
Meeting #7 – May 23, 2025 (in person)	Marcel Colomb First Nation, Nisichawayasihk Cree Nation, Northlands Denesuline First Nation, O-Pipon-Na-Piwin Cree Nation

The meeting on May 23, 2025 included site visits, construction updates, and an outlook on future development changes/plans. Alamos' Independent Environmental Monitor also participated in the in-person 7<sup>th</sup> meeting, providing an introduction and overview of her role and responsibilities. These added in-person activities and discussions were followed by a formal Environmental Advisory Committee meeting, which was also accessible virtually for Indigenous Nations that were not able to attend in-person.

The minutes, presentations and shared documents related to each Environmental Advisory Committee meeting noted in Table 1.2 were (and will continue to be) shared with all 13 Nations involved in the Project even if they do not attend a meeting.

In addition, Alamos has ongoing engagement with Marcel Colomb First Nation – specifically through additional subcommittees (in relation to the signing of the Impacts Benefits Agreement in summer 2023), which were formed for full integration of Traditional Knowledge throughout all of Alamos' work within Marcel Colomb First Nation's Community Interest Zone.

More recently and similarly, Alamos has signed an Impacts Benefit Agreement with Mathias Colomb Cree Nation in winter 2025. Sub-committees are being developed but engagement has been ongoing through the EAC and Nation specific engagement efforts.

A draft of this NOA/NOC was shared with all Indigenous Nations involved in the Project. No feedback has been received to date. If any feedback is received, Alamos will address it with the respective Indigenous Nation(s) and share this information with the Province and IAAC. Based on the above, all Indigenous Nations involved with the Project have been made aware of the proposed alterations.



No formal public engagement is planned beyond the placement of the NOA/NOC on the respective MECC and IAAC public registries for public review and comment as required.

## **1.7 Funding**

Alamos will provide funding for the subject works described in this NOA/NOC.



## 2 Alteration Description

### 2.1 Purpose and Rationale

The purpose of the proposed alteration is to enhance the efficiency, sustainability, and effectiveness of the Project by optimizing infrastructure layout, minimizing new environmental disturbance, maximizing resource recovery, and leveraging existing site features where possible. Alamos is proposing to modify the approved Gordon site to include footprint adjustments for several of the Project components; increase in mined tonnage; remove the previously planned adjustments to the diversion ditch as it is no longer required to support the Project; and add the historical non-acid generating MRSA, which is proposed to be used as a construction borrow source.

### 2.2 Existing Conditions

The existing conditions at the Gordon site remain as originally described in the EIS (Stantec 2020a) prepared for the Project (i.e., Gordon and MacLellan sites) and the EAP Report prepared for the approved Gordon site (Stantec 2020b).

### 2.3 Proposed Alteration

The presently licensed Gordon site is presented in Map 3, Appendix A. Since the EIS (Stantec 2020a) and the EAP Report (Stantec 2020b) were developed:

- The overall mined tonnage has increased by approximately 11%, due to the adjusted open pit footprint but more so due to a lower cut-off grade.
- Detailed engineering has advanced, which has resulted in alteration to the approved Gordon site layout, inclusive of:
  - the adjustment of several Project component footprints (changes to the PDA layout) – the MRSA, facility area (including buildings), ore and overburden stockpiles, and water management structures (sumps, collections ponds, discharge pipeline)
  - the removal of the development of the planned diversion ditch (no longer required), and
  - one new Project component – the non-acid generating historical MRSA to the north of the open pit which is proposed to be used as a source of construction borrow material (borrow source).

The adjusted site layout is shown in Map 2, Appendix A. Table 2.1 lists the proposed alterations to the footprint layout (in comparison with that presented in the EIS [Stantec 2020a]) for the Gordon site.

An update of the light assessment for the Project based on the adjusted site layout is presented in the Summary of Light Modelling Results for the Lynn Lake Gold Project Revised 2023 Mine Design (Appendix B).



*Table 2.1 Gordon Site Feature Footprint Layout Changes*

<b>Mine Feature</b>	<b>EIS Footprint Layout Area (ha)</b>	<b>Proposed Footprint Layout Area (ha)</b>
Mine Rock Storage Area (MRSA) (modified by detailed design)	65.41	60.17
Open Pit (enlarged during detailed design to access additional resources)	29.01	36.72
Ore Storage/Ore Stockpiles (modified by detailed design)	3.38	8.80
Overburden Storage/Stockpile (modified by detailed design)	5.43	17.80
Collection Pond/Ponds/ Discharge Pipeline (modified by detailed design with sumps also sited)	1.32	2.29
Sump 1 (sited during detailed design)	n/a	0.60
Sump 2 (sited during detailed design)	n/a	1.66
Facility Area (sited during detailed design)	n/a	2.26
Gen Set Area (sited during detailed design)	n/a	0.13
Interceptor Wells Pond (sited during detailed design)	n/a	0.18
Stockpile Borrow Source (new addition)	n/a	7.30
Topsoil Storage Area (sited during detailed design)	n/a	4.13
Adjusted Diversion Ditch (removed during detailed design as no longer required)	6.84	n/a

Notes:

n/a – not applicable, ha – hectares

In accordance with the EIS (Stantec 2020a) and the EAP Report (Stantec 2020b), the PDA, encompasses the immediate area in which Project activities and components occur plus a buffer (between 30 and 50 metres (m) depending on the area) and is the anticipated area of direct physical disturbance associated with the construction and operation of the Project. The Project activities footprint and PDA for both the proposed layout and the existing layout are presented in Table 2.2. The Gordon site access road is included in the PDA totals.

*Table 2.2 Gordon Site Project Development Area Changes*

<b>Scenario</b>	<b>Area (ha)</b>
EIS Layout Footprint	104.8
EIS PDA	269.4
Proposed Layout Footprint	142.0
Proposed PDA	291.2



As previously noted, construction of the Gordon site in relation to *Environment Act* Licence No. 3390 and the federal Decision Statement is anticipated to begin in January 2026.

With approval of this NOA/NOC, the Project components will be constructed, operated, and closed as described in the EIS (Stantec 2020a), but in the reconfigured mine layout (see Map 2, Appendix A). This will occur in continued accordance with the current Project approval requirements, already-committed mitigation measures, and developed Management and Monitoring Plans (Version 0 finalized and shared in January 2025), which include detailed Adaptive Management approaches (as required).

## **2.4 Alteration Schedule**

The proposed schedule for the alteration described in this NOA/NOC aligns with the Project phases described in Section 1.5.1.2.



### 3 Environmental Effects and Mitigation

#### 3.1 Project Interactions and Valued Components

Biophysical and socio-economic VCs that could be affected by the Project were defined in the EIS prepared for the Project (i.e., Gordon and MacLellan sites) (Stantec 2020a). The rationale for selecting each VC and potential general interactions between the Project and the VCs remain as originally described in the EIS and the EAP Report for the approved Gordon site (Stantec 2020b).

The VCs identified in Table 1.1 were assessed as part of the EIS and EAP Report (Stantec 2020a and 2020b) and are re-assessed as part of this NOA/NOC because of the increased mine tonnage and adjusted or refined components. The Project activities and components that are proposed to be altered as part of this NOA/NOC that may interact with the VCs are identified in the respective VC sections.

#### 3.2 Residual Effects Criteria

Terms used to characterize the residual environmental effects are summarized in Table 3.1.

Table 3.1 Definition of Terms Used to Characterize Residual Environmental Effects

Characterization	Description	Quantitative Measure or Qualitative Categories
Direction	The long-term trend of the residual effect	<p><b>Positive</b> — an improvement in the VC compared with existing conditions and trends</p> <p><b>Adverse</b> — a decline in the VC compared with existing conditions and trends</p> <p><b>Neutral</b> — no change in the VC from existing conditions and trends</p>
Magnitude	The amount of change in the VC relative to existing conditions	<p><b>Negligible</b> — no measurable change</p> <p><b>Low</b> — a change that falls within the level of natural variability</p> <p><b>Moderate</b> — a measurable change which is unlikely to affect the VC</p> <p><b>High</b> — a measurable change which is likely to affect the VC</p>
Geographic Extent	The geographic area in which an environmental effect occurs	<p><b>PDA</b> — residual effects are restricted to the PDA</p> <p><b>LAA</b> — residual effects extend into the LAA</p> <p><b>RAA</b> — residual effects extend to other adjacent areas of the property into the RAA</p>



<b>Characterization</b>	<b>Description</b>	<b>Quantitative Measure or Qualitative Categories</b>
Frequency	When the residual effect occurs and how often	<p><b>Single event</b> — residual effect occurs once throughout the life of the dewatering work</p> <p><b>Multiple irregular event</b> — residual effect occurs sporadically and intermittently (no set schedule) throughout</p> <p><b>Multiple regular event</b> — residual effect occurs repeatedly and regularly throughout</p> <p><b>Continuous</b> — residual effect occurs continuously throughout the life of the dewatering work</p>
Duration	The period of time required until VC returns to existing condition, or the effect can no longer be measured or otherwise perceived	<p><b>Short-term</b> — residual effect restricted to a duration of 2 weeks</p> <p><b>Medium-term</b> — residual effect extends to 1 year</p> <p><b>Long-term</b> — residual effect extends for longer than 1 year</p>
Reversibility	Whether the VC can return to existing condition after the proposed alteration activity ceases	<p><b>Reversible</b> — the effect is likely to be reversed after activity completion and decommissioning</p> <p><b>Irreversible</b> — the effect is unlikely to be reversed even after decommissioning</p>
Ecological and Socio-economic Context	Existing condition and trends in the area where environmental effects occur	<p><b>Undisturbed</b> — area is relatively undisturbed or not adversely affected by human activity</p> <p><b>Disturbed</b> — area has been substantially previously disturbed by human development or human development is still present</p>

### **3.3 Assessment of Environmental Effects**

This section presents the assessment of environment effects for the VCs identified in Table 1.1 as having potential interactions with the proposed alterations. This assessment is based on the EIS (Stantec 2020a) prepared for the Project (i.e., Gordon and MacLellan sites) and the EAP Report for the approved Gordon site (Stantec 2020b).

#### **3.3.1 Atmospheric Environment**

The atmospheric environment includes air quality and greenhouse gases (GHGs). As outlined in Appendix C, the Project activities and components that are proposed to be altered that may interact with the atmospheric environment and were therefore assessed as part of this NOA/NOC, include but are not limited to the PDA layout, open pit, MRSA, topsoil storage area, location of diesel generator, diesel generator power output, facility area, and blasting parameters.



### **3.3.1.1 Regulatory and Guideline Setting**

#### **3.3.1.1.1 Guideline Criteria**

The applicable regulatory criteria for air quality include the Manitoba Ambient Air Quality Criteria (AAQC; Manitoba Sustainable Development (MSD), now MECC [MSD 2005]), Ontario's Ambient Air Quality Criteria (Ontario Ministry of Environment, Conservation, and Parks [OMECOP] 2020) in the absence of Manitoba AAQC for specific substances of interest, and the Canadian Ambient Air Quality Standards (CAAQS, Canadian Council of Ministers of the Environment [CCME] 2017). These are provided in Table 3.2. The Manitoba AAQC include two concentration levels: Maximum Acceptable Level Concentrations and Maximum Desirable Level Concentrations. The more stringent Maximum Desirable Levels are used in the air quality assessment. In the absence of specific Manitoba AAQC for dustfall, the Ontario 30-day and annual average AAQC were used in the assessment.

The CAAQS were developed as part of the Air Quality Management System (CCME 2012a) with the objective of driving continuous improvement of ambient air quality in Canada. The CCME describes the process for selecting monitoring stations, measuring pollutant concentrations, and determining achievement of the CAAQS (CCME 2019; CCME 2012b). Determining achievement of the CAAQS is based upon the measured air quality concentrations at community monitoring stations and comparing those with the CAAQS and then assigning an air quality status to one of four management levels (CCME 2019; CCME 2012b). The four air quality management levels require progressively more rigorous actions by jurisdictions as air quality concentrations approach or exceed the CAAQS, thereby allowing proactive management actions to be undertaken to reduce emissions and avoid exceedances of the CAAQS (CCME 2019).

The CCME guidance on determining achievement of the CAAQS (CCME 2019) states that:

“CAAQS were not developed as facility level regulatory standards. Rather, they are used by provinces and territories to guide air zone management actions intended to reduce ambient concentrations below the CAAQS and prevent CAAQS exceedances.”

In this context, predicted ambient concentrations due to the Project are compared with the CAAQS for information purposes and do not imply compliance with the AAQC at the “Project Boundary.”



Table 3.2 Applicable Guideline Criteria for Air Quality

Substance	Averaging Period	Manitoba Ambient Air Quality Criteria <sup>a</sup> (µg/m <sup>3</sup> )		Ontario Ambient Air Quality Criteria <sup>b</sup> (µg/m <sup>3</sup> )	2025 Canadian Ambient Air Quality Standards <sup>c</sup> (µg/m <sup>3</sup> )
		Maximum Acceptable Level Concentration	Maximum Desirable Level Concentration		
<b>Gaseous Criteria Air Contaminants (CAC)</b>					
NO <sub>2</sub>	1-hour	<b>400</b>	—	400	<b>79 (42 ppb)<sup>d</sup></b>
	24-hour	<b>200</b>	—	200	—
	Annual	100	<b>60</b>	—	<b>23 (12 ppb)<sup>e</sup></b>
CO	1-hour	35,000	<b>15,000</b>	36,200	—
	8-hour	15,000	<b>6,000</b>	15,700	—
SO <sub>2</sub>	1-hour	900	<b>450</b>	690	<b>170 (65 ppb)<sup>f</sup></b>
	24-hour	300	<b>150</b>	275	—
	Annual	60	<b>30</b>	55	<b>10 (4.0 ppb)<sup>g</sup></b>
<b>Other Gaseous Species</b>					
HCN	1-hour	<b>40</b>	—	—	—
	24-hour	—	—	<b>8</b>	—
	Annual	<b>3</b>	—	—	—
<b>Particulate Matter</b>					
TSP	24-hour	<b>120</b>	—	120	—
	Annual	70 <sup>h</sup>	<b>60<sup>h</sup></b>	60 <sup>h</sup>	—
PM <sub>10</sub>	24-hour	<b>50</b>	—	50	—
PM <sub>2.5</sub>	24-hour	30	—	30	<b>27<sup>i</sup></b>
	Annual	—	—	—	<b>8.8<sup>j</sup></b>
Dustfall	30-day	—	—	<b>7 g/m<sup>2</sup></b>	—
	Annual	—	—	<b>4.6 g/m<sup>2 h</sup></b>	—
<b>Metals</b>					
Arsenic	24-hour	<b>0.3</b>	—	0.3	—
Cadmium	24-hour	<b>2</b>	—	0.025	—
	Annual	—	—	0.005	—
Copper	24-hour	<b>50</b>	—	50	—
Lead	24-hour	<b>2</b>	—	0.5	—
	30-day	<b>0.7</b>	—	0.2	—



Substance	Averaging Period	Manitoba Ambient Air Quality Criteria <sup>a</sup> (µg/m <sup>3</sup> )		Ontario Ambient Air Quality Criteria <sup>b</sup> (µg/m <sup>3</sup> )	2025 Canadian Ambient Air Quality Standards <sup>c</sup> (µg/m <sup>3</sup> )
		Maximum Acceptable Level Concentration	Maximum Desirable Level Concentration		
Nickel	24-hour	<b>2</b>	—	0.2	—
	Annual	—	—	0.04	—
Zinc	24-hour	<b>120</b>	—	120	—

Notes:

NO<sub>2</sub> - nitrogen dioxide; CO - carbon monoxide; SO<sub>2</sub> - sulphur dioxide; HCN - hydrogen cyanide; TSP - total suspended particulate; PM<sub>10</sub> - particulate matter less than 10 microns; PM<sub>2.5</sub> - particulate matter less than 2.5 microns; µg/m<sup>3</sup> - microgram per cubic metre; g/m<sup>2</sup> - grams per square metre; ppb - parts per billion; “—” not available

<sup>a</sup> Manitoba Ambient Air Quality Criteria (MSD 2005)

<sup>b</sup> Ontario Ambient Air Quality Criteria (OMECPC 2020)

<sup>c</sup> Canadian Ambient Air Quality Standards (CCME 2017)

<sup>d</sup> The 1-hour CAAQS for NO<sub>2</sub> is referenced to the three-year average of the annual 98<sup>th</sup> percentile of the NO<sub>2</sub> daily maximum 1- hour average concentrations (effective 2025) (CCME 2017).

<sup>e</sup> The annual CAAQS for NO<sub>2</sub> is referenced to the arithmetic average over a single calendar year of all 1-hour average NO<sub>2</sub> concentrations (effective 2025) (CCME 2017).

<sup>f</sup> The 1-hour CAAQS for SO<sub>2</sub> is referenced to the three-year average of the annual 99<sup>th</sup> percentile of the SO<sub>2</sub> daily maximum 1- hour average concentrations (effective 2025) (CCME 2017).

<sup>g</sup> The annual CAAQS for SO<sub>2</sub> is referenced to the arithmetic average over a single calendar year of all 1-hour average SO<sub>2</sub> concentrations (effective 2025) (CCME 2017).

<sup>h</sup> Annual geometric mean

<sup>i</sup> The CAAQS for 24-hour PM<sub>2.5</sub> is referenced to the annual 98<sup>th</sup> percentile of daily 24-hour average concentrations, averaged over three years (effective 2020) (CCME 2017).

<sup>j</sup> The CAAQS for annual PM<sub>2.5</sub> is referenced to the three-year mean of annual average concentrations (effective 2020) (CCME 2017).

Values in **BOLD** text represent the ambient air quality criteria that are used for the EIS and EAP Report (Stantec 2020a and 2020b)



### **3.3.1.1.2 IAAC Decision Statement**

As per the IAAC Decision Statement, Alamos is required to adhere to the following conditions with respect to the air quality:

*6.1 The Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, measures to mitigate emissions of dust and fugitive particulates within the Project development areas, taking into account the standards and criteria set out in the Canadian Council of Ministers of the Environment's Canadian Ambient Air Quality Standards and Manitoba's Ambient Air Quality Criteria. The Proponent shall implement these measures from construction through decommissioning. In doing so, the Proponent shall:*

*6.1.1 apply dust suppressants, including water, that do not contain chemicals and have the least potential for adverse environmental effects, on haul and access roads during periods when dust generation is expected or occurring, including periods of drought and high winds;*

*6.1.2 locate all stationary machinery and equipment used for processing ore indoors, where technically and economically feasible, including the crushing plant and conveyors feeding into the ore milling and processing plant;*

*6.1.3 ensure all equipment and vehicles used, including equipment and vehicles operated by third-party contractors, are serviced and maintained in accordance with the manufacturer's maintenance guidelines to meet or exceed applicable emission standards, including Tier 4 emission standards for off-road equipment with off-road diesel engines, pursuant to the Off-Road Compression-Ignition (Mobile and Stationary) and Large Spark-Ignition Engine Emission Regulations and Off-Road Compression-Ignition Engine Emission Regulations;*

*6.1.4 develop and implement policies to reduce the fuel consumption of equipment and vehicles operating in the Project development areas, including no-idling and limited cold start policies; and*

*6.1.5 establish speed limits on the roads located in the Project development areas, taking into account the recommended speed limits in Environment and Climate Change Canada's Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities and by requiring and ensuring that speed limits are respected, including by installing signs indicating speed limits.*



### **3.3.1.2 Environmental Effects**

The dispersion modelling methodology used to assess the potential effects of the proposed alterations on air quality is identical to the methodology used in the EIS (Stantec 2020a). The details of CALPUFF model setup, CALMET meteorological data, receptor grid, nitric oxide (NO) to nitrogen dioxide (NO<sub>2</sub>) conversion, and particulate matter deposition can be found in the Air Quality Technical Modelling Report (TMR), Volume 5 Appendix A in the EIS (Stantec 2020a).

The model predicted 1-hour and 8-hour average concentrations are based on the maximum hourly emission rates. The model predicted 24-hour, monthly and average concentrations are based on the daily average emission rates that consider the actual operating hours per day for each mining activity. Baseline concentrations are added to the model predicted maximum concentrations to account for other existing emission sources (natural and anthropogenic) that are not directly included in the model simulation. The model predicted maximum concentrations with the baseline contribution are compared with the Manitoba AAQC and the CAAQS. The CAAQS are reference values for regional air quality management and are applicable to measured ambient concentrations at human receptor locations away from the industrial facility boundaries. The maximum predicted concentrations in the LAA are compared with the CAAQS in this context and do not imply compliance with the AAQC at the Project Boundary. The maximum predicted concentrations are based on areas along and outside the new adjusted Project Boundary (i.e., locations where public access is not restricted). The predicted maximum concentrations and dustfall for the Gordon site, for this update, are presented in the Summary of Air Dispersion Model Results for the Lynn Lake Gold Project Revised 2023 Mine Design memo (Appendix C).

#### **3.3.1.2.1 Maximum NO<sub>2</sub> Concentrations**

The maximum predicted 1-hour NO<sub>2</sub> concentration, 415 micrograms per cubic metre (µg/m<sup>3</sup>), is greater than the Manitoba AAQC (400 µg/m<sup>3</sup>). The maximum predicted 24-hour and annual NO<sub>2</sub> concentrations are 74.2 and 10.4 µg/m<sup>3</sup>, respectively and are less than the Manitoba AAQC and the annual CAAQS. The maximum predicted 1-hour average NO<sub>2</sub> concentration in the metric of the CAAQS (284 µg/m<sup>3</sup>) is greater than the 1-hour CAAQS (79 µg/m<sup>3</sup>). The maximum predicted NO<sub>2</sub> concentrations at human health (HH) receptors for all averaging periods are less than the Manitoba AAQC. The maximum predicted 1-hour average NO<sub>2</sub> concentrations are greater than the 1-hour CAAQS at three HH receptors (receptor ID 73, 76 and 77 in TMR Appendix D Table E-2 (Stantec 2020a).

The maximum predicted 1-hour NO<sub>2</sub> concentration, 415 µg/m<sup>3</sup>, is 10% less than the maximum predicted value in the EIS TMR (Stantec 2020a) and the maximum frequency of exceedance is reduced from 2 hours per year (h/y) to 1 h/y. The maximum predicted 1-hour (CAAQS) NO<sub>2</sub> concentration is 27% greater than the maximum predicted value in the EIS TMR and the maximum frequency of exceedance increases from 99 days per year (d/y) to 101 d/y.

#### **3.3.1.2.2 Maximum CO Concentrations**

The maximum predicted 1-hour, and 8-hour carbon monoxide (CO) concentrations are 14,832 and 4,345 µg/m<sup>3</sup>, respectively and are less than the Manitoba AAQC. The predicted concentrations are 8 to 12% lower than the maximum predicted values in EIS TMR (Stantec 2020a).



### **3.3.1.2.3      *Maximum SO<sub>2</sub> Concentrations***

The maximum predicted 1-hour, 24-hour, and annual sulphur dioxide (SO<sub>2</sub>) concentration are 422, 42.6, and 2.60 µg/m<sup>3</sup>, respectively, and are less than the Manitoba AAQC and annual CAAQS. The maximum predicted 1-hour average SO<sub>2</sub> concentration in the metric of the CAAQS (382 µg/m<sup>3</sup>) is greater than the 1-hour CAAQS (170 µg/m<sup>3</sup>). The maximum predicted SO<sub>2</sub> concentrations at HH receptors for all averaging periods are less than the Manitoba AAQC and CAAQS.

The maximum predicted 1-hour SO<sub>2</sub> CAAQS concentration, 415 µg/m<sup>3</sup>, is 12% greater than the maximum predicted value in the EIS TMR (Stantec 2020a) and the maximum frequency of exceedance increases from 5 d/y to 12 d/y.

### **3.3.1.2.4      *Maximum Total Suspended Particulate (TSP) Concentrations***

The maximum predicted 24-hour TSP concentration, 734 µg/m<sup>3</sup>, is greater than the Manitoba AAQC (120 µg/m<sup>3</sup>). The maximum predicted annual TSP concentration, 15.8 µg/m<sup>3</sup>, is less than the Manitoba AAQC. At three HH receptors, the maximum predicted TSP concentrations are greater than the Manitoba 24-hour AAQC (receptors ID 73, 76, and 77 in TMR Appendix D Table E-2 [Stantec 2020a]).

The maximum predicted TSP concentrations are 7% to 21% greater than the maximum predicted TSP concentrations in the EIS TMR (Stantec 2020a). The maximum frequency of exceedance increases from 73 d/y to 94 d/y.

### **3.3.1.2.5      *Maximum PM<sub>10</sub> Concentrations***

The maximum predicted 24-hour particulate matter <10 microns (PM<sub>10</sub>) concentration, 406 µg/m<sup>3</sup>, is greater than the Manitoba AAQC (50 µg/m<sup>3</sup>). At four receptors, the maximum predicted PM<sub>10</sub> concentrations are greater than the Manitoba 24-hour AAQC (receptors ID 72, 73, 76, and 77 in TMR Appendix D Table E-2 (Stantec 2020a)).

The maximum predicted PM<sub>10</sub> concentration is 12% greater than the maximum predicted PM<sub>10</sub> concentrations in the EIS TMR (Stantec 2020a). The maximum frequency of exceedance increases from 110 d/y to 119 d/y.

### **3.3.1.2.6      *Maximum PM<sub>2.5</sub> Concentrations***

The maximum predicted 24-hour and annual particulate matter less than 2.5 microns (PM<sub>2.5</sub>) concentrations are 25.7 µg/m<sup>3</sup> and 7.40 µg/m<sup>3</sup>, respectively, and are less than the CAAQS. The maximum predicted PM<sub>2.5</sub> concentrations at HH receptors for all averaging periods are less than the CAAQS.

The maximum predicted PM<sub>2.5</sub> concentrations are 8% to 9% greater than the maximum predicted PM<sub>2.5</sub> concentrations in the EIS TMR (Stantec 2020a).



### **3.3.1.2.7      *Maximum Dustfall***

The maximum predicted 30-day and annual average dustfall are 6.50 grams per square metre per 30-day period ( $\text{g}/\text{m}^2/30\text{-day}$ ) and 4.51  $\text{g}/\text{m}^2/30\text{-day}$ , respectively, and are less than the Ontario AAQC. The maximum predicted 30-day and annual average dustfall at HH receptors are less than the dustfall criteria.

The maximum predicted dustfall values are 33% to 36% greater than the maximum predicted dustfall concentrations in the EIS TMR (Stantec 2020a).

### **3.3.1.3      **Summary of Mitigation Measures****

Mitigation measures will be implemented to manage and reduce Project emissions during construction and operation as described in the EIS (Stantec 2020a). As described in the developed Air Quality Management and Monitoring Plan (AQMMP; Version 0, January 2025), ambient air quality and meteorology monitoring will be implemented to provide an understanding of meteorological conditions and off-site ambient concentrations, and to determine the need for additional mitigation. The air quality monitoring program will include continuous meteorological monitoring (wind speed and wind direction), continuous (real time) monitoring of particulate matter (TSP,  $\text{PM}_{10}$ ,  $\text{PM}_{2.5}$ ) and dustfall monitoring. Based on the current wind conditions and measured ambient concentration levels, appropriate and effective mitigation options will be implemented to reduce Project emissions. This emissions mitigation management is referred to as “adaptive management”.

Mitigation measures to reduce air and GHG emissions that were incorporated in the Project design are described in the AQMMP and Greenhouse Gas Management Plan (both Version 0, January 2025). Emission mitigation measures during Project construction and operation are based on standard Best Management Practices (BMPs) for the reduction of air emissions from construction activities (Environment and Climate Change Canada [ECCC] 2005) and mining activities (Centre for Excellence in Mining Innovation [CEMI] 2010). These are described in detail in the plans.

Additional mitigation measures will be implemented on an as-needed basis as discussed in the adaptive management aspects of the plans.

### **3.3.1.4      **Residual Effects****

Compared with the results in the EIS, the air quality effects from the Project activities marginally increased at some receptors. When there is an increase in the model predicted concentrations, the associated change/increase in the frequency of exceedance is low. In conclusion, the results of the updated air quality assessment (Appendix C) do not change the characterization of residual effects as presented in the EIS (Stantec 2020a).

Consistent with the EIS, after applying the mitigation measures, the proposed alterations at the Gordon site will not change the characterization of Project residual effects on air quality, and there is no change to the EIS conclusions (Stantec 2020a).



### **3.3.2 Noise and Vibration**

Noise and vibration resulting from the Project have the potential to affect human health and well-being, land and resource use, wildlife and wildlife habitat, and fish and fish habitat (Stantec 2020a). As outlined in Appendix D, the Project activities and components that are proposed to be altered that may interact with the noise and vibration VC and were therefore assessed as part of this NOA/NOC, include but are not limited to the changes in the PDA layout outlined in Table 2.1, open pit and MRSA, general infrastructure, and mine production capacity.

#### **3.3.2.1 Regulatory and Guideline Setting**

##### **3.3.2.1.1 Guideline Criteria**

###### **Noise**

The Province of Manitoba Guidelines for Sound Pollution (Province of Manitoba n.d.) provides environmental sound level objectives for the assessment of noise in the outdoor environment. The highest desirable level for residential areas is 55 dBA (A-weighted decibel) during the daytime (7:00 AM to 10:00 PM) and 45 dBA during the nighttime (defined as 10:00 PM to 7:00 AM).

Federally, Health Canada's Guidance for Evaluation Human Health Effects in Impact Assessment: Noise (Health Canada 2023a) provides noise targets for annoyance, sleep disturbance, and low-frequency noise effects. Health Canada's approach to noise assessment is based on several international standards and technical publications. This document and the technical standards and publications it references can be used as guidance for noise assessments.

The Health Canada Noise Guidance uses daytime or nighttime equivalent sound levels ( $L_d$  and  $L_n$ , respectively), adjusted day-night average sound levels ( $L_{dn}$ ), and percent highly annoyed (%HA) to quantify noise effects for activities with a duration of more than 12 months. The daytime sound level ( $L_d$ ) is a 15-hour time average over the daytime period from 7:00 AM to 10:00 PM. The nighttime sound level ( $L_n$ ) is a 9-hour time average over the nighttime period from 10:00 PM to 7:00 AM. The adjusted day-night average sound level ( $L_{dn}$ ) is a 24-hour time-averaged  $L_{eq}$ , with a 10-decibel (dB) penalty applied to nighttime hours and adjustments made for certain characteristics of sound such as tonality or impulsiveness.

Based on Health Canada Noise Guidance, the noise target for the highest change in %HA is 6.5%. Impulsive and tonal characteristics of source noise are accounted for in the %HA calculations because their presence can increase annoyance. If the change in %HA is exceeded, effects are considered to be of concern and may require mitigation.

For activities with a duration of less than 12 months, Health Canada Noise Guidance considers the mitigation noise level (MNL) to assess noise effects. The MNL was used as a target for reducing noise annoyance effects related to short-term construction activities such as pile driving. If the noise effects from the activities exceed the MNL, the implementation of mitigation measures is recommended to reduce the effect. The MNL of 47 dBA ( $L_{dn}$ ) for a quiet suburban or rural community is applicable.



For sleep disturbance, Health Canada Noise Guidance recommends targeting an indoor sound level of no more than 30 dBA  $L_{eq}$  for continuous noise during the sleep period. Health Canada also recommends that an outdoor-to-indoor transmission loss with windows at least partially open is 15 dBA and fully closed windows are assumed to reduce outdoor sound levels by approximately 27 dBA; such that the corresponding outdoor sound level targets for sleep disturbance are 45 dBA and 57 dBA for partially open windows and fully closed windows, respectively. More recently, the World Health Organization (WHO) (2009) has published nighttime noise guidelines that are intended to protect the public, including the most vulnerable groups, from adverse health effects associated with sleep disturbance due to nighttime noise. The recommended annual average is 40 dBA  $L_n$  to be considered outdoors.

Sounds with strong low frequency noise (LFN) content may result in noise-induced rattles within buildings, resulting in greater annoyance. Health Canada Noise Guidance recommends that the energy sum of the linear sound levels in the 16, 31.5 and 63-Hertz (Hz) octave bands not exceed 70 linear decibel (dBL).

### **Vibration**

Manitoba does not have provincial guidelines for vibration. Provincially, the OMECP provides guidance on blast-related vibration which is referenced herein in absence of Manitoba guidance. The OMECP Guidelines on Information Required for the Assessment of Blasting Noise and Vibration (OMECP 1985) guidance recommends the following vibration targets:

- Standard targets - ground vibration of 12.5 millimetres per second (mm/s) and air overpressure of 128 dBL.
- Cautionary targets - ground vibration of 10 mm/s and air overpressure of 120 dBL.

The cautionary targets of 10 mm/s and 120 dBL are the most conservative blast-related vibration targets in this assessment. These targets will be applied to all receptors outside the Project Development Area (PDA).

Federally, Health Canada Noise Guidance only provides threshold for air overpressure effect. The guidance recommends that little or no public annoyance is expected to result from any number of daytime sonic booms per day if their measured or predicted peak value is below  $125-10 \log N$  (dBL) where N is number of blasts per day. For one blast per day, the limit is 125 dBL. At receptors inside the PDA, such as the permanent work camp, the Health Canada overpressure target of 125 dBL will be used.

For non-blast-related construction activities, there is no Manitoba or federal construction vibration guidance available for remote locations or smaller population centers. As published codes and guidance for non-blast related vibration levels are limited, the United State Federal Transit Administration Transit Noise and Vibration Impact Assessment Manual (FTA 2018) is referenced for the ground-borne vibration target.



Structural damage targets for ground-borne vibration are expressed in terms of peak particle velocity (PPV) levels in inch per second (in/s) or mm/s. The structural damage target at a residential building due to ground-borne vibration effect is the PPV of 0.2 in/s or 5 mm/s for non-engineered timber and masonry buildings. The human annoyance target for frequent ground-borne vibration is 72 VdB (Vibration Velocity in Decibel Scale). Annoyance target for ground-borne vibration is expressed in terms of root mean square (rms) velocity levels in VdB.

### **3.3.2.1.2 IAAC Decision Statement**

As per the IAAC Decision Statement, Alamos is required to adhere to the following conditions with respect to noise and vibration:

*6.2 The Proponent shall implement measures, during all phases of the Designated Project, to avoid exceedances of the thresholds for noise and vibration, identified in Health Canada's Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise at sensitive receptors identified in the human health and ecological risk assessment in Volume 5 of the Environmental Impact Statement. In doing so, the Proponent shall: develop, prior to construction, a protocol for receiving and addressing feedback related to the exposure to noise and vibration generated by the Designated Project. The Proponent shall provide the protocol to the Agency and Indigenous groups prior to construction, and make the protocol publicly available online. As part of the protocol, the Proponent shall:*

*6.2.1.1 identify how a person may provide feedback, how the Proponent will handle the feedback received, including ranking and responding to feedback received according to the anticipated level of impacts, and how the Proponent may implement modified or additional mitigation measures(s) and/or follow-up requirement(s) in response to the feedback received;*

*6.2.1.2 record any feedback received as soon as feasible, no later than 48 hours after receiving the feedback; and*

*6.2.1.3 implement, as soon as technically feasible, any modified or additional mitigation measure and/or follow-up requirement that the Proponent deems necessary to respond to the feedback received.*

*6.5 The Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, a follow-up program to verify the accuracy of the environmental assessment and determine the effectiveness of mitigation measures as it pertains to noise and vibration from the Designated Project on the health of Indigenous peoples. The Proponent shall implement the follow-up program during all phases of the Designated Project. As part of the follow-up program, the Proponent shall:*

*6.5.1 monitor noise and vibration levels at receptors identified in Volume 1 Chapter 7 Tables 7-7 to 7-10 of the Environmental Impact Statement, and at any other human receptors identified in consultation with Indigenous groups.*



### **3.3.2.2 Environmental Effects**

#### **3.3.2.2.1 Noise**

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

The assessment considered noise effects during the construction phase and operation. The time period from Year -1 was chosen for the construction phase assessment at the Gordon site because it represents a worst-case scenario of equipment usage during activities such as bulk earth work. Year 3 of the Gordon site operation was chosen for the operation phase assessment because it represented the production year with the highest mining rate. The operation scenario includes noise emissions from the Gordon site during the worst-case years.

Details on methods and results are presented in the Lynn Lake Gold Project – Noise and Vibration Impact Assessment Update memo (Appendix D).

During the construction phase the predicted Project  $L_d$  and  $L_n$  sound levels at all residential receptors near Gordon site are below the Manitoba noise guideline (i.e., Manitoba Guidelines for Sound Pollution) target of 55 dBA daytime and 45 dBA nighttime. During the operation phase the predicted Project  $L_d$  and  $L_n$  sound levels at all residential receptors near Gordon site are below the Manitoba noise guideline target of 55 dBA daytime and 45 dBA nighttime.

For the construction and operation phases, change in %HA associated with the Project is compared with the threshold of 6.5%HA advised by Health Canada Noise Guidance. The change in %HA at a receptor is based on the difference between the baseline %HA and total (Project and Baseline) %HA.

At the Gordon site, the changes in %HA at all receptors are below the 6.5% target for the construction phase. The changes in %HA associated with the Project operation phase at the Gordon site are below the 6.5% target for the operation phase. The results indicate compliance with the Health Canada Noise Guidance.

As a target for the LFN issue, Health Canada Noise Guidance recommends that the energy sum of the linear sound levels in the 16, 31.5 and 63-Hz octave bands at a receptor location not exceed 70 dBL. Potential for LFN noise effect is low at receptors near the Gordon site during the operation phase because the predicted sound level results are below the target of 70 dBL.

The outdoor nighttime annual sound level of 40 dBA was used as the sleep disturbance noise target for this assessment update, based on the World Health Organization Night Guidelines for Europe (WHO 2009). The  $L_n$  results indicate that the nighttime equivalent sound levels from the Project are below 40 dBA at all residential receptors. No noise-related sleep disturbances of residential receptors are expected from the Project construction and operation during the nighttime period.



Table 3.3 below summarizes the comparisons of noise effects between the EIS TMR (Stantec 2020a) and current NOA/NOC updates at the most impacted receptors (ID77 and ID76) for the construction and operation phase, respectively.

*Table 3.3 Comparison of Noise Effects – Gordon Site*

Phase	Receptor	L <sub>d</sub> or L <sub>d</sub> (dBA)			L <sub>dn</sub> (dBA)			Change in %HA (%)		
		2020 EIS	NOA/NOC Update	Changes	2020 EIS	NOA/NOC Update	Change	2020 EIS	NOA/NOC Update	Change
Construction	ID77	30.7	33.8	+3.1	37.1	40.2	+3.1	2.2	3.3	1.1
Operation	ID76	38.5	39.9	+1.4	44.9	46.3	+1.4	4.8	5.5	+0.7

### **3.3.2.2.2 Vibration**

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

During the construction phase, heavy equipment such as excavators, compactors, piling equipment, and haul trucks will be used. The ground-borne vibration effect due to high impact piling equipment, excavator, compactor, and large bulldozer were assessed at receptors closest to the construction activities. These pieces of equipment were selected in this assessment because they typically produce higher vibration levels than other construction equipment.

The greatest distance that will result in a structural damage vibration level target of 0.2 in/s or 5 mm/s (FTA 2018) is 29 m for impact pile driving, 8 m for a compactor or excavator, 4.5 m for a bulldozer, and 4.5 m for drilling. Vibration beyond these distances from the activities are not expected to cause structural damage.

This distance is expected to be less for other heavy equipment required for construction that have lower vibratory emissions. The closest receptor to potential construction activities at the Gordon site is located at a distance more than 1 km (ID 76 and ID 73). These receptors are located at a sufficient distance that structural damage due to construction equipment vibration is unlikely.



The greatest distance at which the vibration levels are above the human annoyance target of 72 VdB (FTA 2018) is 280 m for impact pile driving, 71 m for a compactor or excavator, 42 m for a bulldozer, and 42 m for drilling. This distance is expected to be less for other heavy equipment required for construction that have lower vibratory emissions. The closest receptors to potential construction activities at the Gordon site are both located at more than 1 km. These receptors are located at sufficient distances that annoyance due to construction equipment vibration is unlikely. The predicted vibration levels at the closest receptor for the Gordon site is below the annoyance target of 72 VdB.

During the operation phase, the primary vibration effects are ground vibration and air overpressure due to blasting activities within the open pit at the Gordon site. Given the same distance from a blast to the receptor, the primary factor affecting vibration is the explosive charge per delay. The highest explosive charge specification in the blast design is 230 kilograms (kg) per hole per delay for the Gordon site. However, the explosive charge could be reduced during operation due to Gordon site conditions.

The closest receptors to the Gordon site open pit are receptors ID 76 and ID 73 at the approximate distance of 1.4 km and 2.2 km, respectively. These receptors are potential First Nations' traditional land users.

The highest blast charge of 230 kg will result in ground-borne vibration below the vibration target of 10 mm/s at all receptors for the Gordon site. The predicted air overpressures are below the vibration target of 120 dBL at all receptors, except for receptor ID 73 and ID 76 near the Gordon site. The predicted air overpressure at receptor ID 73 and 76 is 121 dBL and 124 dBL, respectively. When the blast charge is reduced from 230 kg to 43 kg per hole per delay, the predicted overpressures at receptor ID 73 and ID 76 meet the 120 dBL target.

The primary factor in the blasting plan that influences the air overpressure is the charge-weight per delay. Charge weight dictates the amount of energy release. Decreasing the charge-weight per delay will effectively reduce the overpressure effect. The blasting plan will consider distance to receptors and will size the charges to avoid exceeding regulatory targets at receptors.

Other mine plan factors such as depth of burial, volume of displaced rock, delay time interval, and type of explosive will also affect the overpressure. A deeply buried or heavily confined charge will cause mostly ground vibration. Lightly confined blast will transfer most blast energy to atmosphere. Blast that displaces large volume of rock create high air overpressure with low frequency content.

Air overpressure monitoring can be conducted at nearby receptors during a blast event to confirm vibrations are below regulatory targets. With mitigation measures the overpressures are predicted to meet the most conservative target of 120 dBL at all receptors outside the PDA.

Table 3.4 below summarizes the comparison of the highest vibration effects due to blasting between the EIS TMR (Stantec 2020a) and current NOA/NOC update at the most impacted receptor (ID76) for the operation phase.



*Table 3.4 Comparison of Vibration Effects – Gordon Site*

Mine Site	Receptor	Ground-borne Vibration (mm/s)			Overpressure (dBL)		
		2020 EIS	NOA/NOC Update	Changes	2020 EIS	NOA/NOC Update	Changes
Gordon	ID76	3.1	3.4	+0.3	123	124	+1

### **3.3.2.3 Summary of Mitigation Measures**

#### **3.3.2.3.1 Noise**

The mitigation measures for noise are identical to mitigation measures recommended in the EIS (Stantec 2020a). The following measures will be implemented as needed to reduce potential noise effects during construction and operation:

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

The operational sound levels listed in the Noise and Vibration Impact Assessment TMR (Volume 5, Appendix B, Stantec 2020a) and the Memo of Lynn Lake Gold Project – Noise and Vibration Impact Assessment Update (Appendix D) are the estimated equipment sound power levels used in the acoustic modelling; it is assumed that these acoustical specifications are achievable by the suppliers. If the sound power level cannot be achieved, additional mitigation measures may be required.

#### **3.3.2.3.2 Vibration**

In an adaptive management approach, mitigation measures presented in this section will be implemented as needed, and monitoring will help to confirm effectiveness. Mitigation will be achieved by blast design. The mitigation measures that apply to Gordon sites are summarized as follows:

- Highest blasting charge per hole that do not exceed 230 kg.
- Only one hole/delay will be fired in the blast.
- Minimum time delay between holes in blasts will not be less than 8 milliseconds (ms).in blasts will not be less than 8 ms.



The specific mitigation measures for receptor ID 73, ID 76 and ID 77 near the Gordon site are as follows:

- The reduced blast charge of 43 kg can be increased if the distances between the blast and closest receptor ID 76, ID 73 and ID 77 are more than 1,420 m, 2,125 m, and 2,255 m, respectively (distance based on receptor location to pit boundary).
- The reduced blast charge of 43 kg can be increased if monitoring results indicate air overpressure level is below 120 dBL at ID 73, ID 76, and ID 77.
- Engagement with Marcel Colomb First Nation to discuss the potential of a seasonal mitigation approach, which relaxes the reduced blast charge of 43 kg during off-season period when trapping activities at receptors (ID 73, ID 76, and ID 77) is not expected.

#### **3.3.2.4 Residual Effects**

The Noise and Vibration Impact Assessment Update memo (Appendix D) summarizes the noise and vibration assessment results based on the design changes for the Gordon site. The predicted results are different from the EIS results (Stantec 2020a). The design changes marginally increases both noise and vibration effects at some receptors in comparison with the EIS (Stantec 2020a). However, the assessment update results indicate that the Project will remain compliant with the applicable noise and vibration thresholds at all receptors. After the application of mitigation measures, the proposed alterations at the Gordon site will not change the characterization of Project residual effects on noise and vibration and there is no change to EIS conclusions.

#### **3.3.3 Groundwater**

Groundwater includes domestic, commercial, and industrial groundwater-source water supplies, and the groundwater component of freshwater ecosystems, including stream flow, vegetation, and wetlands. The Project activities and components that are proposed to be altered that might interact with groundwater and were therefore assessed as part of this NOA/NOC, include: adjustment of the footprint of the MRSA, open pit, and ore storage area. In addition, the removal of the historical north MRSA and partial removal of the historical south MRSA was included in the updated mine plan. Although the interceptor wells were included in the EIS, the number and alignment of the interceptor wells were optimized for this NOA/NOC and effects assessment for groundwater.



### 3.3.3.1 Regulatory and Guideline Setting

#### 3.3.3.1.1 Guideline Criteria

The assessment of potential Project-related environmental effects on groundwater quantity and quality includes the consideration of the following federal legislation:

- The *Fisheries Act* restricts or controls the deposit of deleterious substances into waters or locations frequented by fish unless authorized by regulation. The Metal and Diamond Mining Effluent Regulation (MDMER) defines unionized ammonia, arsenic, copper, cyanide, lead, nickel, zinc, total suspended solids (TSS), and radium 226 as deleterious substances and Schedule 4 of the MDMER imposes limits on their concentrations in effluent at the final discharge point to the receiving body of water. The MDMER defines effluent as seepage containing any deleterious substances that flows over, through, or out of the site of the mine.
- The Canadian Water Quality Guidelines for Protection of Freshwater Aquatic Life (CWQG-FAL) which are used conservatively as screening criteria for areas where groundwater is anticipated to discharge to surface water.
- Federal Environmental Quality Guidelines (FEQG) are recommended chemical thresholds that identify the concentration below which there is a low likelihood of direct adverse effects from the chemical on aquatic life exposed via water or sediment, or where chemicals may bioaccumulate in wildlife that may consume aquatic life. FEQGs are developed by ECCC to support federal environmental quality monitoring, risk assessment and risk management activities on substances for which the CCME guidelines do not yet exist or are not reasonably expected to be updated in the near future. The FEQGs are used conservatively as a screening criterion for areas where groundwater is anticipated to discharge to surface water. Where the CWQG-FAL and the FEQGs differ, the more recent update for the given parameter is used.
- Guidelines for Canadian Drinking Water Quality which are based on current published scientific research related to health effects, aesthetic effects, and operational conditions of various parameters in drinking water.

The assessment of potential Project-related environmental effects on groundwater quantity and quality includes the consideration of the following provincial legislation:

- The *Mines and Minerals Act* and *Mine Closure Regulation* under Part 14 of The *Mines and Minerals Act* sets out standards for mine closure.
- The *Environment Act* contains general provisions associated with Class 1, 2, and 3 developments that can be used to protect surface water and groundwater quality.
- The *Water Protection Act* is the principal statute governing water management and water quality in Manitoba. The Manitoba Water Quality Standards, Objectives, and Guidelines (MWQSOG) under Part 2 of The *Water Protection Act* sets out prescribed water quality standards for several activities, including drinking water, freshwater aquatic life, and common classes of discharge.



### **3.3.3.1.2 IAAC Decision Statement**

As per the IAAC Decision Statement, Alamos is required to adhere to the following conditions with respect to groundwater:

*Condition 3.4 The Proponent shall develop, prior to construction and in consultation with relevant authorities, and implement and maintain, during all phases of the Designated Project, measures to mitigate any potential effects to water levels in Farley Lake and Gordon Lake due to groundwater drawdown resulting from Designated Project activities. In doing so, the Proponent shall intercept and/or redirect groundwater flowing towards the open pits with wells and/or other mitigation measures, as applicable, before it enters the open pits. The Proponent shall submit these measures to the Agency before implementing them.*

*Condition 3.6 The Proponent shall adjust, during construction, the rate of release of water into Farley Lake and Gordon Lake from dewatering the East and Wendy pit lakes and from groundwater intercepted pursuant to condition 3.4 in order to maintain lake levels within the range of natural variability predicted in Volume 2 Chapter 10 of the Environmental Impact Statement and Appendix A Attachment IAAC-48 of the Proponent's Information Request Responses Round 1, Package 1 (Canadian Impact Assessment Registry Reference Number 80140, document #54).*

*Condition 3.7 The Proponent shall collect contact water and seepage from the Project development areas, including seepage and recharge from the tailings management facility, mine rock storage areas, overburden and ore stockpiles, and seepage input to groundwater that flows into the open pits, and treat it, as necessary, before releasing it into the receiving environment during all phases of the Designated Project to ensure that any deposits are made in accordance with the Metal and Diamond Mining Effluent Regulations and the pollution prevention provisions of the Fisheries Act. When treating contact water and seepage, the Proponent shall take into account Manitoba's Water Quality Standards, Objectives, and Guidelines, the Canadian Council of Ministers of the Environment's Canadian Water Quality Guidelines of the Protection for Aquatic Life, and Environment and Climate Change Canada's Federal Environmental Quality Guidelines.*

*Condition 3.12 The Proponent shall develop, prior to construction and in consultation with Indigenous groups, Fisheries and Oceans Canada, Environment and Climate Change Canada and any other relevant authorities, a follow-up program to verify the accuracy of the environmental assessment and determine the effectiveness of the mitigation measures as they pertain to adverse environmental effects of the Designated Project on water quality, taking into account Environment and Climate Change Canada's Metal Mine Technical Guidance for Environmental Effects Monitoring. The Proponent shall implement the follow-up program during all phases of the Designated Project. As part of the follow-up program, the Proponent shall:*

*3.12.3 monitor, beginning during construction, water quality in groundwater near the open pits, Farley Lake, Gordon Lake, the Keewatin River, the unnamed tributary of the Keewatin River, Minton Lake, the unnamed lakes northeast of Minton Lake, Payne Lake, Pump Lake, and Susan Lake, up and down gradient from the tailings management facility, mine rock storage areas, ore and overburden stockpiles, and seepage collection systems. Monitoring shall be conducted for all*



*contaminants that may have adverse effects on fish and fish habitat, including antimony, arsenic, iron, sodium, sulphate, and uranium at the Gordon site and aluminum, antimony, arsenic, cobalt, total cyanide, iron, lead, nitrate, nitrite, sodium, and sulphate at the MacLellan site;*

*Condition 3.13 The Proponent shall develop, prior to construction and in consultation with Indigenous groups, Fisheries and Oceans Canada, Environment and Climate Change Canada and any other relevant authorities, a follow-up program to verify the accuracy of the environmental assessment and determine the effectiveness of the mitigation measures as they pertain to adverse environmental effects of the Designated Project on water quantity. The Proponent shall implement the follow-up program during all phases of the Designated Project. As part of the follow-up program, the Proponent shall:*

*3.13.2 monitor, during all phases of the Designated Project, groundwater levels, gradients and hydraulic conductivity of all hydrogeological units, as identified in the groundwater model in Volume 5 Appendix E and G of the Environmental Impact Statement, with well depths ranging from near surface to a minimum of 115 meters below ground to characterize contaminant transport via groundwater at the depth of the groundwater model for the Designated Project. Monitoring wells shall be installed near the open pits, the tailings management facility, mine rock storage areas, ore and overburden stockpiles, and fish bearing wetlands within the local assessment areas that intersect the Project development areas; and*

### **3.3.3.2 Environmental Effects**

#### **3.3.3.2.1 Groundwater Quantity**

A groundwater model was constructed and used to predict the effects of the Project, as per the NOA/NOC mine plan, on groundwater quantity. Details of the modelling and model results are presented in Appendix E.

#### **Construction**

During construction, the Project activities and components that might interact with groundwater quantity and result in an environmental effect include site preparation, construction of mine components, utilities and infrastructure, and dewatering of the East and Wendy pits. As part of this NOA/NOC, additional Project activities for the construction phase of the Project include removal of the historical north MRSA, partial removal of the historical south MRSA, and storage/stockpiling of mine rock (new MRSA) and associated water management. In the EIS, the new MRSA wasn't anticipated to be constructed until the start of operation. Project components are described in Section 2.

The environmental effects resulting from site preparation and temporary dewatering for foundations and installation of infrastructure remain consistent with the EIS.



The predicted drawdown contours at the end of construction (pre-production period) are presented on Map 17, Appendix E. Dewatering of the East and Wendy pits is anticipated to result in the drawdown of the water table up to 1 m within 500 m of the historical open pits. The extent of drawdown and the resulting effects is consistent with the EIS. In this NOA/NOC, the MRSA contact water collection ditch was simulated which resulted in an area of about 350 m of water table drawdown in the vicinity of the western to northwestern portion of the MRSA where the contact water collection ditch may potentially intersect the water table. The MRSA contact water collection ditch was not simulated in the EIS.

The corresponding changes to groundwater discharge to surface water features at the end of the construction period were predicted using the groundwater flow model and are presented in Table 3.5. The direction of groundwater flow into (discharge) or out of (recharge) each watercourse and lake are predicted to remain consistent between baseline and construction except for Gordon and Farley lakes and the diversion channel (FAR6). Gordon and Farley lakes and the diversion channel (FAR6) shift from gaining groundwater under baseline conditions to surface water recharging groundwater at the end of construction. The water pumped from the interceptor wells (0.10 cubic metres per second [ $\text{m}^3/\text{s}$ ]) will be returned to Gordon and Farley lakes and indirectly to the diversion channel (FAR6) during construction to offset a reduction in groundwater discharge (0.091  $\text{m}^3/\text{s}$ ). The changes to the groundwater flow rates for remaining lakes and watercourses are relatively small (generally less than 0.001  $\text{m}^3/\text{s}$ ) compared with baseline conditions. The overall anticipated effect on flow rates in the surface water features is evaluated in the effects assessment for surface water (Section 3.3.4).

The predicted effects of dewatering the historical East and Wendy pits on groundwater discharge to surface water features at the end of construction are consistent with the EIS except for Marie Lake. Marie Lake was predicted to shift from groundwater discharge to surface water recharging groundwater in the EIS. In this updated assessment of effects, dewatering the historical East and Wendy pits is predicted to have a negligible effect on groundwater discharge to Marie Lake (i.e. less than 0.001  $\text{m}^3/\text{s}$  change in groundwater discharge rate at end of construction compared with baseline conditions).

## **Operation**

During operation, the Project activities and components that might interact with groundwater quantity and result in an environmental effect include open pit mining, storage/stockpiling of mine rock (new MRSA), and water management. The Project activities are consistent with the EIS; however, the size of the infrastructure has been updated in this assessment of effects to be consistent with the NOA/NOC mine plan as described in Section 2.

The primary Project effect on groundwater quantity and/or flow during operation is the lowering of the groundwater table through continued dewatering of the historical Wendy and East pits as they are developed into the ultimate open pit. The groundwater interceptor wells installed during construction will remain in place during operation to reduce groundwater inflow to the open pit due to a high permeability zone in the shallow bedrock associated with the Wendy and East faults.



Two pumping rates for the interceptor wells were simulated and are presented in Appendix E, however, the higher pumping rates are presented in this effects assessment for the purpose of the NOA/NOC. At the end of operation, when the open pit is dewatered to its full extent, groundwater flow into the open pit is predicted to be about 0.033 m<sup>3</sup>/s with the interceptors pumping at a rate of 0.047 m<sup>3</sup>/s. Despite the higher dewatering rate, the drawdown cone is predicted to be slightly smaller than the EIS as additional seepage from Gordon and Farley lakes is induced, which limits the extent of drawdown compared with the EIS. The effects of freezing of the pit wall on groundwater inflow was simulated and predicted to result in a cyclical pattern with lower inflow rates in the winter and higher inflow rates in non-freezing months. With pit wall freezing, groundwater inflow rates are predicted to be about 0.01 m<sup>3</sup>/s in the winter months and about 0.065 m<sup>3</sup>/s in the spring and summer months near the end of operation (with the interceptor wells operating at a combined rate of about 0.085 m<sup>3</sup>/s).

The predicted groundwater drawdown contours at the end of operation are presented on Map 20 of Appendix E. The 1 m drawdown contour is predicted to extend approximately 500 m to the north and 1,000 m to the southwest of the open pit, increasing to more than 20 m of drawdown within 300 m of the open pit. The drawdown extent is limited to the east and west due to recharge to groundwater from Gordon and Farley lakes. The extent of drawdown related to the presence of the MRSA contact water collection ditch is masked by larger effects on the water table from pit dewatering and pumping from the interceptor wells.

Table 3.5 presents the comparison of baseline groundwater discharge rates with effects of dewatering at the end of the operation period. Gordon and Farley lakes, as well as the diversion channel (FAR6) are predicted to shift from gaining from groundwater to losing to groundwater, as was also predicted during construction. The lake north of the Open pit (Lake 3) is also predicted to shift from gaining to losing during operation. The water pumped from the interceptor wells (0.11 m<sup>3</sup>/s) will be returned to Gordon and Farley lakes during operation to offset the reduction in groundwater discharge in the two lakes (0.12 m<sup>3</sup>/s). The changes to the groundwater flow rates for remaining lakes and watercourses are relatively small (generally less than 0.001 m<sup>3</sup>/s) compared with baseline conditions. The overall anticipated effect on flow rates in the surface water features is evaluated in the effects assessment for surface water (Section 3.3.4).

### **Decommissioning/Closure**

Following completion of operation, dewatering of the open pit will cease and water levels will begin to rise within the open pit until they stabilize as there is no outlet to the open pit. The groundwater interceptor wells were assumed to continue to operate during the initial stages of decommissioning/closure and decrease with time as the pit lake stage increases. The MRSA will be covered and revegetated and reach a steady state infiltration rate which is greater than the construction and operation infiltration rate for the MRSA. The Project activities are consistent with the EIS, however the size of the infrastructure in this assessment of effects has been updated to reflect the mine plan in this NOA/NOC as described in Section 2.



At a pit lake stage of 315 metres above sea level, the open pit was predicted to become a “flow through” lake with groundwater flowing into the lake on the upgradient side and out on the downgradient side. Map 23 of Appendix E presents the predicted groundwater drawdown contours in closure when the pit lake has formed. The water table is predicted to have returned to near baseline conditions in the vicinity of the open pit but remains below baseline conditions by up to 5 m in the vicinity of the MRSA contact water collection ditch. After removal of the MRSA contact water collection ditch, groundwater levels in the vicinity of the MRSA are anticipated to also return to near baseline conditions.

Table 3.5 presents the comparison of baseline groundwater discharge rates with effects of dewatering in closure once the pit lake has formed. The groundwater flows to the receptors are predicted to return to near baseline rates (within 0.001 m<sup>3</sup>/s of baseline conditions) once the pit is full except for Farley Lake. In closure, groundwater discharge to Farley Lake is predicted to increase by 0.002 m<sup>3</sup>/s compared with baseline conditions.

### **Comparison with the EIS**

The predicted groundwater inflow rate to the open pit at the end of operation is similar (within 10%) to that predicted for the EIS. Since the EIS, a pumping test and additional modelling was completed to support detailed design of the interceptor well system. The interceptor well system is designed to intercept seepage from Gordon and Farley lakes prior to entering the open pit and return the water to the lakes to mitigate potential changes in lake level due to open pit dewatering. Capturing the water prior to entering the open pit is anticipated to limit effects of blasting residual and metal leaching on groundwater quality and therefore limit potential treatment prior to returning the water to the lakes. In the EIS, 14 interceptor wells were simulated whereas in this updated modelling 11 interceptor wells were simulated. The interceptor well locations were also shifted slightly to the south so more of the wells are in the zone of fractured bedrock. As a result, the combined predicted pumping rate from the interceptor wells increased from approximately 0.014 m<sup>3</sup>/s in the EIS to 0.11 m<sup>3</sup>/s in this updated modelling.

The water table drawdown related to open pit dewatering is slightly smaller (the extent is about 200 to 500 m smaller) than that predicted in the EIS. The smaller drawdown cone is the result of increased seepage from Gordon and Farley lakes to the open pit compared with that in the EIS.

Like the EIS, the seepage from lakes and rivers remains consistent with baseline conditions throughout the various phases of mine life, except for Gordon and Farley Lakes. In both the EIS and this model update, Gordon and Farley lakes are predicted to shift from gaining from groundwater to losing to groundwater. The change in rate of seepage from Gordon and Farley lakes at the end of operation was predicted to be 0.028 m<sup>3</sup>/s in the EIS and 0.12 m<sup>3</sup>/s in this updated modelling. The interceptor wells were optimized in terms of number of wells and pumping rate to offset the increased seepage from the lakes to the open pit which is why there are more interceptor wells, and the pumping rate was increased to 0.11 m<sup>3</sup>/s in this updated modelling. The effect to water levels in Gordon and Farley lakes from the Project are predicted to be mitigated using the interceptor wells.



Table 3.5 Estimated Groundwater Discharge to Surface Water Features

Receiver	Net Groundwater Discharge to Receiver (m <sup>3</sup> /s)						
	Baseline <sup>1</sup>	End of Construction <sup>1</sup>	Change from Baseline	End of Operation <sup>1</sup>	Change from Baseline	Closure <sup>1</sup>	Change from Baseline
<b>Lakes</b>							
Susan Lake	0.00236	0.00240	0.00003	0.00221	-0.00016	0.00218	-0.00019
Pump Lake	-0.00057	-0.00054	0.00003	-0.00057	0.00001	-0.00055	0.00003
Marnie Lake	-0.00030	-0.00023	0.00007	-0.00025	0.00005	-0.00024	0.00006
Marnie Lake North	0.00024	0.00025	negligible	0.00023	-0.00002	0.00024	negligible
Gordon Lake	0.00340	-0.04167	-0.04506	-0.05496	-0.05836	0.00340	0.00001
Farley Lake	0.00893	-0.03667	-0.04559	-0.06016	-0.06909	0.01122	0.00229
Marie Lake	-0.00231	-0.00221	0.00010	-0.00226	0.00005	-0.00227	0.00004
Lake 3	0.00050	0.00021	-0.00029	-0.00072	-0.00123	0.00062	0.00012
<b>Watercourses</b>							
Watercourse connecting Susan and Marrow Lakes (SUS3)	0.00044	0.00045	0.00001	0.00045	0.00001	0.00045	negligible
Tributary of Simpson Lake (FAR3-SIM2)	0.00115	0.00115	negligible	0.00114	-0.00001	0.00113	-0.00002
Tributary of Swede Lake (FAR3-A1)	0.00059	0.00059	0.00001	0.00059	0.00000	0.00058	negligible
Watercourse connecting Unnamed South Lake and Farley Lake (FAR5-MAN1)	0.00013	0.00013	0.00001	0.00011	-0.00002	0.00013	negligible
Tributary of Farley Lake (FAR5-A1)	0.00003	0.00002	-0.00001	-0.00003	-0.00006	0.00003	negligible



**Lynn Lake Gold Project: Gordon Mine Plan Amendment Notice of Alteration / Notice of Change**  
 Section 3: Environmental Effects and Mitigation  
 October 6, 2025

Receiver	Net Groundwater Discharge to Receiver (m <sup>3</sup> /s)						
	Baseline <sup>1</sup>	End of Construction <sup>1</sup>	Change from Baseline	End of Operation <sup>1</sup>	Change from Baseline	Closure <sup>1</sup>	Change from Baseline
Southern Tributary of Gordon Lake (FAR7-A1)	0.00013	0.00010	-0.00003	0.00005	-0.00008	0.00007	-0.00006
Diversion Channel (FAR6)	0.00006	-0.00013	-0.00019	-0.00013	-0.00019	0.00006	0.00001
Watercourse connecting Marie and Farley Lakes (FAR5-MAR1)	0.00009	0.00009	negligible	0.00009	negligible	0.00009	negligible
Watercourse Connecting Marie and Farley Lakes (FAR5-MAR3)	-0.00004	-0.00004	0.00001	-0.00005	-0.00001	-0.00005	negligible
Northern Tributary of Gordon Lake (FAR7B1)	-0.00001	-0.00001	negligible	-0.00001	negligible	0.00000	negligible
<b>Water Management Features</b>							
MRSA Contact Water Collection Ditch	n/a	0.00087	n/a	0.00049	n/a	6.3E-04	n/a
Interceptor Wells	n/a	0.10012	n/a	0.10601	n/a	n/a	n/a

Notes:

<sup>1</sup> Positive groundwater discharge value represents flow from groundwater to receiver

n/a – not applicable



### **3.3.3.2.2      *Groundwater Quality***

The effects assessment for groundwater quality involved an evaluation of seepage quality from mine infrastructure and predicting the fate of seepage from the mine infrastructure. The predicted seepage quality from the MRSAs was assessed in the EIS and remains consistent with the EIS in consideration of this NOA/NOC. As described in Chapter 8.0 of the EIS (Section 8.4.3.3 of the EIS), indicator parameters of groundwater seepage from the MRSA were identified as sulphate, antimony, arsenic, sodium, and uranium, meaning concentrations of these parameters in seepage from the MRSA were above the drinking water guidelines (Guidelines for Canadian Drinking Water Quality [GCDWQ] and MWQSOG Drinking Water) or GW3.

For this NOA/NOC, the assessment of effects to groundwater quality focused on the fate of recharge from the MRSAs for each phase of mine life, particularly the groundwater flow path, discharge rate, and travel times. A groundwater model was constructed and used to predict the fate of recharge from the mine components, as defined per the NOA/NOC mine plan. Details of the modelling and model results are presented in Appendix E.

#### **Construction**

During construction, seepage from the MRSAs (historical and new) has the potential to affect groundwater quality. The historical north MRSA will be removed in construction (either used for construction or placed in the new MRSA) which is different than the EIS which assumed the north MRSA remained throughout each phase of mine life. The historical south MRSA footprint will be reduced by 80% to allow development of the open pit, which is greater than the 37% reduction assumed in the EIS. The new MRSA will be built in the construction phase to accommodate rock from the historical south and north MRSAs which is also different than the EIS which assumed the new MRSA would commence in the operation phase.

The groundwater flow model was used to predict the flow pathway, discharge location, and flux of water recharging the groundwater flow systems from beneath the MRSAs at the end of construction, when the historical East and Wendy pits are fully dewatered. Detailed methods and results of the groundwater flow modelling are provided in Appendix E.

Table 3.6 provides a summary of the discharge fluxes and advective travel times of recharge originating from the historical south MRSA and MRSA at the end of construction when the historical East and Wendy pits are fully dewatered. The particles originating from the historical south MRSA are predicted to be captured by the interceptor wells with a mean advective travel time of approximately one year. The particles originating at the MRSA are predicted to discharge to the MRSA contact water collection ditch or be captured by the interceptor wells with a mean travel time of less than one year. The flow path of seepage from the MRSAs is confined to the PDA. No groundwater supply wells are known to be in the PDA and groundwater originating from the historical south MRSA and MRSA is predicted to discharge to surface water and not to areas where groundwater supply users are known to be located. The effect of the changes in mass loading to surface water receivers on surface water quality is assessed in Section 3.3.4.



## **Operation**

During operation, the MRSA (historical and new) have the potential to affect groundwater quality. As the footprint of the MRSA and the historical south MRSA have changed as part of this NOA/NOC, the groundwater flow model was used to predict the flow pathway, discharge location, and flux of water recharging the groundwater flow systems from beneath the MRSA at the end of operation when the open pit is fully dewatered. Detailed methods and results of the groundwater flow modelling is provided in Appendix E.

Table 3.6 provides a summary of the discharge fluxes and advective travel times of recharge originating from the historical south MRSA and MRSA once the ultimate extent of the open pit has been fully dewatered. The particles originating from the historical south MRSA are captured by the interceptor wells or discharge to the open pit with mean advective travel time of one and two years, respectively. Approximately 72% of the recharge from the MRSA discharges to the open pit or is captured by the interceptor wells or MRSA contact water collection ditch with mean advective travel times of approximately two to four years. About 0.8% of recharge ( $3 \times 10^{-6}$  m<sup>3</sup>/s) from the MRSA is predicted to discharge to Susan Lake with a mean advective travel time of approximately five years. The annual volumes of recharge from the MRSA predicted to discharge to Susan Lake during the operation phase represent 0.21% of the total predicted annual groundwater discharge to Susan Lake. The remaining recharge from the MRSA (28%), remains in the groundwater system during the operation phase. Recharge from the ore storage area (OSA) discharges to the open pit or is captured by the interceptor wells with mean advective travel times of two and three years, respectively.

The flow path of seepage from the MRSA is mainly confined to the PDA with small portion of seepage extending to the south of the PDA toward Susan Lake. No groundwater supply wells are known to be in the PDA or the flow path of seepage from the MRSA. Groundwater originating from the MRSA (historical and new) is predicted to discharge to the open pit, MRSA contact water collection ditches, interceptor wells and/or surface water and not to areas where groundwater supply users are known to be located. The effect of the changes in mass loading to surface water receivers on surface water quality, is assessed in Section 3.3.4.

## **Decommissioning/Closure**

During decommissioning/closure, as the open pit fills, groundwater levels will slowly recover, and the groundwater flow patterns will return to near baseline conditions once the open pit has filled. The groundwater flow model was used to predict the flow pathway, discharge location, and flux of water recharging the groundwater flow systems from beneath the MRSA in closure. Detailed methods and results of the groundwater flow modelling is provided in Appendix E.

In closure, the MRSA is covered and revegetated. The rate of recharge through the new MRSA was based on modelling conducted as part of the EIS that predicted the recharge rate out the base of the MRSA at different phases of wetting up. The wetting up time is the time to reach a steady-state saturation condition in the MRSA, where the volume of water infiltrating into the MRSA from precipitation will result in an equal amount of recharge from the base of the MRSA. The MRSA is predicted to be wet up 19 years after the start of closure. Therefore, the recharge rate from the MRSA was increased in closure



groundwater model simulations compared with operation groundwater model simulations. The contact water collection ditch around the MRSA remains in closure until contact water quality is suitable for discharge to the environment and so the contact water collection ditch was simulated in the assessment of effects to groundwater quality for closure.

Table 3.6 provides a summary of the discharge fluxes and advective travel times of recharge originating from the historical south MRSA and MRSA once the pit lake has formed. The particles originating from the historical south MRSA discharge to the pit lake with a mean advective travel time of less than one year. Approximately 95% of the recharge from the MRSA discharges to the pit lake or the MRSA contact water collection ditch with mean advective travel times of approximately one and two years, respectively. Approximately three percent of recharge from the MRSA discharges to Simpson Lake with a mean advective travel time of 14 years. The annual volume of recharge from the MRSA predicted to discharge to Simpson Lake during the closure period represents 0.8% of the total predicted annual groundwater discharge to Simpson Lake. In comparison to operation, there is no predicted seepage from the MRSA to Susan Lake. In closure, the recharge rate of the MRSA increases due to steady state saturation of the MRSA. As a result of the increased recharge from the MRSA, the recharge is driven deeper into the groundwater flow system, bypassing Susan Lake in closure. The remaining recharge from the MRSA (6%), remains in storage in the groundwater system at the end of the closure period.

The flow path of seepage from the MRSAs is mainly confined to the PDA with small portion of seepage extending to the south of the PDA toward Simpson Lake. No groundwater supply wells are known to be in the PDA or the flow path of seepage from the MRSA. Groundwater originating from the MRSAs (historical and new) is predicted to discharge to the open pit, MRSA contact water collection ditches, interceptor wells and/or surface water and not to areas where groundwater supply users are known to be located. The effect of the changes in mass loading to surface water receivers on surface water quality, is assessed in Section 3.3.4.

### **Comparison with the EIS**

Receptors of groundwater seepage from mine infrastructure remained consistent with the EIS, except for Simpson Lake. A portion of seepage ( $2.2E-05$  m<sup>3</sup>/s or 3% of seepage from the MRSA) is predicted to discharge to Simpson Lake whereas in the EIS there was no predicted seepage from the MRSA to Simpson Lake. The rate of seepage from the MRSA to Simpson Lake represents 0.8% of the overall predicted groundwater discharge to Simpson Lake and therefore is not anticipated to affect the water quality of Simpson Lake. A full assessment of the effect of groundwater discharge on surface water quality is assessed in Section 3.3.4.



Table 3.6 Predicted Groundwater Discharge Rates from Mine Rock Storage Areas and Ore Storage Areas to Receiving Environment.

Source	Receptor	Baseline				End of Construction				End of Operation				Closure (Pit Lake)			
		Discharge (m <sup>3</sup> /s)	Travel Time (years)			Discharge (m <sup>3</sup> /s)	Travel Time (years)			Discharge (m <sup>3</sup> /s)	Travel Time (years)			Discharge (m <sup>3</sup> /s)	Travel Time (years)		
			Min	Mean	Max		Min	Mean	Max		Min	Mean	Max		Min	Mean	Max
Historical North MRSA	East Pit	4.6E-05	15	70	171	-	-	-	-	-	-	-	-	-	-	-	-
	Wendy Pit	4.5E-05	16	116	759	-	-	-	-	-	-	-	-	-	-	-	-
Historical South MRSA	Farley Lake	1.1E-04	991	1,036	1,226	-	-	-	-	-	-	-	-	-	-	-	-
	East Pit	4.4E-05	61	188	500	-	-	-	-	-	-	-	-	-	-	-	-
	Interceptor Wells	-	-	-	-	1.8E-07	1	1	>1	1.1E-06	1	1	1	-	-	-	-
	Open Pit	-	-	-	-	-	-	-	-	1.9E-05	1	2	3	-	-	-	-
	Pit Lake	-	-	-	-	-	-	-	-	-	-	-	-	1.8E-05	<1	<1	1
MRSA	MRSA Contact Water Collection Ditch	-	-	-	-	9.8E-05	<1	<1	>1	1.5E-04	<1	1	4	6.1E-05	<1	1	4
	Interceptor Wells	-	-	-	-	4.9E-06	1	1	>1	6.9E-05	1	2	4	-	-	-	-
	Open Pit	-	-	-	-	-	-	-	-	2.3E-04	2	4	>6	-	-	-	-
	Susan Lake	-	-	-	-	-	-	-	-	4.6E-06	5	5	>6	-	-	-	-
	Pit Lake	-	-	-	-	-	-	-	-	-	-	-	-	6.0E-04	<1	2	18
	Simpson Lake	-	-	-	-	-	-	-	-	-	-	-	-	2.2E-05	9	14	27
Ore Storage Area	Interceptor Wells	-	-	-	-	-	-	-	-	4.2E-05	1	2	2	-	-	-	-
	Open Pit	-	-	-	-	-	-	-	-	6.4E-05	2	3	4	-	-	-	-



Predictions of travel time of seepage from mine infrastructure also changed relative to the EIS. The porosity of the upper, intermediate, and deep bedrock in the EIS groundwater flow model was 0.2. In the model update to support this NOA/NOC, the porosity of the shallow bedrock and faulted shallow bedrock was set to 0.06 and 0.0003, respectively while the porosity for the upper, intermediate, and deep bedrock layers was set to 0.0001. The porosity of the shallow bedrock (faulted and unfaulted) was calibrated in the groundwater flow model to the results of pumping tests. These porosity values reflect discussions and sensitivity analysis completed through the Information Requests after the submission of the EIS (IR-IAAC-83, IR-IAAC-R2-72). In addition, the travel times for Gordon in the EIS were presented as years and after the EIS it was determined that the travel times for Gordon in the EIS were days, which means travel times in the EIS should have been presented as tens of years instead of thousands of years. The porosity does not affect the flux, or specific discharge, of groundwater through the rock, the porosity only affects the predicted timing of seepage from the mine infrastructure discharging to the receiver. As a result, the predicted travel times of seepage from mine infrastructure decreases from tens to thousands of years in the EIS to tens of years in this model update. The predictions of seepage rates and travel times from mine infrastructure remain conservative in that processes along the groundwater flow path such as dispersion and geochemical reactions were not simulated and would serve to increase groundwater flow travel times and decrease concentrations along the groundwater flow path.

### **3.3.3.3 Summary of Mitigation Measures**

The mitigation measures for groundwater quantity and quality are the same as the mitigation measures recommended in the EIS (Stantec 2020a) and described in the Groundwater Management and Monitoring Plan (GMMP; Version 0, January 2025). The conceptual design of some of the mitigation measures have been optimized for the updated mine plan. No additional mitigation measures are required in relation to this NOA/NOC. Alamos is committed to the follow-up and monitoring, and adaptive management (if and as required) that is described in the GMMP.

### **3.3.3.4 Residual Effects**

#### ***3.3.3.4.1 Groundwater Quantity***

During construction, residual environmental effects related to dewatering the historical Wendy and East pits will occur through construction phase and into operation. The changes to groundwater quantity and flow were characterized in the EIS as adverse, medium-term, continuous, and reversible. The magnitude was high within the PDA and LAA/RAA, as the change in groundwater level was anticipated to be greater than 5 m. Timing (i.e., natural seasonal variations in precipitation) may affect dewatering rates, particularly during the spring period when higher groundwater levels are expected; however, these variations would not be considered a Project related effect. The groundwater quantity in the LAA/RAA is disturbed with respect to ecological context. The results of the updated groundwater assessment for this NOA/NOC do not change the characterization of these residual effects for construction.

At the end of operation, the lowering of water levels through continued dewatering of the historical Wendy and East pits and the development and dewatering of the open pit will result in a change in groundwater quantity and flow at the Gordon site. The changes were characterized in the EIS as adverse, medium-



term, continuous, irreversible, and will be confined to the LAA/RAA. The magnitude was high within the PDA and LAA/RAA as the change in groundwater level will be greater than 5 m. The magnitude will be reduced during decommissioning/closure as the open pit fills to form a pit lake. Timing (i.e., natural seasonal variations in precipitation) may affect dewatering rates due to natural seasonal variations, particularly during the spring period when higher groundwater levels are expected; however, these variations would not be considered a Project-related effect. The groundwater quantity in the LAA/RAA is disturbed with respect to ecological context. The results of the updated groundwater assessment for this NOA/NOC do not change the characterization of these residual effects for operation.

In closure, once the pit lake has filled, the drawdown around the open pit will be reduced to near baseline conditions. The changes in groundwater levels in proximity of the open pit were characterized in the EIS as adverse, long-term, continuous, irreversible, and will be confined to the LAA/RAA. The magnitude was low within the PDA and decreased to negligible in the LAA/RAA as the change in groundwater level was less than 1 m. Timing may affect water levels (i.e., natural seasonal variations), particularly during the spring period when higher groundwater levels are expected, but this is not considered a Project-related effect. From an ecological context, the areas where the water level changes occur are disturbed for groundwater availability. The results of the updated groundwater assessment for this NOA/NOC do not change the characterization of these residual effects for closure.

Compared with the results of the EIS, the effects of the Project on groundwater quantity due to the proposed alterations remain similar and where they differ (i.e., Gordon and Farley Lake), measures were simulated to mitigate the potential effect. In conclusion, the results of the updated groundwater assessment do not change the characterization of residual effects as presented in the EIS (Stantec 2020a).

#### **3.3.3.4.2      *Groundwater Quality***

The residual effect on groundwater quality during construction was characterized in the EIS as positive, as no new source of groundwater mass loading was introduced during construction, a portion of the historical south MRSA was relocated, and the seepage from the historical MRSAs was redirected from Gordon and Farley Lake to the open pit. With the proposed alterations, the new MRSA will be operational in construction phase of mine life which means a new source of loading is introduced to the groundwater flow system in construction. However, the seepage from the MRSAs will be captured by the MRSA contact water collection ditch and/or open pit dewatering, redirecting seepage from the historical MRSAs from Gordon and Farley Lake and therefore the residual effect is still characterized as positive. The effects on groundwater quality during construction were characterized in the EIS as short-term, continuous, irreversible, and will be confined to the PDA. The magnitude is moderate because water quality and discharge fluxes for most parameters are predicted to result in temporary reductions in the mass loading from historical MRSAs to surface water receivers within the LAA/RAA relative to baseline conditions. No existing or foreseeable groundwater users are in the areas with groundwater quality that exceeds the GCDWQ or MWQSOG (drinking water). The ecological context of the LAA/RAA is disturbed based on existing parameter loadings from historical mining activities. The results of the updated groundwater assessment for this NOA/NOC do not change the characterization of these residual effects for the construction phase.



The effects on groundwater quality during operation were characterized in the EIS as adverse, long-term, continuous, irreversible, confined to the LAA/RAA, and mainly to the PDA. The magnitude was moderate because water quality and loading for some parameters were predicted to increase but not impact groundwater supply users beyond the PDA. No existing or foreseeable groundwater users were in the areas with groundwater quality that exceeds the GCDWQ or MWQSOG (drinking water). The ecological context of the LAA/RAA was disturbed based on existing parameter loadings from historical mining activities. The results of the updated groundwater assessment for this NOA/NOC do not change the characterization of these residual effects for the operation phase.

The effects on groundwater quality during closure were characterized in the EIS as adverse, long-term, continuous, irreversible, are confined to the LAA/RAA, and mainly to the PDA. The magnitude was moderate as water quality and loading for some parameters are predicted to increase above the GCDWQ or MWQSOG (drinking water) but will not impact groundwater supply users beyond the PDA. No existing or foreseeable groundwater users are in the areas with groundwater quality that exceeds the GCDWQ or MWQSOG (drinking water). The ecological context of the LAA/RAA was disturbed based on existing parameter loadings from historical mining activities. The results of the updated groundwater assessment for this NOA/NOC do not change the characterization of these residual effects for the operation phase.

Compared with the results of the EIS, the effects of the proposed alterations on groundwater quality remain similar and where they differ (i.e., Gordon and Farley Lake), measures were simulated to mitigate the potential effect. In conclusion, the results of the updated groundwater assessment do not change the characterization of residual effects as presented in the EIS (Stantec 2020a).

### **3.3.4 Surface Water**

Surface water includes surface water quantity and surface water quality in freshwater waterbodies and watercourses adjacent to or downstream of the Project. Surface water is important as a source of potable water for humans, for wildlife and freshwater aquatic biota as habitat, and for supporting commercial, recreational, traditional, and industrial activities.

The proposed alterations to the approved Project that may interact with surface water quantity and quality are changes to the open pit footprint and overall mined rock tonnage, changes to the MRSA, ore and overburden storage areas, facility area water management infrastructure footprints, including removal of the approved diversion channel between Gordon and Farley lakes, and use of the historical north MRSA as a borrow source. In addition, the number and alignment of the groundwater interceptor wells were optimized for this NOA/NOC.



### 3.3.4.1 Regulatory and Guideline Setting

#### 3.3.4.1.1 *Federal*

Assessment of the proposed alterations to the approved Gordon site on surface water quantity and quality considered the following federal legislation, policies, and guidelines:

- *The Fisheries Act*, which restricts or controls the deposit of deleterious substances into waters or locations frequented by fish unless authorized by regulation.
- The MDMER, which defines unionized ammonia, arsenic, copper, cyanide, lead, nickel, zinc, TSS, and radium 226 as deleterious substances and Schedule 4 of the MDMER imposes limits on their concentrations in effluent at the final discharge point (FDS) to the receiving body of water. The MDMER requires environmental effects monitoring (EEM) for mines that discharge mine effluent to the receiving environment at a rate exceeding 50 cubic metres per day (m<sup>3</sup>/day).
- CWQG-FAL, which are intended to be protective of all forms of aquatic life and all aspects of the aquatic life cycle during acute and/or chronic exposure regimes. The guidelines were used to identify parameters of potential concern (POPCs).
- Guidelines for Canadian Drinking Water Quality which are based on current published scientific research related to health effects, aesthetic effects, and operational conditions of various parameters in drinking water.
- The Framework for Assessing Ecological Flow Requirements to Support Fisheries in Canada (Fisheries and Oceans Canada [DFO] 2013), which provides guidance on the management of flows required to maintain the ecological functions that sustain fisheries in streams and rivers potentially affected by water withdrawals or diversions.
- Federal Environmental Quality Guidelines (FEQG), which are recommended chemical thresholds that identify the concentration below which there is a low likelihood of adverse effects from the chemical on aquatic life exposed via water or sediment, or where chemicals may bioaccumulate in wildlife that may consume aquatic life. FEQGs are developed by ECCC to support federal environmental quality monitoring, risk assessment and risk management activities on substances for which the CCME guidelines do not yet exist or are not anticipated to be updated in the near future.

#### 3.3.4.1.2 *Provincial*

Assessment of the proposed alterations to the approved Gordon site on surface water quantity and quality included consideration of the following provincial legislation, policies, and guidelines:

- *The Drinking Water Safety Act*, which addresses construction, operation, and monitoring of drinking water systems in Manitoba.
- *The Environment Act*, which contains provisions associated with Class 1, 2, and 3 developments that can be used to protect surface water quality. It also requires provincial assessment and licensing for proposed alteration to streams in Manitoba.



- *The Water Protection Act*, the principal statute governing water management and water quality in Manitoba. The MWQSOG under Part 2 of *The Water Protection Act* sets out prescribed water quality standards for various activities, including drinking water, freshwater aquatic life, and common classes of discharge.
- *The Water Rights Act*, the legislative mechanism governing allocation of water resources and construction of water control works within Manitoba.
- *The Mines and Minerals Act* and Mine Closure Regulation under Part 14 of *The Mines and Minerals Act*, which sets out standards for mine closure.
- *The Public Health Act*, which is intended to enable the delivery of public health services to protect and promote the health and wellbeing of the people of Manitoba. Regulations can be enacted under *The Public Health Act* regarding pollution of wells, groundwater, surface water, and springs, as well as construction, provision, maintenance, and operation of potable and wastewater systems.
- *The Water Resources Conservation Act*, which requires that any removal of water from Manitoba's water basins be conducted in quantities that would not, individually or collectively, have substantial adverse effects on the ecological integrity of Manitoba's water resources or their associated ecosystems.

#### **3.3.4.1.3 IAAC Decision Statement**

As per the IAAC Decision Statement, Alamos is required to adhere to the following conditions with respect to surface water:

*3.4 The Proponent shall develop, prior to construction and in consultation with relevant authorities, and implement and maintain, during all phases of the Designated Project, measures to mitigate any potential effects to water levels in Farley Lake and Gordon Lake due to groundwater drawdown resulting from the Designated Project activities. In doing so, the Proponent shall intercept and/or redirect groundwater flowing towards the open pits with wells and/or other mitigation measures, as applicable, before it enters the open pits. The Proponent shall submit these measures to the Agency before implementing them.*

*3.5 The Proponent shall, when releasing and collected water into Farley Lake and Gordon Lake, including groundwater intercepted pursuant to condition 3.4 and water from dewatering the East and Wendy pit lakes:*

*3.5.1 aerate, or treat by other means, water collected from the East and Wendy pit lakes, prior to release into Farley Lake and Gordon Lake, in accordance with condition 3.7, to precipitate oxides, increase dissolved oxygen concentrations, and prevent chemical stratification; and*



*3.5.2 release collected water into Farley Lake and Gordon Lake in a manner that maintains the lake temperature at the point of release within baseline temperature variations to protect fish and fish habitat, unless otherwise authorized by Fisheries and Oceans Canada.*

*3.6 The Proponent shall adjust, during construction, the rate of release of water into Farley Lake and Gordon Lake from dewatering the East and Wendy pit lakes and from groundwater intercepted pursuant to condition 3.4 in order to maintain lake levels within the range of natural variability predicted in Volume 2 Chapter 10 of the Environmental Impact Statement and Appendix A Attachment IAAC-48 of the Proponent's Information Request Response Round 1, Package 1 (Canadian Impact Assessment Registry Reference Number 80140, document #54)*

*3.7 The Proponent shall collect contact water and seepage from the Project development areas, including seepage and recharge from the tailings management facility, mine rock storage areas, overburden and ore stockpiles, and seepage input to groundwater that flows into the open pits, and treat it, as necessary, before releasing it into the receiving environment during all phases of the Designated Project to ensure that any deposits are made in accordance with the Metal and Diamond Mining Effluent Regulations and the pollution prevention provisions of the Fisheries Act. When treating contact water and seepage, the Proponent shall take into account Manitoba's Water Quality Standards, Objectives, and Guidelines, the Canadian Council of Ministers of the Environment's Canadian Water Quality Guidelines of the Protection for Aquatic Life, and Environment and Climate Change Canada's Federal Environmental Quality Guidelines.*

*3.10 The Proponent shall manage, during all phases of the Designated Project and in consultation with Environment and Climate Change Canada and any other relevant authorities, acid-generating and metal-leaching and potentially acid-generating and metal-leaching tailings and waste, including from the tailings management facility, mine rock storage areas and ore stockpiles. In doing so, the Proponent shall:*

*3.10.1 characterize, prior to construction, the acid rock drainage and metal-leaching potential of overburden and other mine rock to be used for construction;*

*3.10.2 only use materials that are not acid-generating, non-potentially acid-generating and non-metal-leaching during construction, including for earthworks and grading, unless not technically or economically feasible, if not technically or economically feasible, the Proponent shall preclude water and oxygen ingress into the materials used;*

*3.10.3 conduct geochemical testing of generated waste rock and tailings during operation to identify potentially acid-generating and metal-leaching waste material and verify the magnitude and onset of potential acid rock drainage in waste rock and tailings;*

*3.10.4 taking into account results of geochemical testing referred to in condition 3.10.3, implement measures to delay onset and magnitude of acid rock drainage in waste rock, including blending potentially acid-generating with non-potentially acid-generating during operation; and*



*3.10.5 cover all acid-generating, potentially acid-generating, and potentially metal-leaching tailings and waste, including waste in the tailings management facility and mine rock storage areas, during decommissioning with an oxygen-limiting barrier in a manner determined by a qualified individual.*

*3.11 The Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, and implement and maintain during all phases of the Designated Project, measures to control erosion and sedimentation within the Project development areas in a manner consistent with the Fisheries Act and its regulations, and taking into account Environment and Climate Change Canada's Environmental Code of Practice for Metal Mines, and Fisheries and Oceans Canada's Measures to Protect Fish and Fish Habitat. The Proponent shall submit these measures to the Agency before implementing them. As part of these measures, the Proponent shall:*

*3.11.1 install intake pipes pointing upwards and away from sediment; and*

*3.11.2 equip contact water discharge pipes with diffusers.*

*3.12 The Proponent shall develop, prior to construction and in consultation with Indigenous groups, Fisheries and Oceans Canada, Environment and Climate Change Canada and any other relevant authorities, a follow-up program to verify the accuracy of the environmental assessment and determine the effectiveness of the mitigation measures as they pertain to adverse environmental effects of the Designated Project on water quality, taking into account Environment and Climate Change Canada's Metal Mine Technical Guidance for Environmental Effects Monitoring. The Proponent shall implement the follow-up program during all phases of the Designated Project. As part of the follow-up program, the Proponent shall:*

*3.12.1 determine, in consultation with Indigenous groups, Environment and Climate Change Canada, and any other relevant authorities, the location and extent of mixing zones in water bodies that may be affected by the Designated Project;*

*3.12.2 monitor water quality in the East and Wendy pit lakes, newly formed pit lakes, tailings management facility, mine rock storage areas, contact water collection ponds, and receiving water bodies and watercourses upstream and downstream of the Project development areas, including at the edge and downstream of the edge of mixing zones identified pursuant to condition 3.12.1, Arbor Lake, Burge Lake, Cockeram Lake, Ellystan Lake, Farley Creek, Farley Lake, Gordon Lake, the Hughes River, the Keewatin River, the unnamed tributary of the Keewatin River, Minton Lake, Payne Lake, Susan Lake and Swede Lake, for all contaminants that may have adverse effects on fish and fish habitat, including aluminum, antimony, arsenic, calcium, copper, cyanide, fluoride, hexavalent chromium, iron, magnesium, methylmercury, phosphorus, selenium, and total and dissolved cadmium. Monitoring shall be conducted as follows:*

*3.12.2.1 beginning during construction and continuing through decommissioning, except in the East and Wendy pit lakes, and the newly formed pit lakes; and*



*3.12.2.2 beginning during construction in the East and Wendy pit lakes, and beginning during decommissioning and continuing through post-closure in the newly formed pit lakes, until water quality is stable and improving and any contact water or seepage potentially released meets the Canadian Council of Ministers of the Environment's Canadian Water Quality Guidelines of the Protection for Aquatic Life and Manitoba's Water Quality, Standards, Objectives, and Guidelines pursuant to condition 3.7;*

*3.12.4 monitor, during construction and operation, total suspended solids and turbidity in fish bearing water bodies where Designated Project activities are undertaken in or near water frequented by fish; and*

*3.12.5 develop, in consultation with relevant authorities, and implement modified or additional mitigation measures, if the results of monitoring conducted pursuant to condition 3.12.2, 3.12.3 and 3.12.4 demonstrate any unanticipated effects attributable to the Designated Project, taking into account the Canadian Council of Ministers of the Environment's Canadian Water Quality Guidelines of the Protection for Aquatic Life or Manitoba's Water Quality Standards, Objectives, and Guidelines, whichever is most protective of fish and fish habitat, and predicted concentrations identified in Volume 1 Chapter 9 of the Environmental Impact Statement.*

*3.13 The Proponent shall develop, prior to construction and in consultation with Indigenous groups, Fisheries and Oceans Canada, Environment and Climate Change Canada and any other relevant authorities, a follow-up program to verify the accuracy of the environmental assessment and determine the effectiveness of the mitigation measures as they pertain to adverse environmental effects of the Designated Project on water quantity. The Proponent shall implement the follow-up program during all phases of the Designated Project. As part of the follow-up program, the Proponent shall:*

*3.13.1 monitor, during all phases of the Designated Project, surface water instantaneous flows, lake levels and pH levels within Arbor Lake, Burge Lake, Cockeram Lake, Ellystan Lake, Farley Creek, Farley Lake, Gordon Lake, the Keewatin River, the unnamed tributary of the Keewatin River, Minton Lake, Payne Lake, Susan Lake, Swede Lake, fish-bearing wetlands within the local assessment areas, the East and Wendy pit lakes, newly formed pit lakes, the tailings management facility, and contact water collection ponds to verify the environmental assessment predictions identified in Volume 2 Chapter 10 of the Environmental Impact Statement and Appendix A Attachment IAAC-48 of the Proponent's IR Responses Round 1, Package 1 (Canadian Impact Assessment Registry Reference Number 80140, document #54);*

*3.13.2 monitor, during all phases of the Designated Project, groundwater levels, gradients and hydraulic conductivity of all hydrogeological units, as identified in the groundwater model in Volume 5 Appendix E and G of the Environmental Impact Statement, with well depths ranging from near surface to a minimum of 115 meters below ground to characterize contaminant transport via groundwater at the depth of the groundwater model for the Designated Project. Monitoring wells shall be installed near*



*the open pits, the tailings management facility, mine rock storage areas, ore and overburden stockpiles, and fish bearing wetlands within the local assessment areas that intersect with the Project development areas; and*

*3.13.3 develop, in consultation with relevant authorities, and implement modified or additional mitigation measures, if the results of monitoring conducted pursuant to condition 3.13.1 and 3.13.2 demonstrate unanticipated effects attributable to the Designated Project.*

*3.15 The Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, a follow-up program to verify the accuracy of the environmental assessment and the effectiveness of the mitigation measures as they pertain to acid rock drainage and metal leaching into the receiving environment from the Project development areas, including from the mine rock storage areas, ore stockpiles, and the tailings management facility. The Proponent shall implement the follow-up program during all phases of the Designated Project. In doing so, the Proponent shall:*

*3.15.1 verify that the covers installed at the mine rock storage areas and tailings management facility pursuant to condition 3.10.5 perform and continue to perform as predicted in Volume 1 Chapter 5 of the Environmental Impact Statement during all phases of the Designated Project, including post-closure.*

### **3.3.4.2 Environmental Effects**

#### **3.3.4.2.1 Surface Water Quantity**

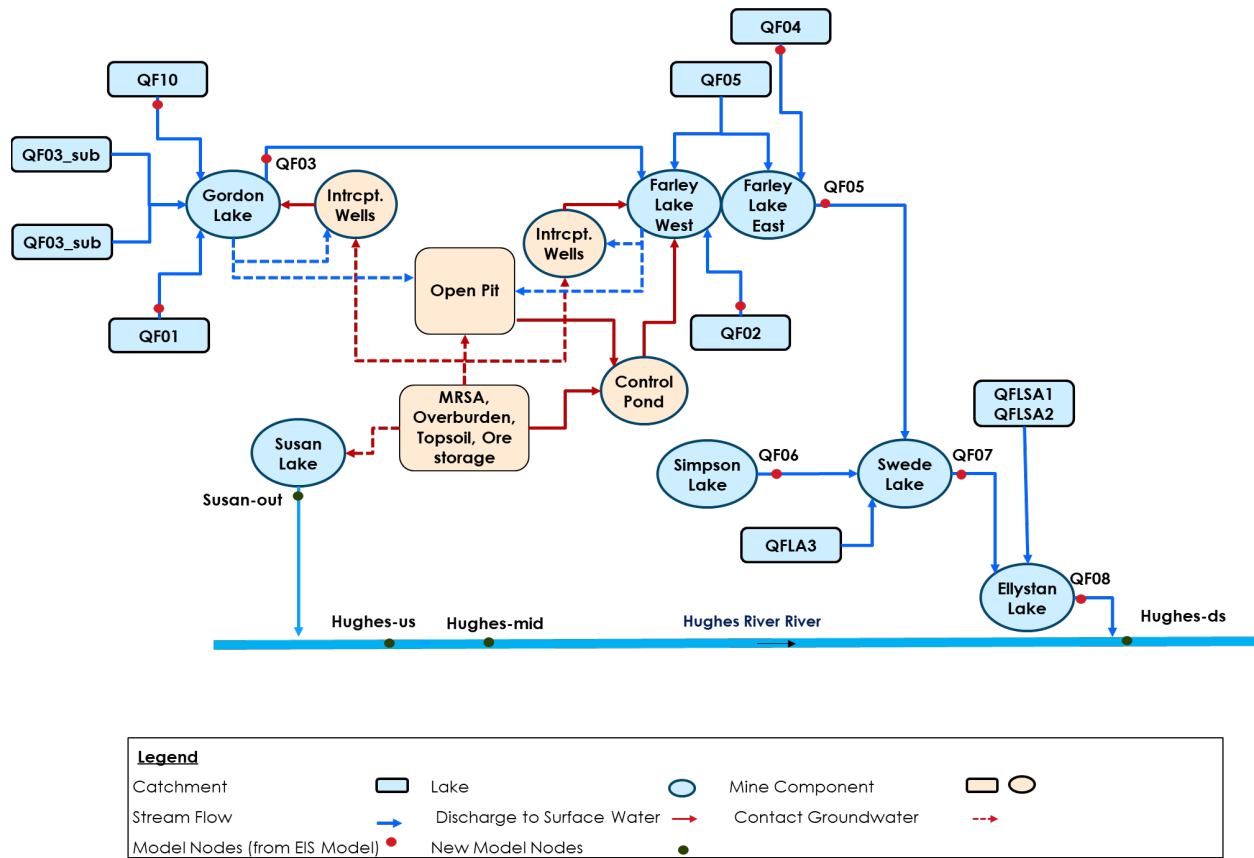
##### **Assessment Methods**

The EIS surface water balance model was updated to reflect the changes presented in Section 2 and results of the effects assessment for groundwater presented in Section 3.3.3 of this NOA/NOC. Details of the updated NOA/NOC water balance, including the results, are presented in Appendix F.

A schematic diagram of flow pathways and model nodes (Appendix F) is shown in Figure 3.1. Summary results, including the effects of the Project on streamflows (at different model nodes) and lake levels, are presented in Table 3.7 to Table 3.22.



Figure 3.1 Water Balance and Water Quality Model Nodes



*Table 3.7 Simulated Average Monthly and Annual Streamflows at Model Node QF01*

Month	Existing Condition	Construction			Operation			Closure (Pit Filling)			Post-Closure		
	Flow (m <sup>3</sup> /s)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)
Jan	0.003	0.003	0.000	0%	0.003	-0.001	-19%	0.002	-0.001	-44%	0.002	-0.001	-44%
Feb	0.002	0.002	0.000	0%	0.002	0.000	-20%	0.001	-0.001	-44%	0.001	-0.001	-44%
Mar	0.001	0.001	0.000	-1%	0.001	0.000	-20%	0.001	0.000	-44%	0.001	0.000	-44%
Apr	0.002	0.002	0.000	-1%	0.002	0.000	-21%	0.001	-0.001	-44%	0.001	-0.001	-44%
May	0.019	0.019	0.000	-1%	0.015	-0.004	-21%	0.011	-0.008	-44%	0.011	-0.008	-44%
Jun	0.020	0.019	0.000	-1%	0.015	-0.004	-22%	0.011	-0.009	-44%	0.011	-0.009	-44%
Jul	0.011	0.011	0.000	-2%	0.009	-0.002	-22%	0.006	-0.005	-44%	0.006	-0.005	-44%
Aug	0.009	0.009	0.000	-2%	0.007	-0.002	-23%	0.005	-0.004	-44%	0.005	-0.004	-44%
Sep	0.010	0.010	0.000	-2%	0.008	-0.002	-23%	0.006	-0.005	-44%	0.006	-0.005	-44%
Oct	0.011	0.010	0.000	-3%	0.008	-0.003	-24%	0.006	-0.005	-44%	0.006	-0.005	-44%
Nov	0.010	0.010	0.000	-3%	0.007	-0.002	-24%	0.005	-0.004	-44%	0.005	-0.004	-44%
Dec	0.006	0.006	0.000	-3%	0.005	-0.002	-25%	0.003	-0.003	-44%	0.003	-0.003	-44%
<b>Annual</b>	<b>0.009</b>	<b>0.009</b>	<b>0.000</b>	<b>-2%</b>	<b>0.007</b>	<b>-0.002</b>	<b>-22%</b>	<b>0.005</b>	<b>-0.004</b>	<b>-44%</b>	<b>0.005</b>	<b>-0.004</b>	<b>-44%</b>

Note:

0.0% and 0.000 m<sup>3</sup>/s in the Table represent < 0.1% and < 0.001 m<sup>3</sup>/s, respectively.



*Table 3.8 Simulated Average Monthly and Annual Streamflows at Model Node QF02*

Month	Existing Condition	Construction			Operation			Closure (Pit Filling)			Post-Closure		
	Flow (m <sup>3</sup> /s)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)
Jan	0.002	0.002	0.000	-1%	0.002	0.000	-22%	0.001	-0.001	-44%	0.001	-0.001	-45%
Feb	0.002	0.001	0.000	-2%	0.001	0.000	-22%	0.001	-0.001	-44%	0.001	-0.001	-45%
Mar	0.001	0.001	0.000	-2%	0.001	0.000	-23%	0.000	0.000	-44%	0.000	0.000	-45%
Apr	0.001	0.001	0.000	-2%	0.001	0.000	-23%	0.001	-0.001	-44%	0.001	-0.001	-45%
May	0.014	0.014	0.000	-2%	0.011	-0.003	-24%	0.008	-0.006	-44%	0.008	-0.006	-45%
Jun	0.014	0.014	0.000	-3%	0.011	-0.003	-24%	0.008	-0.006	-44%	0.008	-0.006	-45%
Jul	0.008	0.008	0.000	-3%	0.006	-0.002	-25%	0.005	-0.004	-45%	0.005	-0.004	-45%
Aug	0.007	0.006	0.000	-4%	0.005	-0.002	-25%	0.004	-0.003	-45%	0.004	-0.003	-45%
Sep	0.008	0.007	0.000	-4%	0.006	-0.002	-26%	0.004	-0.003	-45%	0.004	-0.003	-45%
Oct	0.008	0.008	0.000	-5%	0.006	-0.002	-26%	0.004	-0.004	-45%	0.004	-0.004	-45%
Nov	0.007	0.007	0.000	-5%	0.005	-0.002	-27%	0.004	-0.003	-45%	0.004	-0.003	-45%
Dec	0.004	0.004	0.000	-6%	0.003	-0.001	-27%	0.002	-0.002	-45%	0.002	-0.002	-45%
<b>Annual</b>	<b>0.006</b>	<b>0.006</b>	<b>0.000</b>	<b>-3%</b>	<b>0.005</b>	<b>-0.002</b>	<b>-24%</b>	<b>0.004</b>	<b>-0.003</b>	<b>-44%</b>	<b>0.004</b>	<b>-0.003</b>	<b>-45%</b>

Note:

0.0% and 0.000 m<sup>3</sup>/s in the Table represent < 0.1% and < 0.001 m<sup>3</sup>/s, respectively.



Table 3.9 Simulated Average Monthly and Annual Streamflows at Model Node QF03

Month	Existing Condition	Construction			Operation			Closure (Pit Filling)			Post-Closure		
	Flow (m <sup>3</sup> /s)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)
Jan	0.009	0.009	0.000	0%	0.008	-0.001	-9%	0.007	-0.002	-21%	0.007	-0.002	-21%
Feb	0.006	0.006	0.000	0%	0.005	-0.001	-9%	0.005	-0.001	-21%	0.005	-0.001	-21%
Mar	0.003	0.003	0.000	0%	0.003	0.000	-10%	0.002	-0.001	-21%	0.002	-0.001	-21%
Apr	0.006	0.006	0.000	0%	0.005	-0.001	-10%	0.004	-0.001	-21%	0.004	-0.001	-21%
May	0.055	0.055	0.000	-1%	0.049	-0.006	-10%	0.043	-0.012	-21%	0.043	-0.012	-21%
Jun	0.056	0.056	0.000	-1%	0.050	-0.006	-10%	0.044	-0.012	-21%	0.044	-0.012	-21%
Jul	0.032	0.032	0.000	-1%	0.028	-0.003	-11%	0.025	-0.007	-21%	0.025	-0.007	-21%
Aug	0.026	0.026	0.000	-1%	0.023	-0.003	-11%	0.021	-0.006	-21%	0.021	-0.006	-21%
Sep	0.030	0.030	0.000	-1%	0.026	-0.003	-11%	0.024	-0.006	-21%	0.024	-0.006	-21%
Oct	0.031	0.030	0.000	-1%	0.027	-0.004	-11%	0.024	-0.007	-21%	0.024	-0.007	-21%
Nov	0.028	0.028	0.000	-1%	0.025	-0.003	-12%	0.022	-0.006	-21%	0.022	-0.006	-21%
Dec	0.018	0.017	0.000	-1%	0.015	-0.002	-12%	0.014	-0.004	-21%	0.014	-0.004	-21%
<b>Annual</b>	<b>0.025</b>	<b>0.025</b>	<b>0.000</b>	<b>-1%</b>	<b>0.022</b>	<b>-0.003</b>	<b>-11%</b>	<b>0.020</b>	<b>-0.005</b>	<b>-21%</b>	<b>0.020</b>	<b>-0.005</b>	<b>-21%</b>

Note:

0.0% and 0.000 m<sup>3</sup>/s in the Table represent < 0.1% and < 0.001 m<sup>3</sup>/s, respectively.



*Table 3.10 Simulated Average Monthly and Annual Streamflows at Model Node QF05*

Month	Existing Condition	Construction			Operation			Closure (Pit Filling)			Post-Closure		
	Flow (m <sup>3</sup> /s)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)
Jan	0.038	0.038	0.000	0%	0.052	0.015	39%	0.029	-0.009	-23%	0.056	0.019	50%
Feb	0.025	0.025	0.000	0%	0.040	0.015	60%	0.018	-0.007	-30%	0.045	0.020	79%
Mar	0.013	0.015	0.002	11%	0.029	0.016	120%	0.008	-0.006	-43%	0.034	0.021	159%
Apr	0.024	0.026	0.003	11%	0.047	0.024	99%	0.016	-0.007	-30%	0.057	0.033	139%
May	0.232	0.234	0.002	1%	0.248	0.016	7%	0.206	-0.026	-11%	0.248	0.016	7%
Jun	0.239	0.240	0.001	1%	0.244	0.006	2%	0.212	-0.026	-11%	0.238	0.000	0%
Jul	0.135	0.136	0.002	1%	0.146	0.012	9%	0.118	-0.017	-13%	0.145	0.011	8%
Aug	0.111	0.115	0.004	3%	0.123	0.012	11%	0.096	-0.015	-13%	0.123	0.011	10%
Sep	0.126	0.130	0.004	3%	0.141	0.014	11%	0.110	-0.016	-13%	0.142	0.016	12%
Oct	0.131	0.135	0.005	4%	0.144	0.013	10%	0.114	-0.016	-13%	0.146	0.015	12%
Nov	0.119	0.125	0.006	5%	0.131	0.012	10%	0.104	-0.015	-13%	0.132	0.013	11%
Dec	0.074	0.083	0.008	11%	0.088	0.013	18%	0.063	-0.011	-15%	0.090	0.015	21%
<b>Annual</b>	<b>0.106</b>	<b>0.109</b>	<b>0.003</b>	<b>4%</b>	<b>0.120</b>	<b>0.014</b>	<b>33%</b>	<b>0.092</b>	<b>-0.014</b>	<b>-19%</b>	<b>0.122</b>	<b>0.016</b>	<b>42%</b>

Note:

0.0% and 0.000 m<sup>3</sup>/s in the Table represent < 0.1% and < 0.001 m<sup>3</sup>/s, respectively.



Table 3.11 Simulated Average Monthly and Annual Streamflows at Model Node QF06

Month	Existing Condition	Construction			Operation			Closure (Pit Filling)			Post-Closure		
	Flow (m <sup>3</sup> /s)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)
Jan	0.017	0.017	0.000	0%	0.017	0.000	0%	0.017	0.000	0%	0.017	0.000	0%
Feb	0.011	0.011	0.000	0%	0.011	0.000	0%	0.011	0.000	0%	0.011	0.000	0%
Mar	0.006	0.006	0.000	0%	0.006	0.000	0%	0.006	0.000	0%	0.006	0.000	0%
Apr	0.010	0.010	0.000	0%	0.010	0.000	0%	0.010	0.000	0%	0.010	0.000	0%
May	0.102	0.102	0.000	0%	0.102	0.000	0%	0.102	0.000	0%	0.102	0.000	0%
Jun	0.105	0.105	0.000	0%	0.105	0.000	0%	0.105	0.000	0%	0.105	0.000	0%
Jul	0.059	0.059	0.000	0%	0.059	0.000	0%	0.059	0.000	0%	0.059	0.000	0%
Aug	0.049	0.049	0.000	0%	0.049	0.000	0%	0.049	0.000	0%	0.049	0.000	0%
Sep	0.056	0.056	0.000	0%	0.056	0.000	0%	0.056	0.000	0%	0.056	0.000	0%
Oct	0.057	0.057	0.000	0%	0.057	0.000	0%	0.057	0.000	0%	0.057	0.000	0%
Nov	0.052	0.052	0.000	0%	0.052	0.000	0%	0.052	0.000	0%	0.052	0.000	0%
Dec	0.033	0.033	0.000	0%	0.033	0.000	0%	0.033	0.000	0%	0.033	0.000	0%
<b>Annual</b>	<b>0.047</b>	<b>0.047</b>	<b>0.000</b>	<b>0%</b>	<b>0.047</b>	<b>0.000</b>	<b>0%</b>	<b>0.047</b>	<b>0.000</b>	<b>0%</b>	<b>0.047</b>	<b>0.000</b>	<b>0%</b>

Note:

0.0% and 0.000 m<sup>3</sup>/s in the Table represent < 0.1% and < 0.001 m<sup>3</sup>/s, respectively.



**Lynn Lake Gold Project: Gordon Mine Plan Amendment Notice of Alteration / Notice of Change**

Section 3: Environmental Effects and Mitigation

October 6, 2025

*Table 3.12 Simulated Average Monthly and Annual Streamflows at Model Node QF07*

Month	Existing Condition	Construction			Operation			Closure (Pit Filling)			Post-Closure		
	Flow (m <sup>3</sup> /s)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)
Jan	0.081	0.081	0.000	0%	0.096	0.015	18%	0.072	-0.009	-11%	0.100	0.019	23%
Feb	0.054	0.054	0.000	0%	0.069	0.015	28%	0.047	-0.007	-14%	0.074	0.020	37%
Mar	0.029	0.030	0.002	5%	0.045	0.016	56%	0.023	-0.006	-20%	0.050	0.021	74%
Apr	0.051	0.054	0.003	5%	0.074	0.024	46%	0.044	-0.007	-14%	0.084	0.033	65%
May	0.500	0.502	0.002	0%	0.516	0.016	3%	0.474	-0.026	-5%	0.516	0.016	3%
Jun	0.514	0.515	0.001	0%	0.520	0.006	1%	0.487	-0.026	-5%	0.514	0.000	0%
Jul	0.291	0.292	0.002	1%	0.302	0.012	4%	0.274	-0.017	-6%	0.301	0.010	4%
Aug	0.240	0.243	0.004	1%	0.251	0.012	5%	0.225	-0.015	-6%	0.251	0.011	5%
Sep	0.272	0.276	0.004	1%	0.286	0.014	5%	0.256	-0.016	-6%	0.288	0.016	6%
Oct	0.281	0.286	0.005	2%	0.294	0.013	5%	0.265	-0.016	-6%	0.297	0.015	5%
Nov	0.256	0.263	0.006	2%	0.268	0.012	5%	0.241	-0.015	-6%	0.269	0.013	5%
Dec	0.160	0.169	0.009	5%	0.174	0.013	8%	0.149	-0.011	-7%	0.176	0.016	10%
<b>Annual</b>	<b>0.228</b>	<b>0.231</b>	<b>0.003</b>	<b>2%</b>	<b>0.242</b>	<b>0.014</b>	<b>15%</b>	<b>0.214</b>	<b>-0.014</b>	<b>-9%</b>	<b>0.244</b>	<b>0.016</b>	<b>20%</b>

Note:

0.0% and 0.000 m<sup>3</sup>/s in the Table represent < 0.1% and < 0.001 m<sup>3</sup>/s, respectively.



*Table 3.13 Simulated Average Monthly and Annual Streamflows at Model Node QF08*

Month	Existing Condition	Construction			Operation			Closure (Pit Filling)			Post-Closure		
	Flow (m <sup>3</sup> /s)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)
Jan	0.137	0.137	0.000	0%	0.152	0.015	11%	0.128	-0.009	-6%	0.156	0.019	14%
Feb	0.091	0.091	0.000	0%	0.107	0.015	17%	0.084	-0.007	-8%	0.111	0.020	22%
Mar	0.048	0.050	0.002	3%	0.064	0.016	33%	0.043	-0.006	-12%	0.070	0.021	44%
Apr	0.086	0.089	0.003	3%	0.110	0.023	27%	0.079	-0.007	-8%	0.119	0.033	38%
May	0.844	0.846	0.002	0%	0.860	0.016	2%	0.818	-0.026	-3%	0.861	0.017	2%
Jun	0.868	0.869	0.001	0%	0.874	0.006	1%	0.841	-0.026	-3%	0.868	0.000	0%
Jul	0.491	0.492	0.002	0%	0.502	0.012	2%	0.474	-0.017	-3%	0.501	0.011	2%
Aug	0.405	0.408	0.004	1%	0.416	0.012	3%	0.390	-0.015	-4%	0.416	0.011	3%
Sep	0.459	0.463	0.004	1%	0.474	0.014	3%	0.443	-0.016	-3%	0.475	0.016	3%
Oct	0.475	0.479	0.005	1%	0.488	0.013	3%	0.458	-0.016	-3%	0.490	0.015	3%
Nov	0.433	0.439	0.006	1%	0.445	0.012	3%	0.418	-0.015	-3%	0.446	0.013	3%
Dec	0.271	0.279	0.008	3%	0.284	0.013	5%	0.260	-0.011	-4%	0.286	0.015	6%
<b>Annual</b>	<b>0.386</b>	<b>0.388</b>	<b>0.003</b>	<b>1%</b>	<b>0.399</b>	<b>0.014</b>	<b>9%</b>	<b>0.371</b>	<b>-0.014</b>	<b>-5%</b>	<b>0.401</b>	<b>0.016</b>	<b>12%</b>

Note:

0.0% and 0.000 m<sup>3</sup>/s in the Table represent < 0.1% and < 0.001 m<sup>3</sup>/s, respectively.



Table 3.14 Simulated Average Monthly and Annual Streamflows at Model Node Susan Outflow

Month	Existing Condition	Construction			Operation			Closure (Pit Filling)			Post-Closure		
	Flow (m <sup>3</sup> /s)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)
Jan	0.002	0.002	0.000	0%	0.002	0.000	0%	0.002	0.000	0%	0.002	0.000	0%
Feb	0.001	0.001	0.000	0%	0.001	0.000	0%	0.001	0.000	0%	0.001	0.000	0%
Mar	0.001	0.001	0.000	0%	0.001	0.000	0%	0.001	0.000	1%	0.001	0.000	1%
Apr	0.001	0.001	0.000	0%	0.001	0.000	0%	0.001	0.000	0%	0.001	0.000	0%
May	0.013	0.013	0.000	0%	0.013	0.000	0%	0.013	0.000	0%	0.013	0.000	0%
Jun	0.014	0.014	0.000	0%	0.014	0.000	0%	0.014	0.000	0%	0.014	0.000	0%
Jul	0.008	0.008	0.000	0%	0.008	0.000	0%	0.008	0.000	0%	0.008	0.000	0%
Aug	0.006	0.006	0.000	0%	0.006	0.000	0%	0.006	0.000	0%	0.006	0.000	0%
Sep	0.007	0.007	0.000	0%	0.007	0.000	0%	0.007	0.000	0%	0.007	0.000	0%
Oct	0.007	0.007	0.000	0%	0.007	0.000	0%	0.007	0.000	0%	0.007	0.000	0%
Nov	0.007	0.007	0.000	0%	0.007	0.000	0%	0.007	0.000	0%	0.007	0.000	0%
Dec	0.004	0.004	0.000	0%	0.004	0.000	0%	0.004	0.000	0%	0.004	0.000	0%
<b>Annual</b>	<b>0.006</b>	<b>0.006</b>	<b>0.000</b>	<b>0%</b>	<b>0.006</b>	<b>0.000</b>	<b>0%</b>	<b>0.006</b>	<b>0.000</b>	<b>0%</b>	<b>0.006</b>	<b>0.000</b>	<b>0%</b>

Note:

0.0% and 0.000 m<sup>3</sup>/s in the Table represent < 0.1% and < 0.001 m<sup>3</sup>/s, respectively.



*Table 3.15 Simulated Average Monthly and Annual Streamflows at Model Node Hughes-us*

Month	Existing Condition	Construction			Operation			Closure (Pit Filling)			Post-Closure		
	Flow (m <sup>3</sup> /s)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)
Jan	6.54	6.54	0.00	0%	6.54	0.00	0%	6.54	0.00	0%	6.54	0.00	0%
Feb	4.36	4.36	0.00	0%	4.36	0.00	0%	4.36	0.00	0%	4.36	0.00	0%
Mar	2.31	2.31	0.00	0%	2.31	0.00	0%	2.31	0.00	0%	2.31	0.00	0%
Apr	4.11	4.11	0.00	0%	4.11	0.00	0%	4.11	0.00	0%	4.11	0.00	0%
May	40.30	40.30	0.00	0%	40.30	0.00	0%	40.30	0.00	0%	40.30	0.00	0%
Jun	41.44	41.44	0.00	0%	41.44	0.00	0%	41.44	0.00	0%	41.44	0.00	0%
Jul	23.42	23.42	0.00	0%	23.42	0.00	0%	23.42	0.00	0%	23.42	0.00	0%
Aug	19.31	19.31	0.00	0%	19.31	0.00	0%	19.31	0.00	0%	19.31	0.00	0%
Sep	21.94	21.94	0.00	0%	21.94	0.00	0%	21.94	0.00	0%	21.94	0.00	0%
Oct	22.66	22.66	0.00	0%	22.66	0.00	0%	22.66	0.00	0%	22.66	0.00	0%
Nov	20.67	20.67	0.00	0%	20.67	0.00	0%	20.67	0.00	0%	20.67	0.00	0%
Dec	12.93	12.93	0.00	0%	12.93	0.00	0%	12.93	0.00	0%	12.93	0.00	0%
<b>Annual</b>	<b>18.41</b>	<b>18.41</b>	<b>0.00</b>	<b>0%</b>	<b>18.41</b>	<b>0.00</b>	<b>0%</b>	<b>18.41</b>	<b>0.00</b>	<b>0%</b>	<b>18.41</b>	<b>0.00</b>	<b>0%</b>

Note:

0.0% and 0.00 m<sup>3</sup>/s in the Table represent < 0.1% and < 0.001 m<sup>3</sup>/s, respectively.



**Lynn Lake Gold Project: Gordon Mine Plan Amendment Notice of Alteration / Notice of Change**

Section 3: Environmental Effects and Mitigation

October 6, 2025

*Table 3.16 Simulated Average Monthly and Annual Streamflows at Model Node Hughes-mid*

Month	Existing Condition	Construction			Operation			Closure (Pit Filling)			Post-Closure		
	Flow (m <sup>3</sup> /s)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)
Jan	6.54	6.54	0.00	0%	6.54	0.00	0%	6.54	0.00	0%	6.54	0.00	0%
Feb	4.36	4.36	0.00	0%	4.36	0.00	0%	4.36	0.00	0%	4.36	0.00	0%
Mar	2.31	2.31	0.00	0%	2.31	0.00	0%	2.31	0.00	0%	2.31	0.00	0%
Apr	4.11	4.11	0.00	0%	4.11	0.00	0%	4.11	0.00	0%	4.11	0.00	0%
May	40.30	40.49	0.19	0%	40.30	0.00	0%	40.30	0.00	0%	40.30	0.00	0%
Jun	41.44	41.62	0.17	0%	41.44	0.00	0%	41.44	0.00	0%	41.44	0.00	0%
Jul	23.42	23.46	0.03	0%	23.42	0.00	0%	23.42	0.00	0%	23.42	0.00	0%
Aug	19.31	19.31	0.00	0%	19.31	0.00	0%	19.31	0.00	0%	19.31	0.00	0%
Sep	21.94	21.94	0.00	0%	21.94	0.00	0%	21.94	0.00	0%	21.94	0.00	0%
Oct	22.66	22.66	0.00	0%	22.66	0.00	0%	22.66	0.00	0%	22.66	0.00	0%
Nov	20.67	20.67	0.00	0%	20.67	0.00	0%	20.67	0.00	0%	20.67	0.00	0%
Dec	12.93	12.93	0.00	0%	12.93	0.00	0%	12.93	0.00	0%	12.93	0.00	0%
<b>Annual</b>	<b>18.41</b>	<b>18.44</b>	<b>0.03</b>	<b>0%</b>	<b>18.41</b>	<b>0.00</b>	<b>0%</b>	<b>18.41</b>	<b>0.00</b>	<b>0%</b>	<b>18.41</b>	<b>0.00</b>	<b>0%</b>

Note:

0.0% and 0.00 m<sup>3</sup>/s in the Table represent < 0.1% and < 0.001 m<sup>3</sup>/s, respectively.



**Lynn Lake Gold Project: Gordon Mine Plan Amendment Notice of Alteration / Notice of Change**

Section 3: Environmental Effects and Mitigation

October 6, 2025

*Table 3.17 Simulated Average Monthly and Annual Streamflows at Model Node Hughes-ds*

Month	Existing Condition	Construction			Operation			Closure (Pit Filling)			Post-Closure		
	Flow (m <sup>3</sup> /s)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)	Flow (m <sup>3</sup> /s)	Change from Existing (m <sup>3</sup> /s)	Change from Existing (%)
Jan	6.68	6.68	0.00	0%	6.70	0.02	0%	6.67	-0.01	0%	6.70	0.02	0%
Feb	4.45	4.45	0.00	0%	4.47	0.01	0%	4.45	-0.01	0%	4.47	0.02	0%
Mar	2.36	2.36	0.00	0%	2.37	0.02	1%	2.35	-0.01	0%	2.38	0.02	1%
Apr	4.20	4.20	0.00	0%	4.22	0.02	1%	4.19	-0.01	0%	4.23	0.03	1%
May	41.15	41.34	0.19	0%	41.16	0.01	0%	41.12	-0.03	0%	41.16	0.01	0%
Jun	42.31	42.49	0.17	0%	42.32	0.01	0%	42.28	-0.03	0%	42.31	0.00	0%
Jul	23.91	23.95	0.04	0%	23.93	0.02	0%	23.90	-0.01	0%	23.92	0.01	0%
Aug	19.72	19.72	0.00	0%	19.73	0.01	0%	19.70	-0.02	0%	19.73	0.01	0%
Sep	22.40	22.40	0.00	0%	22.41	0.01	0%	22.38	-0.02	0%	22.41	0.01	0%
Oct	23.14	23.14	0.00	0%	23.15	0.01	0%	23.12	-0.02	0%	23.15	0.01	0%
Nov	21.11	21.11	0.00	0%	21.12	0.01	0%	21.09	-0.02	0%	21.12	0.01	0%
Dec	13.20	13.21	0.01	0%	13.21	0.01	0%	13.19	-0.01	0%	13.21	0.01	0%
<b>Annual</b>	<b>18.79</b>	<b>18.83</b>	<b>0.03</b>	<b>0%</b>	<b>18.81</b>	<b>0.01</b>	<b>0%</b>	<b>18.78</b>	<b>-0.01</b>	<b>0%</b>	<b>18.81</b>	<b>0.01</b>	<b>0%</b>

Note:

0.0% and 0.00 m<sup>3</sup>/s in the Table represent < 0.1% and < 0.001 m<sup>3</sup>/s, respectively.



Table 3.18 Simulated Average Monthly and Annual Water Levels at Gordon Lake

Month	Existing Condition	Construction		Operation		Closure (Pit Filling)		Post-Closure	
	Level (m)	Level (m)	Change from Existing (m)	Level (m)	Change from Existing (m)	Level (m)	Change from Existing (m)	Level (m)	Change from Existing (m)
Jan	315.18	315.18	0.00	315.17	-0.01	315.15	-0.03	315.15	-0.03
Feb	315.13	315.13	0.00	315.12	-0.01	315.11	-0.02	315.11	-0.02
Mar	315.07	315.07	0.00	315.06	-0.01	315.05	-0.02	315.05	-0.02
Apr	315.13	315.13	0.00	315.12	-0.01	315.10	-0.03	315.10	-0.03
May	315.47	315.47	0.00	315.45	-0.02	315.42	-0.05	315.42	-0.05
Jun	315.48	315.48	0.00	315.45	-0.03	315.43	-0.05	315.43	-0.05
Jul	315.37	315.37	0.00	315.35	-0.02	315.33	-0.04	315.33	-0.04
Aug	315.33	315.33	0.00	315.32	-0.01	315.30	-0.03	315.30	-0.03
Sep	315.36	315.36	0.00	315.34	-0.02	315.32	-0.04	315.32	-0.04
Oct	315.36	315.36	0.00	315.34	-0.02	315.32	-0.04	315.32	-0.04
Nov	315.35	315.35	0.00	315.33	-0.02	315.31	-0.04	315.31	-0.04
Dec	315.27	315.27	0.00	315.25	-0.02	315.24	-0.03	315.24	-0.03
<b>Annual</b>	<b>315.29</b>	<b>315.29</b>	<b>0.00</b>	<b>315.27</b>	<b>-0.02</b>	<b>315.26</b>	<b>-0.03</b>	<b>315.26</b>	<b>-0.04</b>

Note:

0.00 m in the Table represents < 0.01 m.



*Table 3.19 Simulated Average Monthly and Annual Water Levels at Farley Lake*

Month	Existing Condition	Construction		Operation		Closure (Pit Filling)		Post-Closure	
	Level (m)	Level (m)	Change from Existing (m)	Level (m)	Change from Existing (m)	Level (m)	Change from Existing (m)	Level (m)	Change from Existing (m)
Jan	313.55	313.55	0.00	313.57	0.02	313.53	-0.02	313.57	0.02
Feb	313.52	313.52	0.00	313.55	0.03	313.50	-0.02	313.56	0.04
Mar	313.48	313.49	0.00	313.53	0.05	313.44	-0.04	313.54	0.06
Apr	313.52	313.53	0.00	313.56	0.04	313.49	-0.03	313.57	0.05
May	313.68	313.69	0.00	313.69	0.01	313.67	-0.01	313.69	0.01
Jun	313.69	313.69	0.00	313.69	0.00	313.68	-0.01	313.69	0.00
Jul	313.64	313.64	0.00	313.65	0.01	313.63	-0.01	313.65	0.01
Aug	313.62	313.63	0.01	313.63	0.01	313.61	-0.01	313.63	0.01
Sep	313.63	313.64	0.01	313.64	0.01	313.62	-0.01	313.64	0.01
Oct	313.64	313.64	0.00	313.65	0.01	313.63	-0.01	313.65	0.01
Nov	313.63	313.63	0.00	313.64	0.01	313.62	-0.01	313.64	0.01
Dec	313.59	313.61	0.02	313.61	0.02	313.58	-0.01	313.61	0.02
<b>Annual</b>	<b>313.60</b>	<b>313.60</b>	<b>0.00</b>	<b>313.62</b>	<b>0.02</b>	<b>313.58</b>	<b>-0.02</b>	<b>313.62</b>	<b>0.02</b>

Note:

0.00 m in the Table represents < 0.01 m.



*Table 3.20 Simulated Average Monthly and Annual Water Levels at Simpson Lake*

Month	Existing Condition	Construction		Operation		Closure (Pit Filling)		Post-Closure	
	Level (m)	Level (m)	Change from Existing (m)	Level (m)	Change from Existing (m)	Level (m)	Change from Existing (m)	Level (m)	Change from Existing (m)
Jan	297.21	297.21	0.00	297.21	0.00	297.21	0.00	297.21	0.00
Feb	297.17	297.17	0.00	297.17	0.00	297.17	0.00	297.17	0.00
Mar	297.13	297.13	0.00	297.13	0.00	297.13	0.00	297.13	0.00
Apr	297.17	297.17	0.00	297.17	0.00	297.17	0.00	297.17	0.00
May	297.40	297.40	0.00	297.40	0.00	297.40	0.00	297.40	0.00
Jun	297.41	297.41	0.00	297.41	0.00	297.41	0.00	297.41	0.00
Jul	297.33	297.33	0.00	297.33	0.00	297.33	0.00	297.33	0.00
Aug	297.31	297.31	0.00	297.31	0.00	297.31	0.00	297.31	0.00
Sep	297.33	297.33	0.00	297.33	0.00	297.33	0.00	297.33	0.00
Oct	297.33	297.33	0.00	297.33	0.00	297.33	0.00	297.33	0.00
Nov	297.32	297.32	0.00	297.32	0.00	297.32	0.00	297.32	0.00
Dec	297.27	297.27	0.00	297.27	0.00	297.27	0.00	297.27	0.00
<b>Annual</b>	<b>297.28</b>	<b>297.28</b>	<b>0.00</b>	<b>297.28</b>	<b>0.00</b>	<b>297.28</b>	<b>0.00</b>	<b>297.28</b>	<b>0.00</b>

Note:

0.00 m in the Table represents < 0.01 m.



Table 3.21 Simulated Average Monthly and Annual Water Levels at Swede Lake

Month	Existing Condition	Construction		Operation		Closure (Pit Filling)		Post-Closure	
	Level (m)	Level (m)	Change from Existing (m)	Level (m)	Change from Existing (m)	Level (m)	Change from Existing (m)	Level (m)	Change from Existing (m)
Jan	297.15	297.15	0.00	297.17	0.02	297.14	-0.01	297.18	0.03
Feb	297.12	297.12	0.00	297.14	0.02	297.11	-0.01	297.15	0.03
Mar	297.08	297.08	0.00	297.10	0.02	297.07	-0.01	297.11	0.03
Apr	297.11	297.12	0.00	297.14	0.03	297.10	-0.01	297.16	0.05
May	297.46	297.46	0.00	297.47	0.01	297.45	-0.01	297.47	0.01
Jun	297.47	297.47	0.00	297.47	0.00	297.45	-0.02	297.47	0.00
Jul	297.34	297.34	0.00	297.35	0.01	297.32	-0.02	297.34	0.00
Aug	297.30	297.30	0.00	297.31	0.01	297.29	-0.01	297.31	0.01
Sep	297.32	297.33	0.00	297.33	0.01	297.31	-0.01	297.33	0.01
Oct	297.33	297.33	0.00	297.34	0.01	297.32	-0.01	297.34	0.01
Nov	297.31	297.32	0.01	297.32	0.01	297.30	-0.01	297.32	0.01
Dec	297.24	297.25	0.00	297.25	0.01	297.23	-0.01	297.25	0.01
<b>Annual</b>	<b>297.27</b>	<b>297.27</b>	<b>0.00</b>	<b>297.28</b>	<b>0.01</b>	<b>297.26</b>	<b>-0.01</b>	<b>297.29</b>	<b>0.02</b>

Note:

0.00 m in the Table represents < 0.01 m.



Table 3.22 Simulated Average Monthly and Annual Water Levels at Ellystan Lake

Month	Existing Condition	Construction		Operation		Closure (Pit Filling)		Post-Closure	
	Level (m)	Level (m)	Change from Existing (m)	Level (m)	Change from Existing (m)	Level (m)	Change from Existing (m)	Level (m)	Change from Existing (m)
Jan	282.88	282.88	0.00	282.89	0.01	282.88	0.00	282.89	0.01
Feb	282.85	282.85	0.00	282.86	0.01	282.84	-0.01	282.86	0.01
Mar	282.80	282.80	0.00	282.82	0.02	282.79	-0.01	282.82	0.02
Apr	282.84	282.85	0.01	282.86	0.02	282.84	0.00	282.87	0.03
May	283.06	283.06	0.00	283.07	0.01	283.06	0.00	283.07	0.01
Jun	283.07	283.07	0.00	283.07	0.00	283.06	-0.01	283.07	0.00
Jul	283.01	283.01	0.00	283.01	0.00	283.00	-0.01	283.01	0.00
Aug	282.99	282.99	0.00	282.99	0.00	282.98	-0.01	282.99	0.00
Sep	283.00	283.00	0.00	283.00	0.00	283.00	0.00	283.00	0.00
Oct	283.00	283.00	0.00	283.01	0.01	283.00	0.00	283.01	0.01
Nov	282.99	282.99	0.00	283.00	0.01	282.99	0.00	283.00	0.01
Dec	282.95	282.95	0.00	282.95	0.00	282.94	-0.01	282.95	0.00
<b>Annual</b>	<b>282.95</b>	<b>282.95</b>	<b>0.00</b>	<b>282.96</b>	<b>0.01</b>	<b>282.95</b>	<b>-0.01</b>	<b>282.96</b>	<b>0.01</b>

Note:

0.00 m in the Table represents < 0.01 m.



## **Construction**

Aside from the discharge from Wendy and East pits into Hughes River (approved separately in summer 2025), no additional Project activities were identified in this NOA/NOC that might interact with surface water quantity for the construction phase of the Project, beyond those noted in the EIS. Like the EIS, during construction, the Project activities and components that might interact with surface water quantity and result in environmental effects include:

- Site preparation, including vegetation removal, topsoil stripping, ground compaction, and the decommissioning and removal of existing historical buildings, which may reduce infiltration and evapotranspiration and increase runoff. Removal of the historical north and south MRSA were not included as a change in the water balance as recharge through these features were consistent with the recharge for the remainder of the groundwater flow model domain but were assessed further in the effects to surface water quality in Section 3.3.4.2.2.
- Construction of mine components, including vegetation removal, topsoil stripping, ground compaction, and building construction, which may result in reduced infiltration and evapotranspiration and increased runoff.
- Dewatering of Wendy and East pits into Hughes River, which may reduce streamflow in the existing downstream environment of these pits (i.e., Farley Lake) and increase streamflow in Hughes River.
- Pumping groundwater from interceptor wells (installed between the open pit and Gordon Lake and Farley Lake) and discharging it to Gordon and Farley lakes.

Collectively, these activities are predicted to result in up to a 6% reduction or 11% increase in flows, and up to a 0.02 m increase in lake levels at various modelling nodes, during different months (Table 3.7 to Table 3.22).

## **Operation**

There were no additional Project activities identified in this NOA/NOC that might interact with surface water quantity for the operation phase of the Project beyond those described in the EIS. Like the EIS, during operation, the Project activities and components that might interact with surface water quantity and result in environmental effects include:

- Dewatering of the open pit into Farley Lake via the collection pond
- Collection of contact runoff from the MRSA, overburden storage area, ore storage area, and topsoil storage area into the collection pond and discharging it into Farley Lake
- Pumping of groundwater from interceptor wells (installed between the open pit and Gordon Lake and Farley Lake) and discharging it to Gordon and Farley lakes

Collection of contact runoff from the MRSA, overburden storage area, ore storage area, and topsoil storage area reduces the natural catchment area and streamflow at nodes QF01, QF02, and QF03, as well as the water level in Gordon Lake (Table 3.7, Table 3.8, Table 3.9, and Table 3.18).



Since contact water from these disturbed areas (where runoff is higher than in undisturbed areas, as described above) is discharged to Farley Lake, streamflow at QF05 and water levels in Farley Lake are predicted to increase (Table 3.10 and Table 3.19).

Nodes and lakes downstream of QF05 and Farley Lake (i.e., QF07, QF08, Swede Lake, and Ellystan Lake) show similar (but dampened) effects compared with those of QF05 and Farley Lake (Table 3.12, Table 3.13, Table 3.21, and Table 3.22).

Predicted changes in streamflow and lake levels at QF06, Susan Outflow, Hughes-us, Hughes-mid, Hughes-ds, and Simpson Lake are not substantial (less than 1% as shown in Table 3.11, Table 3.14, Table 3.15, Table 3.16, Table 3.17, and less than 0.01 m as shown in Table 3.20).

### **Decommissioning/Closure**

There were no additional Project activities identified in this NOA/NOC that might interact with surface water quantity for the decommissioning/closure phase of the Project beyond those noted in the EIS. Like the EIS, during closure, the Project activities and components that might interact with surface water quantity and result in environmental effects include:

- Closure and reclamation of the MRSA, closure of the collection pond, and the rerouting of runoff from reclaimed areas to fill the open pit
- Pumping of groundwater from interceptor wells (installed between the open pit and Gordon Lake and Farley Lake) and discharging it to Gordon and Farley lakes. Dewatering of interceptor wells will continue (at a lower pump rate compared with the operation phase) until the pit lake forms and overflows (approximately 12 years, like the EIS model).

Flow reduction at QF01, QF02, and QF03, as well as water level reduction in Gordon Lake, continues during closure, primarily due to the reduction of their natural catchment area, which become disturbed areas. The average flow and water level reductions during closure are greater than those of operation (Table 3.7, Table 3.8, Table 3.9, and Table 3.18) because these areas have reached their maximum footprint by the start of closure, whereas in the operation phase, the disturbed area footprint gradually increased over time.

Since contact water from these disturbed areas is rerouted to fill the pit (rather than being discharged into Farley Lake), streamflow at QF05 and water level in Farley Lake are predicted to decrease (Table 3.10 and Table 3.19). When the pit fills and overflows at post-closure, like the operation phase, QF05 flows are predicted to increase.

Nodes and lakes downstream of QF05 and Farley Lake (i.e., QF07, QF08, Swede Lake, and Ellystan Lake) show similar (but dampened) effects compared with those of QF05 and Farley Lake (Table 3.12, Table 3.13, Table 3.21, and Table 3.22).

Predicted changes in streamflow and lake levels at QF06, Susan Outflow, Hughes-us, Hughes-mid, Hughes-ds, and Simpson Lake are not substantial (less than 1% as shown in Table 3.11, Table 3.14, Table 3.15, Table 3.16, Table 3.17, and Table 3.20).



## **Comparison with the EIS**

The EIS model results (Stantec 2020a and 2020b) and updated model results (Table 3.7 to Table 3.22) indicate the following effects (Table 3.23 and Table 3.24):

- QF01 and QF02:
  - Both the EIS and updated models predict reductions in average monthly streamflows under project-affected conditions.
- QF03:
  - The EIS model predicted monthly flow increases of over 100% during construction and operation compared with existing conditions. The updated model predicts small reductions in flow instead, primarily due to optimization of the interceptor well placements and pumping rates.
  - Both the EIS and updated models predict reductions in average monthly streamflows during closure and post-closure compared with existing conditions.
- QF05:
  - The EIS model predicted flow increases of greater than 300% during construction and operation compared with existing conditions. The updated model predicts less than 120% increase in flow in construction and operation compared with existing conditions. The difference in predicted increase in flow due to the Project is attributed to dewatering the historical open pits into Hughes River (instead of dewatering into Farley Lake) and optimization of the interceptor well pumping system.
  - At closure, the updated model predicts flow reductions of up to 43% in winter (December through April) and 13% during the open water season (May through November; Table 3.10) compared with existing conditions. These reductions are predicted as the pit fills. Note that the 43% winter flow reduction corresponds to a decrease of only 0.006 m<sup>3</sup>/s from an average annual flow of 0.092 m<sup>3</sup>/s. The EIS model did not predict as high a percentage of winter flow reduction, due to its different surface water and groundwater inputs.
  - At post-closure, the updated model predicts flow increases of up to 159% during the winter months (equivalent to only 0.02 m<sup>3</sup>/s increase in flow, due to increased baseflows and disturbed areas) and 12% during the open water season (Table 3.10) compared with existing conditions. The predicted increase in flow for post-closure compared with existing conditions in the EIS model was less than the predicted increase in flow in the updated model.
- QF06: Both the EIS and updated models predict less than 1% change in flow between existing conditions and each Project phase.



**Lynn Lake Gold Project: Gordon Mine Plan Amendment Notice of Alteration / Notice of Change**

Section 3: Environmental Effects and Mitigation

October 6, 2025

- QF07 and QF08: These downstream nodes observed similar flow change patterns to QF05 between the EIS model and updated model.
- Susan Outflow, Hughes-us, Hughes-mid, and Hughes-ds: The updated model predicts less than 1% change in flow for each Project phase compared with existing conditions. Streamflows at these locations were not assessed in the EIS model.
- Gordon Lake, Farley Lake, Swede Lake and Ellystan Lake: Both the EIS model and updated model predict average monthly water level changes of less than 0.10 m for each Project phase compared with existing conditions.
- Simpson Lake: The updated model predicts changes of less than 0.01 m in average monthly water levels for each Project phase compared with existing conditions. The water levels at this lake were not assessed in the EIS model.



Table 3.23 Comparison of Updated Water Balance Model Results with EIS Results – Monthly Streamflows

Model Node	Source	Construction		Operation		Closure (Pit Filling)		Post-Closure		Maximum of All Phases <sup>3</sup>	
		decrease <sup>1</sup>	Increase <sup>2</sup>	decrease <sup>1</sup>	Increase <sup>2</sup>	decrease <sup>1</sup>	Increase <sup>2</sup>	decrease <sup>1</sup>	Increase <sup>2</sup>	Decrease <sup>3</sup>	Increase <sup>3</sup>
QF01	EIS <sup>4</sup>	-31%	0%	-31%	0%	-31%	0%	-31%	0%	-31%	0%
	Updated <sup>5</sup>	-3%	0%	-25%	0%	-44%	0%	-44%	0%	-44%	0%
QF02	EIS <sup>4</sup>	-33%	0%	-33%	0%	-33%	0%	-33%	0%	-33%	0%
	Updated <sup>5</sup>	-6%	0%	-27%	0%	-45%	0%	-45%	0%	-45%	0%
QF03	EIS <sup>4</sup>	-3%	133%	-3%	133%	-18%	0%	-21%	0%	-21%	133%
	Updated <sup>5</sup>	-1%	0%	-12%	0%	-21%	0%	-21%	0%	-21%	0%
QF05	EIS <sup>4</sup>	0%	378%	0%	342%	-8%	10%	-3%	28%	-8%	378%
	Updated <sup>5</sup>	0%	11%	0%	120%	-43%	0%	0%	159%	-43%	159%
QF06	EIS <sup>4</sup>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Updated <sup>5</sup>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
QF07	EIS <sup>4</sup>	0%	139%	0%	136%	-3%	4%	-1%	9%	-3%	139%
	Updated <sup>5</sup>	0%	5%	0%	56%	-20%	0%	0%	74%	-20%	74%
QF08	EIS <sup>4</sup>	0%	76%	0%	84%	-3%	3%	-1%	4%	-3%	84%
	Updated <sup>5</sup>	0%	3%	0%	33%	-12%	0%	0%	44%	-12%	44%
Susan Outflow	EIS <sup>4</sup>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Updated <sup>5</sup>	0%	0%	0%	0%	0%	1%	0%	1%	0%	1%
Hughes-us	EIS <sup>4</sup>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Updated <sup>5</sup>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Hughes-mid	EIS <sup>4</sup>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Updated <sup>5</sup>	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%



**Lynn Lake Gold Project: Gordon Mine Plan Amendment Notice of Alteration / Notice of Change**

Section 3: Environmental Effects and Mitigation

October 6, 2025

Model Node	Source	Construction		Operation		Closure (Pit Filling)		Post-Closure		Maximum of All Phases <sup>3</sup>	
		decrease <sup>1</sup>	Increase <sup>2</sup>	decrease <sup>1</sup>	Increase <sup>2</sup>	decrease <sup>1</sup>	Increase <sup>2</sup>	decrease <sup>1</sup>	Increase <sup>2</sup>	Decrease <sup>3</sup>	Increase <sup>3</sup>
Hughes-ds	EIS <sup>4</sup>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Updated <sup>5</sup>	0%	0%	0%	1%	0%	0%	0%	1%	0%	1%

**Notes:**

<sup>1</sup> maximum decrease of monthly flows during each Phase of the Project. For example, in Table 3.13 (for QF08), during construction, maximum increase of average monthly flows is 3% which occurs in March, April, and December. This 3% flow change is shown in this table, for 'updated' results for 'QF08' flow decrease during 'construction'.

<sup>2</sup> maximum increases of monthly flows during each Phase of the Project.

<sup>3</sup> maximum of percent decrease and increase values for individual phases, as provided in the construction, operation, closure (pit filling) and post-closure columns of this table.

<sup>4</sup> EIS model results (Stantec 2020a and 2020b)

<sup>5</sup> Updated model Results (Table 3.7 to Table 3.17)

0%: Lower than 1% change in streamflow

n/a: not assessed in the EIS model



*Table 3.24 Comparison of Updated Water Balance Model Results with EIS Results – Monthly Lake Levels*

Model Node	Source	Construction		Operation		Closure (Pit Filling)		Post-closure		Maximum of All Phases <sup>3</sup>	
		decrease <sup>1</sup>	Increase <sup>2</sup>	decrease <sup>1</sup>	Increase <sup>2</sup>	decrease <sup>1</sup>	Increase <sup>2</sup>	decrease <sup>1</sup>	Increase <sup>2</sup>	Decrease <sup>3</sup>	Increase <sup>3</sup>
Gordon Lake	EIS <sup>4</sup>	0.00	0.08	0.00	0.08	-0.03	0.00	-0.04	0.00	-0.04	0.08
	Updated <sup>5</sup>	0.00	0.00	-0.03	0.00	-0.05	0.00	-0.05	0.00	-0.05	0.00
Farley Lake	EIS <sup>4</sup>	0.00	0.26	0.00	0.25	-0.02	0.01	-0.01	0.03	-0.02	0.26
	Updated <sup>5</sup>	0.00	0.02	0.00	0.05	-0.04	0.00	0.00	0.06	-0.04	0.06
Simpson Lake	EIS <sup>4</sup>	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Updated <sup>5</sup>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Swede Lake	EIS <sup>4</sup>	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.03	0.00	0.03
	Updated <sup>5</sup>	0.00	0.01	0.00	0.03	-0.02	0.00	0.00	0.05	-0.02	0.05
Ellystan Lake	EIS <sup>4</sup>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Updated <sup>5</sup>	0.00	0.01	0.00	0.02	-0.01	0.00	0.00	0.03	-0.01	0.03

**Notes:**

<sup>1</sup> maximum decrease of monthly water level during each Phase of the Project. For example, in Table 3.18 (for Gordon Lake), during operation, maximum reduction of average monthly lake level is 0.03 m which occurs in June. This -0.03 m level change is shown in this Table, for 'updated' results for Gordon Lake' water level decrease during 'operation'.

<sup>2</sup> maximum increase of monthly water level during each Phase of the Project.

<sup>4</sup> EIS model results (Stantec 2020a and 2020b)

<sup>5</sup> Updated model Results (Table 3.18 to Table 3.22)

0.00: Lower than 0.01m in lake level

n/a: not assessed in the EIS model



### **3.3.4.2.2 Surface Water Quality**

#### **Assessment Methods**

The EIS surface water quality model was updated to reflect modifications to the approved Gordon site described in Section 2.3, results of the NOA/NOC groundwater modelling presented in Section 3.3.3.2.2, and updates to the mine rock and ore volumes and geochemical source terms since submission of the EIS.

As in the EIS, the updated NOA/NOC water quality model included two scenarios: an “Expected Case” scenario based on average climate conditions, average baseline water quality in the receiving environment, average groundwater quality, and average geochemical source term concentrations, and an “Upper Case” scenario based on average climate conditions paired with 95<sup>th</sup> percentile baseline water quality in the receiving environment, and 95<sup>th</sup> percentile geochemical source terms. However, like the EIS, only the Expected Case scenario predictions were used to identify POPCs and to assess residual effects on surface water quality in the receiving environment. Results from the Upper-Case scenario were provided only to show potential extreme changes in the predicted water quality parameters even though the likelihood of these predictions occurring during any Project phase is very low.

The updated surface water quality model utilized the same assessment nodes (Table 3.25 and Figure 1-1 in Appendix F) and approach as the EIS surface water quality model except for the modifications listed below. A detailed description of the modifications to the surface water quality model is presented in Appendix F.

- Three new model nodes on the Hughes River were added to the updated model. These assessment nodes are located upstream of the pit dewatering discharge point, immediately downstream of the pit dewatering discharge point, and downstream of the confluence of the Ellystan Lake outflow. These nodes were added to the updated model due to the proposal to dewater the existing Wendy and East pits into Hughes River during the construction phase.
- The mine rock tonnage in the updated model (51.9 million tonnes [Mt]) was increased by 4% compared with the EIS model. However, the ore tonnage (7.9 Mt) and estimate of potentially acid generating mine rock in the updated model was the same as in the EIS model.
- In the updated model, Wendy Pit receives seepage from the historical north MRSA pre-construction, East Pit receives seepage from the historical North and South MRSA pre-construction, groundwater interceptor wells near Farley Lake receive seepage from the historical South MRSA during construction and operation, and the open pit receives seepage from the historical South MRSA during operation and closure. By comparison, Gordon Lake received seepage from the historical north MRSA and West Farley Lake received seepage from the historical South MRSA pre-construction and during closure in the EIS model (Stantec 2020a) while seepage from the historical north and south MRSA was captured by the interceptor wells during construction and operation.



- Use of the historical north MRSA as a borrow source was assumed to contribute no contaminant load to the downstream receiving environment during and after construction in the updated model.
- The percentage of total nitrogen loss used for the expected case scenario source term in the updated model was 0.5%, which is higher than the 0.2% value used in the EIS model. The percentage of total nitrogen loss used for the upper-case scenario in the updated model was 1.5%, which is higher than the 1% value used in the EIS model.
- The open pit volume and pit wall rubble mass was increased by approximately 9% in the updated model compared with the EIS model.
- Total and dissolved concentrations in seepage from the MRSA discharging to surface water are equal in the updated model whereas this assumption was not applied in the EIS model. This change was made to reflect that particulates are not expected to transport through an aquifer.
- The mass addition and removal rates applied to lakes for the upper-case source terms are the same as the expected case source terms in the updated model whereas mass addition and removal rates for the upper-case source terms differed from those used for the expected case source terms in the EIS.

*Table 3.25 Gordon Site Assessment Nodes*

<b>Assessment Node Name</b>	<b>Corresponding Water Quality Site</b>	<b>Assessment Node Description</b>
Susan Lake	AQF11	Downstream of the PDA and upstream of Hughes Lake
Gordon Lake	AQF2	Adjacent to PDA; will receive discharges from groundwater interceptor wells
West Farley Lake	AQF34	Adjacent to PDA; planned to receive discharge from collection pond and open pit
East Farley Lake	AQF9	Eastern basin of Farley Lake; linked to West Farley Lake via a narrow channel
Swede Lake	AQF15	Downstream of East Farley Lake
Ellystan Lake	AQF20	Downstream of Swede Lake; farthest node downstream of the PDA
Hughes River US	AQF41*	Upstream of pit dewatering effluent discharge point
Hughes River Mid	AQF40A*	Downstream of pit dewatering effluent discharge point.
Hughes River DS	AQF43*	At confluence of Ellystan Lake outflow

Note:

\*New node in NOA/NOC



Like the EIS, POPCs were identified for instances in which at least a single month's predicted concentration exceeded modelled baseline by at least 20% while also exceeding the applicable guideline(s). However, unlike the EIS which relied only on the long-term and short-term CWQG-FAL and Manitoba Water Quality Standards, Objectives, and Guidelines for Protection of Freshwater Aquatic Life (MWQSOG-FAL) to identify POPCs, the assessment of the proposed alterations to the approved Gordon site used the more recently published FEQGs in addition to the CWQG-FAL and MWQSOG-FAL for those parameters for which FEQGs existed (i.e., total aluminum, total cobalt, dissolved copper, total hexavalent chromium, total iron, dissolved lead, dissolved strontium, and total vanadium). The FEQGs are equivalent to long-term water quality guidelines and, because the FEQGs are more recent and based on the current state of science compared with CWQG-FALs and MWQSOG-FALs, only the FEQG was used to identify POPCs in this updated assessment for parameters which had an FEQG.

## **Construction**

Since the EIS was filed in 2020, Alamos has submitted a prior NOA/NOC to allow dewatering of the existing two open pits at the Gordon site to the Hughes River instead of Farley Lake. While not part of this NOA/NOC, this change will allow Alamos to dewater the two existing pits in two to three months instead of approximately two years and would eliminate potential changes in water levels, stream flows, water temperatures, and water quality in Farley Lake and Farley Creek. This change was approved in summer 2025 and has been incorporated into the updated water balance/water quality model for this NOA/NOC.

Besides dewatering the existing pits to the Hughes River, the only new Project activity that has the potential to affect surface water quality in the receiving environment during construction is use of the existing north MRSA as a borrow source for construction material. Use of the north MRSA as a borrow source removes a source of historical contamination to surface water via groundwater and, therefore unlike the EIS, was assumed to contribute no contaminant load to surface or groundwater for the NOA/NOC. The other construction activities that have the potential to affect surface water quality during construction at the Gordon site that are the same as the EIS, are:

- Site preparation (i.e., tree clearing, grading, and grubbing)
- Construction of mine components (e.g., MRSA, ore, overburden and topsoil storage areas, facilities area, roads)
- Construction of water management infrastructure (e.g., collection ditches, sumps, and ponds)
- Discharge of groundwater pumped from interceptor wells installed between the open pit and Gordon and Farley Lakes
- Collection of surface contact water to a collection pond with discharge to Farley Lake.

Using the existing north MRSA for borrow material and other site preparation activities have the potential to increase sediment loading to waterbodies and watercourses downstream or downslope of the PDA. Except for groundwater pumped from the interceptor wells west of the open pit to Gordon Lake, all surface contact water runoff will be directed to a collection pond and discharged to West Farley Lake.



## **Operation**

There are no new activities proposed to the approved Gordon site during the operation phase that were not assessed or modelled in the EIS. However, the size and layout of various mine components (e.g., open pit, MRSA, ore, overburden, and topsoil stockpiles) have changed since the EIS (Table 2.1 and Map 2) and these proposed changes have the potential to alter contact water volumes and loadings reporting to the collection pond during operation; these proposed changes have been incorporated into the updated water balance/water quality model. Operation activities that continue to have the potential to affect surface water quality in the receiving environment that are to the same as the EIS, are:

- Release of sediment during stockpiling of ore, overburden, topsoil, and mine rock and maintenance of access roads
- Discharge of groundwater pumped from interceptor wells into Gordon Lake and Farley Lake
- Collection of surface contact water to a collection pond, including blast residues from the open pit, with discharge to Farley Lake

## **Decommissioning/Closure**

There are no new Project components or activities proposed to the approved Gordon site during the decommissioning/closure phase that were not assessed or modelled in the EIS.

Decommissioning/closure activities that continue to have the potential to affect surface water quality in the receiving environment that are to the same the EIS are:

- Release of sediment during reclamation of ore, overburden, and topsoil storage areas, the facilities area, and MRSA
- Discharge of groundwater pumped from interceptor wells into Gordon Lake and Farley Lake (until open pit is filled with water)
- Discharge of contact water from the collection pond to the open pit
- Discharge of water from the open pit into Farley Lake (once the pit has filled)

During decommission/closure, Project infrastructure will be removed, the water intake and effluent pipes will be removed from the Gordon and Farley Lakes, collection ponds will be dewatered and decommissioned and contact water ditches and sumps will be realigned to direct contact water to the open pit by gravity. As the pit fills, groundwater pumping rates in the interceptor wells will be gradually reduced until the pit is filled with water. The pit is expected to fill in approximately 12 years (instead of 11 years in the EIS) under average climate and runoff conditions at the Gordon site. Once the open pit is filled, groundwater interceptor wells will be decommissioned and water in the pit lake will flow into West Farley Lake via a new channel constructed between the existing diversion channel and in the northeast corner of the pit.



Like the historical East and Wendy pit lakes at the Gordon site, the new pit lake is expected to become meromictic (i.e., chemically and thermally stratified), with denser, more saline (i.e., higher concentrations of dissolved metals and salts), and less oxygenated water in the lower monimolimnion and less dense, less saline, and more oxygenated water in the upper mixolimnion. The chemocline separating these two zones exists between 10 m and 15 m depth in the historical East and Wendy pit lakes at the Gordon site. A similar chemocline depth is expected to develop in the new pit lake at the Gordon site.

### **Comparison with the EIS**

Four water quality parameters were identified as POPCs in the updated NOA/NOC water quality model for the Expected Case scenario: fluoride, total iron, nitrite, and total phosphorus (Table 3.26). This is two more POPCs than were identified for the EIS; total iron and nitrite were not identified as POPCs for the EIS, but fluoride and total phosphorus were. Differences between the POPCs identified for this NOA/NOC and the EIS are:

- Fluoride is identified as a POPC in West Farley Lake and East Farley Lake during operation and post-closure phases for the NOA/NOC but not during construction and closure phases as it was in the EIS. The reason for the exclusion of fluoride as a POPC in West Farley Lake and East Farley Lake during construction for the NOA/NOC is because Wendy and East pits will now be dewatered to Hughes River and not West Farley Lake (which drains into East Farley Lake). The reason for the exclusion of fluoride as a POPC in West Farley Lake and East Farley Lake during closure for the NOA/NOC is because contact water from the collection pond is diverted to the open pit to accelerate pit filling and because the open pit doesn't overflow to Farley Lake until post-closure.
- Fluoride is not identified as a POPC in Gordon Lake during any mine phases for the NOA/NOC but was identified as a POPC in Gordon Lake during all mine phases in the EIS. This difference is due to a change in fate of seepage from the historical north and south MRSAs in closure and changes in the predicted flow rates from the interceptor wells to Gordon Lake. In the EIS, seepage from the historical north and south MRSAs was predicted to discharge to Gordon Lake in closure. In this NOA/NOC, seepage from the historical north and south MRSAs is not predicted to discharge to Gordon Lake in closure because the north MRSA and most of the south MRSA will be removed during construction. In addition, the predicted flow from the interceptor wells to Gordon Lake is lower in this NOA/NOC than in the EIS based on the updated groundwater model results and optimization of the interceptor well system design (Appendix D of the Gordon Mine Plan NOA/NOC).



- Total iron is identified as a POPC in Gordon Lake during closure and post-closure phases for the NOA/NOC but was not identified as a POPC in Gordon Lake in the EIS. In the EIS, the difference in total iron concentration between baseline and closure and post-closure phases was slightly lower than the 20% criteria for identification of POPCs. For the NOA/NOC, the surface water catchment area of Gordon Lake is reduced in closure and post-closure compared with the EIS which results in a large enough increase in total iron concentrations in Gordon Lake during closure and post-closure phases to exceed the 20% criteria for identification of POPCs. In addition, predicted total iron concentrations during closure and post-closure phases in Gordon Lake exceed the more stringent FEQG for total iron that is used in this NOA/NOC but was not used for the EIS.
- Nitrite is identified as a POPC in West Farley Lake during operation for the NOA/NOC but was not identified as a POPC in the EIS because the percentage of residual total nitrogen from blasting in the open pit for the Expected Case source terms was increased to 0.5% in the updated model compared with 0.2% used in the EIS model (Appendix F). The greater residual total nitrogen percentage in the open pit during operation results in greater total nitrogen loads in the collection pond, which receives contact water from the open pit, which is then discharged to West Farley Lake during operation.
- Total phosphorus is identified as a POPC in East Farley Lake during closure for the NOA/NOC, but total phosphorus was identified as a POPC in West Farley Lake during construction for the EIS. The reasons for these differences are: 1) water in the existing Wendy and East pits will no longer discharge to West Farley Lake during construction (it will now discharge to the Hughes River); 2) dissolved phosphorus loadings from groundwater pumped to Gordon and West Farley lakes during operation were used in the NOA/NOC instead of the total phosphorous loadings from groundwater that were used during operation in the EIS (dissolved concentrations were considered more representative of groundwater than total concentrations because aquifers typically filter out particulate matter); and 3) total phosphorus concentrations in East Farley Lake exceed the MWQSOG during summer low flow conditions in the updated model.

Fluoride, total iron, nitrite, and total phosphorus were carried forward in the assessment of residual effects on surface water quality using the methods described in Section 9.4.2.1 of the EIS. These four POPCs were also assessed for their potential to cause acute or chronic toxicological effects to fish and other aquatic biota in Section 3.3.5.2.2 of this assessment.



**Lynn Lake Gold Project: Gordon Mine Plan Amendment Notice of Alteration / Notice of Change**

Section 3: Environmental Effects and Mitigation

October 6, 2025

*Table 3.26 Comparison of Parameters of Potential Concern Predicted in Receiving Environment at the Gordon Site for the Expected Case Between the EIS Model and Updated Model*

Parameter of Potential Concern (POPC)	Assessment Node Associated with Identification of POPC	EIS				NOA/NOC			
		Phase Associated with Identification of POPC				Phase Associated with Identification of POPC			
		Construction	Operation	Closure	Post-Closure	Construction	Operation	Closure	Post-Closure
Fluoride	Gordon Lake	x	x	x	x	-	-	-	-
	West Farley Lake	x	x	x	x	-	x	-	x
	East Farley Lake	x	x	x	x	-	x	-	x
Total Iron	Gordon Lake	-	-	-	-	-	-	x	x
Nitrite	West Farley Lake	-	-	-	-	-	x	-	-
Total Phosphorus	West Farley Lake	x	-	-	-	-	-	-	-
	East Farley Lake	-	-	-	-	-	-	x	-

Notes:

- no POPC predicted
- x POPC predicted



## **Parameters of Potential Concern**

Predicted concentrations for fluoride, total iron, nitrite, and total phosphorus (i.e., the four POPCs identified for the Expected Case scenario) during operation, closure, and post-closure phases at the Gordon site are summarized in Table 3.27 to Table 3.30, respectively. Each table includes predicted mean and maximum concentrations at each assessment node associated with the POPC for the Expected Case, summarized by phase, as well as the magnitude of the predicted maximum concentration above the modelled baseline concentration, the appropriate water quality guideline and the percentage of months in each phase that the parameter concentration is predicted to exceed the appropriate guideline. Similar statistics are provided for the predicted POPC concentrations for the Upper-Case scenario. Details of the surface water quality modelling and model results are presented in Appendix F. Graphical representations of predicted POPC concentrations in the receiving environment over time are provided in Appendix G.

POPCs were predicted to occur in Gordon Lake, West Farley Lake, and East Farley Lake during operation, closure, and/or post-closure phases. Descriptions of these waterbodies and explanations for why POPCs were predicted to occur is provided below:

- Gordon Lake is a fish-bearing waterbody located upstream of the existing Wendy and East pits in the headwaters of the Ellystan Lake watershed, a tributary watershed of the Hughes River. Gordon Lake currently drains into Farley Lake through a constructed diversion channel and will continue to do so throughout the Project now that the new diversion channel has been removed from the Project Description. Gordon Lake will receive groundwater pumped from the interceptor wells installed between Gordon Lake and the west side of the open pit during construction, operation, and closure phases.
- West Farley Lake is the largest and deepest of the three basins that make up Farley Lake, a fish-bearing lake in the Ellystan Lake watershed. West Farley Lake receives inflow from Gordon Lake (via the constructed diversion channel that drains into North Farley Lake), its surrounding watershed, and the two existing pit lakes (Wendy and East pits). West Farley Lake has a maximum depth of 10.8 m and stratifies in the summer. During construction and operation, West Farley Lake will receive effluent from a collection pond that will receive contact water from the PDA and groundwater pumped from the interceptor wells installed between West Farley Lake and the open pit. West Farley Lake will receive overflow from the filled pit lake post-closure.
- East Farley Lake is the smallest and shallowest of the three basins that make up Farley Lake. East Farley Lake receives inflow from West Farley Lake and drains to Swede Lake via Farley Creek at its eastern most location. East Farley Lake is <1 m deep and does not stratify in summer. Changes in water quality in East Farley Lake during operation, closure, and post-closure phases are due entirely to inflows from West Farley Lake (East Farley Lake will not receive any effluent discharges directly)



Table 3.27 Predicted Fluoride Concentrations, by Phase, at Gordon Site Model Nodes Associated with Exceedances of Screening Criteria for the Expected and Upper-Case Scenarios

Model Scenario	Node	Phase	Number of Years in Phase	Long-term CWQG-FAL (mg/L)	Modelled Baseline		Project Predictions		Magnitude of Exceedance of POPC Screening Criteria		Percent of Months in Exceedance of Guideline
					Phase Mean (mg/L)	Phase Max (mg/L)	Phase Mean (mg/L)	Phase Max (mg/L)	Max fold Change: Project vs. Baseline	Max fold Exceedance of Long-term CWQG-FAL	
Expected Case	West Farley Lake	Construction	2	0.12	0.0742	0.104	0.0769	0.114	-	-	-
		Operation	5	0.12	0.0742	0.104	0.0980	0.135	1.3	1.1	8%
		Closure	12	0.12	0.0742	0.104	0.0786	0.113	-	-	-
		Post-Closure	176	0.12	0.0742	0.104	0.1060	0.224	2.5	1.9	33%
	East Farley Lake	Construction	2	0.12	0.0728	0.106	0.0745	0.116	-	-	-
		Operation	5	0.12	0.0728	0.106	0.0915	0.140	1.3	1.2	8%
		Closure	12	0.12	0.0728	0.106	0.0757	0.115	-	-	-
		Post-Closure	176	0.12	0.0728	0.106	0.0977	0.197	2.2	1.6	23%
Upper Case	West Farley Lake	Construction	2	0.12	0.0753	0.105	0.0787	0.117	-	-	-
		Operation	5	0.12	0.0753	0.105	0.1000	0.137	1.4	1.1	13%
		Closure	12	0.12	0.0753	0.105	0.0797	0.115	-	-	-
		Post-Closure	176	0.12	0.0753	0.105	0.1330	0.470	5.2	3.9	51%
	East Farley Lake	Construction	2	0.12	0.0736	0.107	0.0757	0.119	-	-	-
		Operation	5	0.12	0.0736	0.107	0.0932	0.142	1.3	1.2	10%
		Closure	12	0.12	0.0736	0.107	0.0765	0.117	-	-	-
		Post-Closure	176	0.12	0.0736	0.107	0.1190	0.394	4.5	3.3	40%

Notes:

CWQG-FAL = Canadian Water Quality Guideline - Freshwater Aquatic Life

Maximum magnitudes and frequencies of exceedances only shown for nodes and phases in which at least a single month exceeded baseline by at least 20% and the applicable guideline

Maximum fold exceedance of applicable guidelines based on predicted phase maximum concentration

- = not applicable; values not provided for phases not associated with an identification of the POPC

Max Fold Change Project vs Baseline: the maxima presented is the maximum magnitude difference of prediction versus baseline across all model time steps (i.e. modelled months).



Table 3.28 Predicted Total Iron Concentrations, by Phase, at the Gordon Site Model Nodes Associated with Exceedances of Screening Criteria for the Expected and Upper-Case Scenarios

Model Scenario	Node	Phase	Number of Years in Phase	Long-term FEQG (mg/L)	Modelled Baseline		Project Predictions		Max fold Change: Project vs. Baseline	Magnitude of Exceedance of POPC Screening Criteria Max fold Exceedance of Long-term FEQG	Percent of Months in Exceedance of Guideline
					Phase Mean (mg/L)	Phase Max (mg/L)	Phase Mean (mg/L)	Phase Max (mg/L)			
<b>Expected Case</b>	Gordon Lake	Construction	2	0.79 - 0.8	0.674	1.18	0.670	1.18	-	-	-
		Operation	5	0.79 - 0.8	0.674	1.18	0.531	1.18	-	-	-
		Closure	12	0.79 - 0.8	0.674	1.18	0.653	1.27	1.2	1.6	22%
		Post-Closure	176	0.79 - 0.8	0.674	1.18	0.800	1.28	1.2	1.6	33%
<b>Upper Case</b>	Gordon Lake	Construction	2	0.79 - 0.8	0.848	1.35	0.842	1.35	-	-	-
		Operation	5	0.79 - 0.8	0.848	1.35	0.653	1.34	-	-	-
		Closure	12	0.79 - 0.8	0.848	1.35	0.809	1.45	1.2	1.8	42%
		Post-Closure	176	0.79 - 0.8	0.848	1.35	1.000	1.46	1.2	1.8	92%

Notes:

FEQG = Federal Environmental Quality Guidelines

The FEQG long term guideline uses look-up table or calculator. See ECCC (2024)

Maximum magnitudes and frequencies of exceedances only shown for nodes and phases in which at least a single month exceeded baseline by at least 20% and the applicable guideline

Maximum fold exceedance of applicable guidelines based on predicted phase maximum concentration

- = not applicable; values not provided for phases not associated with the identification of the POPC

Max Fold Change Project vs Baseline: the maxima presented is the maximum magnitude difference of prediction versus baseline across all model time steps (i.e. modelled months).



Table 3.29 Predicted Nitrite Concentrations, by Phase, at the Gordon Site Model Nodes Associated with Exceedances of Screening Criteria for the Expected and Upper-Case Scenarios

Model Scenario	Node	Phase	Number of Years in Phase	Long-term CWQG-FAL (mg/L)	Long-term MWQSOG-FAL (mg/L)	Modelled Baseline		Project Predictions		Max fold Change: Project vs. Baseline	Magnitude of Exceedance of POPC Screening Criteria		Percent of Months in Exceedance of Guideline
						Phase Mean (mg/L)	Phase Max (mg/L)	Phase Mean (mg/L)	Phase Max (mg/L)		Long-term CWQG-FAL (mg/L)	Long-term MWQSOG-FAL (mg/L)	
<b>Expected Case</b>	West Farley Lake	Construction	2	0.06	0.06	0.0199	0.0451	0.0206	0.0476	-	-	-	-
		Operation	5	0.06	0.06	0.0199	0.0451	0.0383	0.0883	2.4	1.5	1.5	12%
		Closure	12	0.06	0.06	0.0199	0.0451	0.0210	0.0479	-	-	-	-
		Post-Closure	176	0.06	0.06	0.0199	0.0451	0.0327	0.0551	-	-	-	-
<b>Upper Case</b>	West Farley Lake	Construction	2	0.06	0.06	0.0217	0.0468	0.0229	0.0506	-	-	-	-
		Operation	5	0.06	0.06	0.0217	0.0468	0.0493	0.1120	9.0	1.9	1.9	32%
		Closure	12	0.06	0.06	0.0217	0.0468	0.0223	0.0494	-	-	-	-
		Post-Closure	176	0.06	0.06	0.0217	0.0468	0.0447	0.0631	1.4	1.1	1.1	8%

Notes:

MWQSOG-FAL = Manitoba Standards, Objectives, and Guidelines - Freshwater Aquatic Life; CWQG-FAL = Canadian Water Quality Guideline - Freshwater Aquatic Life

Maximum magnitudes and frequencies of exceedances only shown for nodes and phases in which at least a single month exceeded baseline by at least 20% and the applicable guideline

Maximum fold exceedance of applicable guidelines based on predicted phase maximum concentration

- = not applicable; values not provided for phases not associated with the identification of the POPC

Max Fold Change Project vs Baseline: the maxima presented is the maximum magnitude difference of prediction versus baseline across all model time steps (i.e. modelled months).



Table 3.30 Predicted Total Phosphorus Concentrations, by Phase, at the Gordon Site Model Nodes Associated with Exceedances of Screening Criteria for the Expected and Upper-Case Scenarios

Model Scenario	Node	Phase	Number of Years in Phase	Long-term MWQSOG-FAL (mg/L)	Modelled Baseline		Project Predictions		Magnitude of Exceedance of POPC Screening Criteria		Percent of Months in Exceedance of Guideline
					Phase Mean (mg/L)	Phase Max (mg/L)	Phase Mean (mg/L)	Phase Max (mg/L)	Max fold Change: Project vs. Baseline	Max fold Exceedance of Long-term MWQSOG-FAL	
<b>Expected Case</b>	East Farley Lake	Construction	2	0.025	0.0198	0.0279	0.0196	0.0282	-	-	-
		Operation	5	0.025	0.0198	0.0279	0.0172	0.0264	-	-	-
		Closure	12	0.025	0.0198	0.0279	0.0202	0.0293	1.2	1.2	24%
		Post-Closure	176	0.025	0.0198	0.0279	0.0160	0.0263	-	-	-
<b>Upper Case</b>	East Farley Lake	Construction	2	0.025	0.0203	0.0283	0.0202	0.0286	-	-	-
		Operation	5	0.025	0.0203	0.0283	0.0177	0.0271	-	-	-
		Closure	12	0.025	0.0203	0.0283	0.0207	0.0297	1.2	1.2	24%
		Post-Closure	176	0.025	0.0203	0.0283	0.0165	0.0266	-	-	-

Notes:

MWQSOG-FAL = Manitoba Standards, Objectives, and Guidelines - Freshwater Aquatic Life.

Maximum magnitudes and frequencies of exceedances only shown for nodes and phases in which at least a single month exceeded baseline by at least 20% and the applicable guideline.

Maximum fold exceedance of applicable guidelines based on predicted phase maximum concentration

- = not applicable; values not provided for phases not associated with the identification of the POPC

Max Fold Change Project vs Baseline: the maxima presented is the maximum magnitude difference of prediction versus baseline across all model time steps (i.e. modelled months).



### ***Fluoride***

Fluoride is identified as a POPC in West Farley Lake and East Farley Lake during operation and post-closure for the Expected Case scenario (Table 3.27). Project-related changes to fluoride concentrations in West Farley Lake and East Farley Lake during operation are associated with discharge of contact water effluent from the collection pond. Project-related changes to fluoride concentrations in West Farley Lake and East Farley Lake in post-closure are due to overflow from the open pit.

For the Expected Case scenario, the maximum predicted fluoride concentrations in West Farley Lake and East Farley Lake in the updated NOA/NOC water quality model are:

- 0.14 mg/L in West Farley Lake during operation, which is approximately 1.1 times the long-term CWQG-FAL (0.12 mg/L) and 1.3 times the modelled baseline concentration (Table 3.27; Figure H-1, Appendix G).
- 0.22 mg/L in West Farley Lake during post-closure, which is approximately 1.9 times the long-term CWQG-FAL (0.12 mg/L) and 2.5 times the modelled baseline concentration (Table 3.27; Figure H-1, Appendix G).
- 0.14 mg/L in East Farley Lake during operation, which is approximately 1.2 times the long-term CWQG-FAL (0.12 mg/L) and 1.3 times the modelled baseline concentration (Table 3.27; Figure H-3, Appendix G).
- 0.20 mg/L in East Farley Lake during post-closure, which is approximately 1.6 times the long-term CWQG-FAL (0.12 mg/L) and 2.2 times the modelled baseline concentration (Table 3.27; Figure H-3, Appendix G).

For the Expected Case, fluoride concentrations in West Farley Lake and East Farley Lake were predicted to exceed the CWQG-FAL in 8% of months during operation. Fluoride concentrations in West Farley Lake and East Farley Lake were predicted to exceed the CWQG-FAL in 33% and 22% of the modelled months during post-closure, respectively (Table 3.27, Figures H-1 and H-3, respectively), but were predicted to exceed the CWQG-FAL seasonally until the end of the modelled post-closure phase.

For the Upper-Case scenario, the maximum predicted fluoride concentrations in West Farley Lake and East Farley Lake in the updated NOA/NOC water quality model are:

- 0.14 mg/L in West Farley Lake during operation, which is approximately 1.1 times the long-term CWQG-FAL (0.12 mg/L) and 1.4 times the modelled baseline concentration (Table 3.27; Figure H-2, Appendix G).
- 0.47 mg/L in West Farley Lake during post-closure, which is approximately 3.9 times the long-term CWQG-FAL (0.12 mg/L) and 5.2 times the modelled baseline concentration (Table 3.27; Figure H-2, Appendix G).



- 0.14 mg/L in East Farley Lake during operation, which is approximately 1.2 times the long-term CWQG-FAL (0.12 mg/L) and 1.3 times the modelled baseline concentration (Table 3.27; Figure H-4, Appendix G).
- 0.39 mg/L in East Farley Lake during post-closure, which is approximately 3.3 times the long-term CWQG-FAL (0.12 mg/L) and 4.5 times the modelled baseline concentration (Table 3.27; Figure H-4, Appendix G).

### ***Seasonal Trends for Fluoride***

Seasonal trends in predicted fluoride concentrations in West Farley Lake and East Farley Lake compared with Swede Lake, Ellystan Lake, and the Hughes River downstream of the LAA are provided for the construction, operation, closure, and post-closure phases in Figure H-5 (Appendix G).

Predicted mean monthly fluoride concentrations for the Expected Case scenario and the Upper-case scenario followed similar seasonal trends to monthly baseline fluoride concentrations in West Farley Lake, East Farley Lake, Swede Lake, and Ellystan Lake during construction, operation, and closure phases; fluoride concentrations were low during summer (i.e., June to September), increased in October, remained elevated during the winter (i.e., November to April) and then decreased during the spring freshet (i.e., May). Similar seasonal trends for fluoride were predicted to occur in West Farley Lake, East Farley Lake, and Swede Lake during construction, operation, and closure phases in the EIS.

Seasonal trends in predicted mean monthly fluoride concentrations in West Farley Lake, East Farley Lake, Swede Lake, and Ellystan Lake follow the same pattern during post-closure as in construction, operation, and closure phases but deviate more from average monthly baseline fluoride concentrations than during the earlier phases, particularly during the fall and winter months.

### ***Total Iron***

Total iron is identified as a POPC in Gordon Lake during closure and post-closure for the Expected Case scenario (Table 3.26). This is predicted to occur for two reasons. First, total iron concentrations are predicted to decrease at the beginning of operation due to a greater mass load of total iron seeping via groundwater from Gordon Lake to the open pit than the mass load of total iron pumped from the interceptor wells to Gordon Lake (due to the time lag between water in Gordon Lake moving toward the open pit and groundwater pumped by the interceptor wells to Gordon Lake). In closure, the seepage rate from Gordon Lake will decrease as the open pit fills and the mass load of iron discharged from the interceptor wells to Gordon Lake will be greater than the mass load of iron seeping from Gordon Lake to the open pit. Therefore, the concentration of total iron in Gordon Lake is predicted to increase in closure and post-closure phases compared with baseline conditions. Second, the catchment area of Gordon Lake will be reduced during closure and post-closure which is predicted to increase total iron concentrations in Gordon Lake above the 20% difference criterion between baseline and predicted concentrations for identification of POPCs and above the dissolved organic carbon (DOC) and pH dependent FEQG for total iron (not used for the EIS).



Total iron concentrations were predicted to exceed the FEQG during all Project phases. However, unlike closure and post-closure phases, total iron was not identified as a POPC during construction and operation because the difference between modelled baseline total iron concentrations and predicted total iron concentrations during construction and operation were not greater than 20%. Unlike the EIS, seepage from the historical north and south MRSAs will no longer report to Gordon Lake after construction begins, meaning that the total iron load reporting to Gordon Lake during construction and operation will be smaller.

For the Expected Case scenario, the maximum predicted total iron concentrations in Gordon Lake in the updated NOA/NOC water quality model are:

- 1.27 mg/L during closure, which is approximately 1.6 times the long-term FEQG and 1.2 times the modelled baseline concentration in closure (Table 3.28; Figure H-6, Appendix G).
- 1.28 mg/L during post-closure, which is approximately 1.6 times the long-term FEQG and 1.2 times the modelled baseline concentration in closure (Table 3.28; Figure H-6, Appendix G).

For the Expected Case scenario, maximum total iron concentrations in Gordon Lake are predicted to exceed the FEQG in 22% of all months during closure and in 33% of all months during post-closure. However, maximum total iron concentrations in Gordon Lake are predicted to exceed the FEQG until the end of the modelled post-closure period (Figure H-6, Appendix G).

For the Upper-Case scenario, maximum predicted total iron concentrations in Gordon Lake in the updated NOA/NOC water quality model are:

- 1.45 mg/L during closure, which is approximately 1.8 times the long-term FEQG and 1.2 times the modelled baseline concentration in closure (Table 3.28; Figure H-7, Appendix G).
- 1.46 mg/L during post-closure, which is approximately 1.8 times the long-term FEQG and 1.2 times the modelled baseline concentration in closure (Table 3.28; Figure H-7, Appendix G).

### ***Seasonal Trends for Total Iron***

Seasonal trends in predicted total iron concentrations in Gordon Lake compared with Swede Lake, Ellystan Lake, and the Hughes River downstream of the LAA are provided for the construction, operation, closure, and post-closure phases in Figure H-8 (Appendix G).

In Gordon Lake, seasonal trends in average monthly total iron concentration are similar for all mine phases for the Expected Case and Upper-Case scenarios. For each mine phase, lower average monthly total iron concentrations are predicted to occur in Gordon Lake in winter (i.e., November to April), followed by a peak total iron concentration in May which is consistent with seasonal changes in baseline total iron concentrations (Figure H-8, Appendix G). Average monthly total iron concentrations in Gordon Lake are predicted to decrease over the summer and fall.



In Swede Lake and Ellystan Lake, average monthly total iron concentrations for the Expected Case and Upper-Case scenarios are predicted to follow the same seasonal patterns as baseline average monthly total iron concentrations (Figure H-8, Appendix G), indicating that natural seasonal variation in total iron concentrations will continue to be the largest influence on total iron concentrations in both lakes during all mine phases. The lower total iron concentrations predicted in Swede Lake for the Expected and Upper-case scenarios compared with baseline total iron concentrations is due to the difference in inflow volumes from Farley Lake and Simpson Lake into Swede Lake.

### ***Nitrite***

Nitrite is identified as a POPC in West Farley Lake during operation for the Expected Case scenario (Table 3.29). Project-related changes to nitrite concentrations in West Farley Lake are associated with discharge of contact water effluent from the collection pond during operation. Nitrite was not identified as a POPC in any lake during any Project phase for the EIS. Nitrite was identified as a POPC in West Farley Lake for this NOA/NOC but not in the EIS because the percentage of total nitrogen loss during blasting in the open pit used for the Expected Case source terms was increased to 0.5% for the updated model compared with 0.2% applied in the EIS model (Appendix F).

For the Expected Case scenario, the maximum predicted nitrite concentration in West Farley Lake in the updated NOA/NOC water quality model is:

- 0.088 mg/L during operation, which is approximately 1.5 times the long-term CWQG-FAL and MWQSOG-FAL (0.060 mg/L) and 2.4 times the modelled baseline concentration (Table 3.29; Figure H-9, Appendix G).

For the Expected Case scenario, nitrite concentrations in West Farley Lake were predicted to increase above the CWQG-FAL and MWQSOG-FAL in summer during operation when the collection pond is discharging to West Farley Lake and all other inflows to West Farley Lake are low (Figure H-9, Appendix G). Nitrite concentrations in West Farley Lake were predicted to exceed the CWQG-FAL and MWQSOG-FAL for 12% of all months during operation (Table 3.29).

For the Upper-Case scenario, the maximum predicted nitrite concentrations in West Farley Lake in the updated NOA/NOC water quality model are:

- 0.112 mg/L during operation, which is approximately 1.9 times the long-term CWQG-FAL and MWQSOG-FAL (0.060 mg/L) and 9 times the modelled baseline concentration (Table 3.29; Figure H-10, Appendix G).
- 0.063 mg/L during post-closure, which is approximately 1.1 times the long-term CWQG-FAL and MWQSOG-FAL (0.060 mg/L) and 1.4 times the modelled baseline concentration (Table 3.29; Figure H-10, Appendix G).



### ***Seasonal Trends for Nitrite***

Seasonal trends in predicted average monthly nitrite concentrations in West Farley Lake, Swede Lake, Ellystan Lake, and the Hughes River downstream of the LAA are provided for construction, operation, closure, and post-closure phases in Figure H-11 (Appendix G).

In West Farley Lake, seasonal trends in average monthly nitrite concentrations are predicted to be similar during construction, operation, and closure phases for the Expected Case and Upper-case scenarios. For both scenarios, average monthly nitrite concentrations during construction, operation, and closure phases are predicted to decrease in May during the spring freshet, increase in summer to a peak in August, and decrease from late summer, through fall and into winter (Figure H-11, Appendix G). Average monthly nitrite concentrations during post-closure are predicted to increase during the winter, decrease during the spring freshet, increase during the summer to a peak in August and gradually decrease over the fall and winter for the Expected Case and Upper-case scenarios.

Seasonal trends in average monthly nitrite concentrations in Swede and Ellystan lakes were opposite from the season trends in average monthly nitrite concentrations predicted in West Farley Lake (Figure H-11, Appendix G). In Swede and Ellystan lakes, average monthly nitrite concentrations are predicted to be high in the winter, decrease in May during the spring freshet and remain low during summer before increasing over the fall for the Expected Case and Upper-Case scenarios.

### ***Total Phosphorus***

Total phosphorus is identified as a POPC in East Farley Lake during closure for the Expected Case scenario (Table 3.30). This is because the total phosphorus load entering East Farley Lake from West Farley Lake during closure is predicted to be greater than 20% of baseline total phosphorus concentrations in East Farley Lake during June and November while also being greater than the MWQSOG-FAL (0.025 mg/L) in these months.

Total phosphorus is not identified as a POPC in East Farley Lake during construction, operation, and post-closure because the total phosphorus load entering East Farley Lake from West Farley Lake is lower in total during these phases compared with closure.

Total phosphorus is not identified as a POPC in West Farley Lake during closure (or any other Project phase) because the total phosphorus load entering West Farley Lake from the collection pond (construction and operation), groundwater interceptor wells and Gordon Lake (closure) and pit lake overflow (post-closure) is insufficient to raise predicted total phosphorus concentrations in this larger basin of Farley Lake more than 20% higher than modelled baseline total phosphorus concentrations. The total phosphorus concentrations in these discharges are lower than the total phosphorus in West Farley Lake.

For the Expected Case scenario, the maximum predicted total phosphorus concentration in East Farley Lake in the updated NOA/NOC water quality model is:

- 0.029 mg/L during closure, which is approximately 1.2 times the long-term MWQSOG-FAL (0.025 mg/L) and 1.2 times modelled baseline (Table 3.30; Figure H-12, Appendix G).



For the Expected Case scenario, maximum total phosphorus concentrations in East Farley Lake are predicted to exceed the long-term MWQSOG-FAL (0.025 mg/L) at least once per year during closure (Figure H-12, Appendix G). Total phosphorus concentrations are predicted to exceed the MWQSOG-FAL in 24% of months in East Farley Lake during closure for the Expected Case scenario (Table 3.30).

For the Upper-Case scenario, the maximum predicted total phosphorus concentrations in East Farley Lake in the updated NOA/NOC water quality model were:

- 0.030 mg/L during closure, which is 1.2 times the long-term MWQSOG-FAL (0.025 mg/L) and 1.2 times modelled baseline (Table 3.30; Figure H-13, Appendix G).

### ***Seasonal Trends for Total Phosphorus***

Seasonal trends in average monthly total phosphorus concentrations predicted in East Farley Lake, Swede Lake, Ellystan Lake, and the Hughes River downstream of the LAA during construction, operation, closure, and post-closure phases are presented in Figure H-14 (Appendix G).

Seasonal trends in average monthly total phosphorus concentration predicted in East Farley Lake, Swede Lake, and Ellystan Lake during construction were similar for the Expected Case, Upper Case, and baseline scenarios (Figure H-14, Appendix G). This is because water in the existing pit lakes at the Gordon site (Wendy and East pits) will no longer be pumped to Farley Lake and, therefore, will not be a source of total phosphorus to the downstream receiving environment.

Seasonal trends in average total phosphorus concentrations in East Farley Lake during operation and post-closure phases are similar for the Expected and Upper-case scenarios (Figure H-14, Appendix G). This trend is characterized by a decrease in average monthly total phosphorus during the winter, an increase in total phosphorus concentrations in May and June, a decrease in total phosphorus concentrations through the summer, and an increase in total phosphorus concentrations in fall. Lower total phosphorus concentrations in winter during operation is attributable to dilution from lower total phosphorus content groundwater being discharged to Farley Lake from the interceptor wells.

During closure, when contact water is diverted to the open pit, average monthly total phosphorus concentrations are predicted to gradually increase in East Farley Lake during the winter and spring, followed by a decrease in total phosphorus concentration in summer and an increase in total phosphorus concentrations in fall, like what is predicted during operation and post-closure phases.

In Swede Lake, seasonal trends in predicted total phosphorus concentrations are similar for all mine phases for the Expected Case and the Upper-Case scenarios; total phosphorus concentrations are predicted to be highest in winter and lowest in summer. In Ellystan Lake, total phosphorus concentrations are predicted to be lowest in winter and highest in summer. These seasonal trends are consistent with seasonal trends observed at baseline in both lakes, suggesting that seasonal trends in total phosphorus concentrations in Swede Lake and Ellystan Lake will be driven more by natural processes than by effects of the Project.



### **3.3.4.3 Summary of Mitigation Measures**

The only mitigation measure for eliminating or reducing potential effects to surface water quantity and quality that was not included in the EIS that is included in this NOA/NOC is the change from dewatering the existing pit lakes (Wendy and East pits) to the Hughes River instead of to Farley Lake. This change was approved separately in summer 2025. All other mitigation measures for surface water quantity and quality are identical to the mitigation measures in the EIS (Stantec 2020a) and described in the Surface Water Management and Monitoring Plan (SWMMP; Version 0, January 2025). Alamos is committed to the follow-up monitoring and adaptive management actions (if and as required) that are described in the SWMMP.

### **3.3.4.4 Residual Effects**

#### **3.3.4.4.1 Surface Water Quantity**

The Project will result in changes to surface water quantity within the LAA. The magnitude of these changes vary at different locations and between Project phases as follows:

- Within the headwater sub-catchments, i.e., Gordon Lake inflow sub-catchments (QF01 and QF02), moderate-magnitude (i.e., between 10% and 30%) reductions in annual streamflow compared with existing conditions are predicted during operation, and high-magnitude (i.e., greater than 30%) reductions are predicted during closure and post-closure (Table 3.7 and Table 3.8). These streamflow reductions are consistent with those predicted by the EIS model.
- At Gordon Lake outflow (QF03), moderate-magnitude reductions in annual streamflow are simulated during operation, closure, and post-closure. The EIS model had also predicted streamflow reductions during closure and post-closure compared with existing conditions, but it had predicted increases in streamflow during operation, primarily due to unoptimized interceptors well placement and pump rates.
- At Farley Lake outflow (QF05), while high-magnitude increases in annual streamflow are predicted during operation and post-closure, moderate-magnitude reductions in annual streamflow are predicted during closure (Table 3.10). These streamflow changes are consistent with those predicted by the EIS model, except during post-closure where the EIS model had predicted low magnitude increases in streamflow.
- At the downstream end of the LAA, i.e., Ellystan Lake outflow (QF08), low-magnitude (i.e., less than 10%) increases in annual streamflow are simulated during operation, low-magnitude reductions during closure, and moderate-magnitude increases during post-closure (Table 3.13). These streamflow changes are consistent with those predicted by the EIS model, except during post-closure where the EIS model had predicted low magnitude increases in streamflow.
- Outside the LAA (i.e., in the Hughes River [Hughes-ds]), the magnitude of changes in surface water quantity compared with existing conditions is predicted to be negligible (i.e., less than 1% difference, Table 3.17). Therefore, like the EIS, the effects are expected to be contained within the LAA.



As described above, as presented in the EIS, the surface water quantity changes will continue through post-closure and the timing of changes are predicted to occur continuously throughout the year.

In summary, as presented in the EIS, residual effects of the Project on surface water quantity during the construction, operation, closure, and post-closure phases are characterized as adverse in direction and moderate magnitude at the downstream end of the LAA, continuous, long-term, and irreversible.

#### **3.3.4.4.2      *Surface Water Quality***

The proposed alterations to the approved Gordon site are predicted to result in large enough changes to surface water quality in Gordon Lake, West Farley Lake, and East Farley Lake within the LAA to exceed provincial or federal water quality guidelines for the protection of freshwater aquatic life during at least one Project phase. Updates to the groundwater and surface water quality models that address the proposed alterations to the Gordon site for this NOA/NOC and the use of more stringent FEQGs (total iron only) resulted in changes to the magnitude and frequency of guideline exceedances, the location and timing of guideline exceedances, and two new POPCs compared with the EIS. These changes to surface water quality results in the NOA/NOC are:

- Exclusion of fluoride as a POPC in Gordon Lake during all Project phases and in West Farley Lake and East Farley Lake during the construction and closure phases compared with the EIS
- Approximately 26% decrease and 49% increase in maximum predicted fluoride concentrations in West Farley Lake during operation and post-closure, respectively, compared with the EIS.
- Approximately 25% decrease and 28% increase in maximum predicted fluoride concentration in East Farley Lake during operation and post-closure, respectively, compared with the EIS.
- Inclusion of total iron as a POPC in Gordon Lake during closure and post-closure compared with the EIS
- Inclusion of nitrite as a POPC in West Farley Lake during operation compared with the EIS
- Inclusion of phosphorus as a POPC in East Farley Lake during closure, but elimination of total phosphorus as a POPC in West Farley Lake during all mine phases compared with the EIS.

For these reasons, characterization of residual effects to surface water quality are different than the characterization of residual effects to surface water quality in the EIS. An updated characterization of residual effects to surface water quality at the Gordon site due to the combination of updated groundwater and surface water model predictions that address the proposed alterations to the Gordon site are as follows:

- Construction: Adverse in direction, negligible in magnitude, confined to the LAA, short term, and reversible.
- Operation: Adverse in direction, moderate in magnitude, confined to the LAA, medium term, and reversible.
- Closure/Decommissioning: Adverse in direction, moderate in magnitude, confined to the LAA, long term, and irreversible.



Characterization of residual effects to surface water quality were separated by Project phase because of the differences in the number, timing, duration, and magnitude of POPCs that were predicted to occur during construction, operation, closure, and post-closure phases. Negligible magnitude residual effects to surface water quality are predicted to occur in Gordon Lake, West Farley Lake, and East Farley Lake during construction in consideration of the proposed alterations. This is because, with the change to pump water from the existing pit lakes (East and Wendy pits) to the Hughes River instead of Farley Lake, there are no parameters predicted to exceed baseline concentrations by more than 20% and any provincial or federal water quality guideline in Gordon Lake, West Farley Lake, or East Farley Lake during construction. By comparison, moderate magnitude residual effects to surface water quality were predicted at the Gordon site during construction for the EIS because fluoride and total phosphorus concentrations were identified as POPCs in Gordon Lake and West Farley Lake during construction, but concentrations were expected to be high enough to have an adverse effect on fish or other aquatic biota in either lake.

Moderate magnitude residual effects to surface water quality are predicted to occur during operation in consideration of the proposed alterations. This is because maximum nitrite concentrations are predicted to exceed baseline concentrations by more than 20% and the CWQG-FAL in West Farley Lake during operation, but adverse effects to fish and other aquatic biota in West Farley Lake are not expected to occur because the assumptions used to predict nitrite concentrations in West Farley Lake are conservative and because the predicted nitrite concentrations are below the sub-lethal effect concentrations for the most abundant fish and benthic invertebrate species present in West Farley Lake (see Section 3.3.5.4.2 for details).

Moderate magnitude residual effects to surface water quality are predicted to occur during the decommissioning/closure phase in consideration of the proposed alterations. This is because total iron concentrations are predicted to exceed baseline concentrations by more than 20% and the FEQG for total iron in Gordon Lake during closure, but adverse effects to fish and other aquatic biota in Gordon Lake are not expected to occur because the surface water quality model did not account for any reduction in total iron concentrations resulting from aeration of groundwater prior to pumping to Gordon Lake and because high DOC concentrations in Gordon Lake are expected to attenuate sub-lethal toxicological effects to fish and other aquatic biota (see Section 3.3.5.4.2 for details). The duration of the residual effect to surface water quality during decommissioning/closure is long-term because total iron concentrations are predicted to remain elevated in perpetuity in Gordon Lake post-closure.

Besides the above differences, the characterization of residual effects to surface water quality for this NOA/NOC are the same as the EIS (i.e., direction, geographic extent, timing, frequency, reversibility, and ecological context).

As stated in the EIS, Alamos is committed to monitoring and adaptively managing potential residual effects of the Project on surface water quality. To do this, Alamos has developed a SWMMP that includes monitoring water quality in Gordon Lake, West Farley Lake, East Farley Lake, Swede Lake, and suitable reference lakes during all Project phases. If surface water quality monitoring data shows that fluoride, total iron, nitrite, total phosphorus or any other monitored parameter is exceeding, or trending toward exceeding, a provincial and/or federal water quality guidelines for the protection of freshwater aquatic life, Alamos will initiate the adaptive management plan outlined in the SWMMP. This adaptive management



plan includes a hierarchical process of determining if the elevated water quality concentration(s) observed in the monitoring data are due to the Project and, if so, the measures that will be taken to reduce the effect. Mitigation measures that could be implemented at the Gordon site to reduce elevated water quality parameters include but are not limited to: 1) collect and treat (as required) contact water in the collection pond(s) prior to discharge; 2) increasing aeration of groundwater from the interceptor wells to encourage precipitation of elements that form oxides (e.g. iron oxide) prior to discharge to Gordon Lake; 3) discharging effluent to wetlands, the Hughes River, or lakes with larger assimilative capacity.

### **3.3.5 Fish and Fish Habitat**

Fish and fish habitat are valued by Indigenous Nations, the public, and other stakeholders and are protected in Canada by the *Fisheries Act*. Fish and fish habitat provide cultural, economic, recreational, and aesthetic values to local communities, contribute to biodiversity, and are indicators of aquatic ecosystem health.

Alterations to the open pit, MRSA, ore and overburden stockpiles, facility area, and water management infrastructure at the Gordon site have the potential to alter water quantity, water quality, and groundwater contributions in streams, lakes, and fish-bearing wetlands downstream and adjacent to the Gordon site. These changes could affect fish community composition, population abundance and individual fish health. They may also affect fish indirectly due to changes in lower trophic communities that form the basis of the aquatic food web.

#### **3.3.5.1 Regulatory and Guideline Setting**

##### **3.3.5.1.1 Federal Guideline Criteria**

The assessment of potential effects of the proposed alterations on fish and fish habitat at the Gordon site included consideration of the federal legislation, regulations, and guidelines described below.

##### ***Fisheries Act***

The *Fisheries Act* provides a framework for the “proper management and control of fisheries and the conservation and protection of fish and fish habitat, including by preventing pollution”. To do so, the *Fisheries Act* includes the following prohibitions:

- Sections 34(2) provides provisions for maintaining adequate flow and passage of fish.
- Section 34.4(1) prohibits any work, undertaking or activity, other than fishing, that results in the death of fish.
- Section 35(1) prohibits the carrying on of a work, undertaking or activity that results in the harmful alteration, disruption, or destruction (HADD) of fish habitat.
- Section 36(3) prohibits the deposit of deleterious substances of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance may enter such water.



## **Metal and Diamond Mining Effluent Regulation**

The MDMER, promulgated under the *Fisheries Act*, regulates the deposit of deleterious mine effluents, tailings, and mine rock into waters frequented by fish and is administered by ECCC. The MDMER defines mine effluent as:

- (a) hydrometallurgical facility effluent, milling facility effluent, mine water effluent, tailings impoundment area effluent, treatment pond effluent or treatment facility effluent other than effluent from a sewage treatment facility.
- (b) any seepage or surface runoff containing any deleterious substance that flows over, through or out of the site of a mine.

The MDMER applies to metal and diamond mines with an effluent flow rate of greater than 50 m<sup>3</sup>/d based on effluent deposited from all final discharge points of the MacLellan Gold Mine. For these mines, the MDMER allows the discharge of mine effluent containing deleterious substances if the effluent is:

- not acutely lethal
- the pH is equal to or greater than 6.0, but not greater than 9.5
- the concentrations of deleterious substances do not exceed concentration limits identified in Schedule 4 of the MDMER at the final discharge point(s).

Under the MDMER, all mines and recognized closed mines are required to conduct acute lethality testing of final effluent, effluent characterization, and EEM in the downstream receiving environment in three-year cycles.

## **Species at Risk Act**

The *Species at Risk Act* (SARA) provides protection and mandates recovery strategies and action plans for extirpated, endangered, or threatened species in Canada, while managing species of special concern to prevent further declines. DFO administers SARA for aquatic species listed on SARA Schedule 1. Species at risk are added to Schedule 1, the official list of species at risk, through a federal government process after receiving scientific information and recommendations from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Each species is classified as extirpated, endangered, threatened, or special concern. Species listed on Schedule 1 are subject to protection and recovery measures.

The upper Churchill River populations of lake sturgeon are part of the western Hudson Bay populations of lake sturgeon that are classified as “endangered” by COSEWIC. However, they are not currently included under SARA Schedule 1 (Government of Canada 2025) or listed by the Manitoba Conservation Data Centre [MB CDC 2015]).



## **DFO's Ecological Flow Requirements**

"The Framework for Assessing Ecological Flow Requirements to Support Fisheries in Canada" (DFO 2013) provides guidance on the management of flows required to maintain the ecological functions that sustain fisheries in streams and rivers potentially affected by flow withdrawals. The guidance promotes the maintenance of natural flow regimes to sustain riverine ecosystems, with the understanding that the probability of degrading riverine ecosystems increases with increasing alteration of the natural flow regime. To manage this risk, the Framework for Assessing Ecological Flow Requirements to Support Fisheries in Canada (DFO 2013) recommends that assessment of alterations to the natural flow regime be considered in a cumulative sense, not just on a project-by-project basis, and that:

- Cumulative flow alterations less than 10% in amplitude of the actual "instantaneous" flow in the river relative to a "natural flow regime" have a low probability of detectable effects to ecosystems that support commercial, recreational, or Aboriginal fisheries.
- Cumulative flow alterations that result in instantaneous flows less than 30% of the mean annual discharge (MAD) have a heightened risk of impacts to fisheries.
- Cumulative flow alterations greater than 10% of instantaneous discharge or that results in flows less than 30% of MAD, require a more rigorous level of assessment to evaluate potential impacts on ecosystem functions which support fisheries.

## **Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life**

The CWQG-FAL are intended to protect all forms of freshwater aquatic life and all aspects of their aquatic life cycle, including the most sensitive life stage of the most sensitive species over the long-term from anthropogenic stressors such as chemical inputs or changes to physical components. CWQG-FALs provide science-based benchmarks for a nationally consistent level of protection for aquatic life in Canada. CWQG-FALs are developed by the CCME, an inter-governmental forum comprised of federal and provincial ministries of the environment.

## **Federal Environmental Quality Guidelines**

FEQGs are recommended chemical thresholds that identify the concentration below which there is a low likelihood of direct adverse effects from the chemical on aquatic life exposed via water or sediment, or where chemicals may bioaccumulate in wildlife that may consume aquatic life. Use of FEQGs is voluntary unless prescribed by regulation of binding agreements. FEQGs are not effluent limits nor are they "never-to-be-exceeded" values. FEQGs are developed by ECCC to support federal environmental quality monitoring, risk assessment and risk management activities on substances for which CCME guidelines do not yet exist or are not reasonably expected to be updated in the near future.



### **3.3.5.1.2 Provincial Guideline Criteria**

The assessment of potential effects of the proposed alterations on fish and fish habitat at the MacLellan site included consideration of the provincial legislation, regulations, and guidelines described below.

#### **The Environment Act**

Alterations to stream channels that affect fish mobility and/or fish habitat and works resulting in modification to lake or river levels for a water surface area greater than 2 square kilometres (km<sup>2</sup>) are considered Class 2 developments under section 3(9) of the Classes of Development Regulations pursuant to *The Environment Act* of Manitoba (Chapter 1). Consequently, any proposed alteration to streams in Manitoba is subject to provincial assessment and licensing requirements.

#### **The Water Rights Act**

*The Water Rights Act*, administered by MECC, regulates the use or diversion of water in Manitoba. Section 9 requires consideration of flows required to protect and maintain aquatic ecosystems during water licensing and allows the Minister to suspend or restrict water rights under a licence if the available flow is insufficient to protect aquatic ecosystems, based on scientific information. Section 14.1 allows the Minister to undertake investigations into groundwater and instream flows to determine whether insufficient flows are negatively affecting aquatic ecosystems.

#### **The Water Protection Act**

*The Water Protection Act*, administered by MECC, provides for the protection of freshwater biota and human and wildlife consumers of fish. The MWQSOG lists water quality and tissue residue guidelines, which are set out in the *Water Quality Standards, Objectives, and Guidelines Regulation*.

#### **The Mine and Minerals Act**

Under *The Mines and Minerals Act*, water that is removed from the workings under a mine lease must be disposed of safely and securely. Regulation 67/99 of *The Mines and Minerals Act* stipulates requirements for restoration of watercourses during mine closure.

#### **The Water Resources Conservation Act**

*The Water Resources Conservation Act* requires that the removal of water from Manitoba's water basins is not done in quantities that could, individually or collectively, have significant adverse effects on the ecological integrity of Manitoba's water resources or their associated ecosystems.



### **3.3.5.1.3 IAAC Decision Statement**

As per the IAAC Decision Statement, Alamos is required to adhere to the following conditions with respect to fish and fish habitat:

*3.1 The Proponent shall develop, prior to construction and to the satisfaction of Fisheries and Oceans Canada and in consultation with Indigenous groups, and implement an offsetting plan to mitigate residual effects to fish and fish habitat associated with carrying out of the Designated Project. The Proponent shall share the proposed plan with Indigenous groups at least 30 days prior to formal submission to Fisheries and Oceans Canada, and submit the approved plan to the Agency prior to implementation*

*3.2 The Proponent shall, for any fish habitat offsetting measure proposed in any offsetting plan referred to in condition 3.1 that may cause adverse environmental effects not considered in the environmental assessment, develop and implement, following consultation with Indigenous groups and relevant authorities, measures to mitigate those effects. The Proponent shall submit these measures to the Agency before implementing them.*

*3.3 The Proponent shall install exclusion screens on intake pipes prior to their operation, taking into account Fisheries and Oceans Canada's "Freshwater Intake End-of-Pipe Fish Screen Guideline", and in a manner consistent with the Fisheries Act and its regulations.*

*3.4 The Proponent shall develop, prior to construction and in consultation with relevant authorities, and implement and maintain, during all phases of the Designated Project, measures to mitigate any potential effects to water levels in Farley Lake and Gordon Lake due to groundwater drawdown resulting from Designated Project activities. In doing so, the Proponent shall intercept and/or redirect groundwater flowing towards the open pit with wells and/or other mitigation measures, as applicable, before it enters the open pit. The Proponent shall submit these measures to the Agency before implementing them.*

*3.5 The Proponent shall, when releasing any collected water into Farley Lake and Gordon Lake, including groundwater intercepted pursuant to condition 3.4 and water from dewatering the East and Wendy pit lakes:*

*3.5.1 aerate, or treat by other means, water collected from the East and Wendy pit lakes, prior to release into Farley Lake and Gordon Lake, in accordance with condition 3.7, to precipitate oxides, increase dissolved oxygen concentrations, and prevent chemical stratification; and*

*3.5.2 release collected water into Farley Lake and Gordon Lake in a manner that maintains the lake temperature at the point of release within baseline temperature variations to protect fish and fish habitat, unless otherwise authorized by Fisheries and Oceans Canada*



*3.6 The Proponent shall adjust, during construction, the rate of release of water into Farley Lake and Gordon Lake from dewatering the East and Wendy pit lakes and from groundwater intercepted pursuant to condition 3.4 in order to maintain lake levels within the range of natural variability predicted in Volume 2 Chapter 10 of the Environmental Impact Statement and Appendix A Attachment IAAC-48 of the Proponent's Information Request Responses Round 1, Package 1 (Canadian Impact Assessment Registry Reference Number 80140, document #54)*

*3.7 The Proponent shall collect contact water and seepage from the Project development areas, including seepage and recharge from the tailings management facility, mine rock storage areas, overburden and ore stockpiles, and seepage input to groundwater that flows into the open pits, and treat it, as necessary, before releasing it into the receiving environment during all phase of the Designated Project to ensure that any deposits are made in accordance with the Metal and Diamond Mining Effluent Regulation and the pollution prevention provisions of the Fisheries Act. When treating contact water and seepage, the Proponent shall take into account Manitoba's "Water Quality Standards, Objectives, and Guidelines", the Canadian Council of Ministers of the Environment's "Canadian Water Quality Guidelines for the Protection of Aquatic Life", and Environment and Climate Change Canada's "Federal Environmental Quality Guidelines".*

*3.8 the Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, measures to protect fish and fish habitat when undertaking activities in or near fish-bearing water bodies, in a manner that complies with any authorization issued under the Fisheries Act for the Designated Project. The Proponent shall implement these measures during all phases of the Designated Project. In doing so, the Proponent shall:*

*3.8.1 Salvage and relocated fish prior to conducting any Designated Project activity requiring the removal of fish habitat, including dewatering*

*3.8.2 Conduct activities in or near fish-bearing water bodies in accordance with Fisheries and Oceans Canada's "Manitoba Restricted Activity Timing Windows for the Protection of Fish and Fish Habitat" and "Measures to Protect Fish and Fish Habitat", unless otherwise authorized by relevant authorities*

*3.8.3 Maintain, during all phases of the Designated Project, a buffer of undisturbed vegetation of at least 30 metres from the high-water mark, as follows:*

*3.8.3.1 around fish-bearing water bodies, including wetlands, within and adjacent to the Project development areas that are not required to be removed for construction of the Designated Project, in a manner that complies with any authorization issued under the Fisheries Act*



*3.8.3.2 around wetlands, within and adjacent to the project development areas that are not required to be removed for construction of the designated Project, unless not technically or economically feasible. If work within 30 metres of wetlands is required, the Proponent shall use weight-distributing materials under heavy machinery to limit soil compaction and give preference to using existing access roads to access areas near wetlands*

*3.9 The Proponent shall identify in consultation with Indigenous groups, prior to conducting the salvage and relocation of fish referred to in condition 3.8.1, opportunities for Indigenous groups to take part in, and determine their interest to take part in, the salvage and relocation of fish*

*3.11 The Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, and implement and maintain during all phases of the Designated Project, measures to control erosion and sedimentation within the Project development areas in a manner consistent with the Fisheries Act and its regulations, and taking into account Environment and Climate Change Canada's "Environmental Code of Practice for Metal Mines", and Fisheries and Oceans Canada's "Measures to Protect Fish and Fish Habitat". The Proponent shall submit these measures to the Agency before implementing them. As part of these measures, the Proponent shall:*

*3.11.1 install intake pipes point upward and away from sediment*

*3.11.2 equipment contact water discharge pipes with diffusers*

*3.12 the Proponent shall develop, prior to construction and in consultation with Indigenous groups, Fisheries and Oceans Canada, Environment and Climate Change Canada, and any other relevant authorities, a follow-up program to verify the accuracy of the environmental assessment and determine the effectiveness of the mitigation measures as they pertain to adverse environmental effects of the Designated Project on water quality, taking into account Environment and Climate Change Canada's "Metal Mine Technical Guidance for Environmental Effects Monitoring". The Proponent shall implement the follow-up program during all phases of the Designated Project. As part of the follow-up program, the Proponent shall:*

*3.12.1 determine, in consultation with Indigenous groups, Environment and Climate Change Canada, and any other relevant authorities, the location and extent of mixing zones in water bodies that may be affected by the Designated Project.*



*3.12.2 monitor water quality in the East and Wendy pit lakes, newly formed pit lakes, tailings management facility, mine rock storage areas, contact water collection ponds, and receiving water bodies and watercourses upstream and downstream of the Project development areas, including at the edge and downstream of the edge of mixing zones identified pursuant to condition 3.12.1, Arbor Lake, Burge Lake, Cockeram Lake, Ellystan Lake, Farley Creek, Farley Lake, Gordon Lake, the Hughes River, the Keewatin River, the unnamed tributary of the Keewatin River, Minton Lake, Payne Lake, Susan Lake, and Swede Lake, for all contaminant that may have adverse effects on fish and fish habitat, including aluminum, antimony, arsenic, calcium, copper, cyanide, fluoride, hexavalent chromium, iron, magnesium, methylmercury, phosphorus, selenium, and total and dissolved cadmium. Monitoring shall be conducted as follows:*

*3.12.2.1 beginning during construction and continuing through decommissioning, except in the East and Wendy pit lakes, and the newly formed pit lakes; and*

*3.12.2.2 beginning during construction in the East and Wendy pit lakes, and beginning during decommissioning and continuing through post-closure in the newly formed pit lakes, until water quality is stable and improving and any contact water or seepage potentially released meets the Canadian Council of Ministers of the Environment's "Canadian Water Quality Guidelines for the Protection of Aquatic Life" and Manitoba's "Water Quality Standards, Objectives, and Guidelines" pursuant to condition 3.7*

*3.12.4 monitor, during construction and operation, total suspended solids and turbidity in fish-bearing water bodies where Designated Project activities are undertaken in or near waters frequented by fish*

*3.12.5 develop, in consultation with relevant authorities, and implement modified or additional mitigation measures, if the results of monitoring conducted pursuant to condition 3.12.2, 3.12.3, and 3.12.4 demonstrate any unanticipated effects attributable to the Designated Project, taking into account the Canadian Council of the Ministers of the Environment's "Canadian Water Quality Guidelines for the Protection of Aquatic Life" or Manitoba's "Water Quality Standards, Objectives, and Guidelines", whichever is most protective of fish and fish habitat, and predicted concentrations identified in Volume 1, Chapter 9 of the environment Impact Statement*



*3.13 the Proponent shall develop, prior to construction and in consultation with Indigenous groups, Fisheries and Oceans Canada, Environment and Climate Change Canada and any other relevant authorities, a follow-up program to verify the accuracy of the environmental assessment and determine the effectiveness of the mitigation measures as they pertain to adverse environmental effects of the Designated Project on water quantity. The Proponent shall implement the follow-up program during all phases of the Designated Project. As part of the follow-up program, the Proponent shall:*

*3.13.1 monitor, during all phases of the Designated Project, surface water instantaneous flows, lake levels and pH levels in Arbor Lake, Burge Lake, Cockeram Lake, Ellystan Lake, Farley Creek, Farley Lake, Gordon Lake, the Keewatin River, the unnamed tributary of the Keewatin River, Minton Lake, Payne Lake, Susan Lake, fish-bearing wetlands within the local assessment areas, the East and Wendy pit lakes, newly formed pit lakes, the tailings management facility, and contact water collection ponds to verify the environmental assessment predictions identified in Volume 2 Chapter 10 of the Environmental Impact Assessment and Appendix A Attachment IAAC-48 of the Proponent's IR Responses Round 1, Package 1 (Canadian Impact Assessment Registry Reference Number 80140, document #54*

*3.13.2 monitor, during all phases of the Designated Project, groundwater levels, gradients and hydraulic conductivity of all hydrogeological units, as identified in the groundwater model in Volume 5 Appendix E and G of the Environment Impact Statement, with well depths ranging from near surface to a minimum of 115 metres below ground to characterize contaminant transport via groundwater at the depth of the groundwater model for the Designated Project. Monitoring wells shall be installed near the open pits, the tailings management facility, mine rock storage areas, ore and overburden stockpiles, and fish-bearing wetlands within the local assessment areas that intersect with the Project development areas; and*

*3.13.3 develop, in consultation with relevant authorities, and implement modified or additional mitigation measures, if the results of monitoring conducted pursuant to condition 3.13.1 and 3.13.2 demonstrate unanticipated effects attributable to the Designated Project*



*3.14 The Proponent shall develop, prior to construction and in consultation with Indigenous groups, Fisheries and Oceans Canada, Environment and Climate Change Canada and any other relevant authorities, a follow-up program to determine the effectiveness of the mitigation measures and verify the accuracy of the environmental assessment predictions identified in Volume 2 Chapter 10 of the Environmental Impact Statement as they pertain to adverse environmental effects of the Designated Project on fish and fish habitat, taking into account Environment and Climate Change Canada's Metal Mine Technical Guidance for Environmental Effects Monitoring. The Proponent shall implement the follow-up program during all phases of the Designated Project. As part of the follow-up program, the Proponent shall:*

*3.14.1 monitor, during all phases of the Designated Project, water temperature in Farley Creek, Farley Lake, Gordon Lake, the Hughes River, the Keewatin River, Minton Lake, the new diversion channel, and any additional locations identified in consultation with relevant authorities, taking into account predictions in Volume 2 Chapter 10 of the Environmental Impact Statement*

*3.14.2 monitoring total invertebrate density, taxon richness, Simpson's Evenness Index, Bray-Curtis Index, and chlorophyll a to characterize benthic invertebrate, plankton and periphyton communities in Farley Creek, Farley Lake, Gordon Lake, the Hughes River, the Keewatin River, Minton Lake, the new diversion channel, and any additional locations identified in consultation with Indigenous groups and relevant authorities, for the detection of project-related changes in nutrient and contaminant levels, taking into account predictions in Volume 2 Chapter 10 of the Environment Impact Statement*

*3.14.3 identify, in consultation with Indigenous groups, Fisheries and Oceans Canada and any other relevant authorities, fish species to monitor, including species used for traditional purposes by Indigenous groups. Species shall include northern pike (*Esox lucius*), lake whitefish (*Coregonus clupeaformis*), and white sucker (*Catostomus commersoni*)*

*3.14.4 monitor, starting prior to construction and during all phases of the Designated Project, fish habitat quality and quantity endpoints for all species identified pursuant to condition 3.14.3, in Farley Creek, Farley Lake, Gordon Lake, the Keewatin River, Minton Lake, the new diversion channel, fish-bearing wetlands within and downstream of the Project development areas, and any additional locations identified in consultation with Indigenous groups and relevant authorities*



### **3.3.5.2 Environmental Effects**

The proposed alterations to the approved Gordon site may adversely affect the fish and fish habitat VC due to changes in fish habitat and/or changes in fish health, growth, or survival. The potential for the proposed alterations to adversely affect fish habitat and/or fish health, growth, or survival is described in the sections below.

#### **3.3.5.2.1 *Change in Fish Habitat***

The proposed alterations to the approved Gordon site may affect fish habitat in the following ways:

1. Alteration of flows in Farley Creek downstream of the PDA due to diversion or capture of run-off from their upstream catchment areas during all Project phases
2. Alteration of flows in Farley Creek downstream of the PDA due to discharge of groundwater intercepted by the interceptor wells installed between the open pit and Gordon Lake and Farley Lake during all Project phases
3. Alteration of water levels in Gordon Lake, Farley Lake, and fish-bearing wetlands due to changes to the groundwater table during all Project phases

Overall, the proposed alterations to the approved Gordon site will make the footprint and PDA larger than the footprint and PDA proposed in the EIS (Table 2.2). However, none of the proposed alterations to the Gordon site footprint will result in any new HADD of fish habitat that has not already been accounted for in Alamos' fish habitat offset plan and will not trigger designation of any "waters frequented by fish" as a Tailings Impoundment Areas (TIA) under Schedule 2 of the MDMER. Additionally, maintaining the existing diversion channel between Gordon and Farley lakes will not result in any change to utilization of, or movements in, this channel by fish.

### **Construction**

During construction, the Gordon site will be cleared of trees, topsoil will be removed and stockpiled, overburden will be removed and stockpiled, foundations will be prepared for the buildings in the facilities area, MRSA, and topsoil, overburden, and ore storage areas. Contact water collection ditches, sumps, and collection ponds will be built around the eastern perimeter of the MRSA, and around the perimeters of the ore, overburden, and topsoil storage areas, facilities area, and open pit. Non-contact water diversion ditches and sumps will be built around the southern perimeter of the MRSA. A freshwater intake pipe will be installed in Farley Lake and effluent diffusers will be installed in Gordon and Farley lakes. Interceptor wells will be installed between Gordon Lake and the western side of the open pit and between Farley Lake and the eastern side of the open pit.



Collectively, construction of these mine infrastructure and water management components will alter the upstream catchment areas, alter infiltration and evapotranspiration rates, and alter run-off reporting to Gordon Lake, Farley Lake, and Farley Creek. This has the potential to alter the magnitude, timing, and frequency of flows in streams and water levels in lakes, effects that have the potential to affect the quantity and quality of fish habitat used by different fish species and life stages at different times of the year.

Alamos no longer proposes to dewater Wendy and East pits to Farley Lake. Instead, Alamos will pump water from Wendy and East pits to the Hughes River via an approximately 8-km long flexible pipeline laid within the existing Gordon site access road right-of-way. This alteration, and its potential effects on the Hughes River, was submitted to IAAC, the Province of Manitoba, and the EAC, in a previous NOA/NOC. This alteration eliminates potential effects on fish habitat in Farley Lake and Farley Creek due to pit dewatering during construction of the Gordon site.

### **Operation**

During operation, mining will progressively increase the size and depth of the open pit and, consequently, increase the size and height of the MRSA, and topsoil, overburden, and ore storage areas. Non-contact water will be diverted around the Gordon site while contact water will be collected and conveyed to the collection pond. Freshwater will be withdrawn from Farley Lake only fire suppression, safety showers and truck washes.

As the open pit gets larger and deeper, the hydraulic gradient between the pit and Gordon and Farley Lakes and between the pit and the local groundwater table will increase (i.e., water will want to move toward the pit via gravity). To maintain water levels in Farley Lake, Gordon Lake, and fish-bearing wetlands near the Gordon site, groundwater and surface water moving toward the open pit will be captured by interceptor wells installed between the open pit and Gordon and Farley lakes and pumped back to Gordon and Farley lakes.

Collectively, alteration of the upstream catchment areas, changes to the evapotranspiration and ground infiltration rates, and pumping of groundwater have the potential to alter water levels in Gordon Lake, Farley Lake, and in fish-bearing wetlands near the Gordon site and to alter stream flows in Farley Creek. Change in water levels or stream flows have the potential to alter fish habitat and its use by the fish in Gordon and Farley lakes and in Farley Creek.

### **Decommissioning/Closure**

During decommissioning/closure, buildings and equipment will be removed, disturbed areas will be recontoured, collection ditches, sumps, and ponds will be recontoured or backfilled, the water intake will be removed from Farley Lake, and roads and the MRSA will be reclaimed. Prior to their decommissioning, contact water in the collection ditches, sumps and ponds will be diverted to the open pit and groundwater pumping rates in the interceptor wells will be gradually reduced. Together with direct precipitation and run-off from the surrounding catchment area, these actions are expected to fill the open pit with water in approximately 11 years.



Once the open pit is filled with water, the interceptor wells around the pit lake will be decommissioned and an inlet channel and outlet channel will be constructed in the southeastern and northwestern corners of the pit, respectively, to allow run-off from Gordon Lake to drain into the pit lake and run-off from the pit lake to drain into the northern basin of Farley Lake. Construction of these inlet and outlet channels connecting the pit lake to Gordon and Farley lakes will require isolation and dewatering of the existing diversion channel between Gordon and Farley lakes.

Decommissioning/closure of the Gordon site, particularly, reclamation of the water management infrastructure and establishment of final site drainage will result in permanent alteration of the catchment areas of Gordon Lake, Farley Lake, and Farley Creek compared with their pre-mine condition. This has the potential to alter the magnitude, timing, and frequency of flows in Farley Creek and water levels in Gordon and Farley lakes compared with pre-mine conditions. However, filling of the open pit with water will restore the groundwater table elevation and eliminate the hydraulic gradient between Gordon Lake, Farley Lake and fish-bearing wetlands and the open pit.

#### **3.3.5.2.2 *Change in Fish Health, Growth, or Survival***

The proposed alterations to the approved Gordon site may affect fish health, growth, or survival in the following ways:

1. Change in water quality in Gordon Lake due to discharge of groundwater from the interceptor wells during operation
2. Change in water quality in Farley Lake due to the combined discharge of site contact water and groundwater from the interceptor wells during operation
3. Change in water quality in Susan Lake due to groundwater seepage from the MRSA during operation, decommissioning/closure, and post-closure phases

#### **Construction**

During construction, the main activities that could affect fish health, growth, or survival are clearing of trees, and grubbing and grading of the areas where mine infrastructure will be built. These activities have the potential to increase sediment loading to the streams, ponds, and lakes downstream and downslope of the mine infrastructure. Similarly, construction of the water management infrastructure has the potential to increase sediment loading to streams, ponds, and lakes. Increases in sediment to streams, ponds, and lakes can affect fish health, growth, and survival by covering fish eggs, irritating gills, and increasing turbidity of the water, a change that can reduce periphyton and phytoplankton production and reduce the ability of fish to detect prey and predators.



## **Operation**

As mining progresses, the volume of mine rock added to the MRSA, the volume of ore added to the ore storage area and the volume of topsoil and overburden added to the topsoil and overburden storage areas will increase. These increases have the potential to increase the volume of contact water run-off and/or seepage reporting to streams, ponds, or lakes downstream or downslope of these facilities and to the surrounding groundwater table. Sources of contamination include metal leachate from the ore storage area, MRSA, and open pit, and blasting residues from the open pit.

Contact water and seepage from the MRSA, open pit, ore storage area, overburden storage area, topsoil storage area stockpile, and facilities area will be collected in collection ditches and sumps and conveyed to a collection pond near Farley Lake. Contact water in the collection pond will be combined with groundwater pumped from the interceptor wells on the eastern side of the open pit and discharged into the western basin of Farley Lake if it meets effluent limits identified in Schedule 4 of the MDMER. Groundwater pumped from the interceptor wells on the western side of the open pit will be discharged into Gordon Lake if it meets effluent limits identified in Schedule 4 of the MDMER.

Discharge of groundwater into Gordon Lake, discharge of the combined contact water and groundwater into Farley Lake and any seepage that is not captured in collection ditches around the perimeters of the MRSA, or ore, topsoil and overburden storage areas has the potential to affect fish health, growth, and survival by altering water quality in streams, ponds, or lakes downstream or downslope of these facilities. This can result in acute or chronic toxicological effects on fish health, growth, or survival depending on the magnitude, frequency, and duration of the exposure to the contaminant(s) in the receiving environment, the sensitivity of organisms to the contaminant(s), and whether there are other water quality parameters in the effluent or receiving environment that may exacerbate or reduce the toxicity of the contaminant (e.g., hardness, pH).

## **Decommissioning/Closure**

During decommissioning/closure, buildings and equipment will be removed, disturbed areas will be recontoured, collection ditches, sumps, and ponds will be recontoured or backfilled, roads will be reclaimed, the water intake and effluent pipes will be removed, and the MRSA and ore, topsoil, and overburden storage areas will be reclaimed. These activities have the potential to increase sediment loading in streams, ponds, and lakes downstream and downslope of these facilities. The potential effects of increased sediment loading on fish were described previously (see construction, above).

Prior to their decommissioning, contact water in the collection ditches, sumps and ponds will be diverted to the open pit. Together with direct precipitation and run-off from its surrounding catchment area, contact water is expected to fill the open pit with water in approximately 11 years. Once filled, run-off from the open pit will drain to Farley Lake through a constructed outlet channel. If the concentration of metals, nutrients, or other contaminants are elevated in the pit water, acute or chronic toxicological effects to fish, fish eggs, periphyton, or benthic invertebrates in Farley Lake may occur depending on the magnitude, frequency, and duration of exposure to the contaminant(s) before the pit lake stratifies and water quality in the outflow improves.



### **3.3.5.3 Summary of Mitigation Measures**

The principal mitigation measure for reducing or eliminating potential effects to fish and fish habitat due to the proposed alterations to the Gordon site continues to be avoid placing any new or expanded mine infrastructure on top of any fish-bearing stream, lake, or wetland. This was true for the EIS and remains so for this NOA/NOC.

Groundwater interceptor wells between the open pit and Gordon Lake and Farley Lake continues to be an important mitigation measure for reducing potential effects to fish and fish habitat at the Gordon site. The purpose of these wells is to intercept groundwater flowing toward the open pit prior to daylighting at the pit wall and to return this water to Gordon and Farley lakes. These wells will be installed during construction, operated throughout the operation phase, and gradually diminished during decommissioning/closure to help fill the open pit with water while still maintaining water levels in Gordon and Farley lakes. The groundwater interceptor wells will be decommissioned only once the open pit has filled with water and the groundwater table elevation has been restored to near pre-mine levels.

Another mitigation measure for reducing potential effects to fish and fish habitat at the Gordon site will be pumping water in the existing two open pits (Wendy and East pits) to the Hughes River instead of to Farley Lake. This change was submitted to IAAC in a previous NOA/NOC and, if approved, would reduce the dewatering period from several years to two or three months and would eliminate the following potential effects to fish and fish habitat during construction:

1. Increases in water levels in Farley Lake and stream flows in Farley Creek
2. Change in water quality in Farley Lake and Farley Creek
3. Change in water temperature in Farley Lake and Farley Creek

Other mitigation measures for reducing or eliminating potential effects to fish and fish habitat due to the proposed alterations at Gordon site were described in Chapter 10.0 of the EIS (Stantec 2020a), were included as conditions of the federal Decision Statement, and were included in the GMMP and SWMMP (Versions 0, January 2025). They include mitigation measures designed to reduce or eliminate potential changes in groundwater seepage and groundwater table drawdown and potential changes in stream flows and lake levels.

Mitigation measures specific to avoiding or reducing potential effects to fish health, growth and survival at the Gordon site were described in Chapter 10.0 of the EIS (Stantec 2020a), were included as conditions of the federal Decision Statement, and were discussed in the Aquatic Effects Monitoring Plan (AEMP; Version 0, January 2025). An important mitigation measure from the EIS that continues to be part of the Gordon NOA/NOC is aeration of groundwater pumped from the interceptor wells. The purpose of aeration is to encourage iron precipitation and to increase dissolved oxygen concentrations prior to discharge to Gordon and Farley lakes. These mitigation measures, and the adaptive management framework described in the AEMP, continue to apply to the alterations discussed in this NOA/NOC.



### **3.3.5.4 Residual Effects**

#### **3.3.5.4.1 *Change in Fish Habitat***

Potential changes in fish habitat due to changes in stream flows or water levels in ponds, lakes, or fish-bearing wetlands caused by changes in upstream catchment areas, water withdrawals from Farley Lake, and/or changes in the groundwater table were predicted using a GoldSim™ water balance model. Details of this model are described in a technical modelling report appended to this NOA/NOC (Appendix F). In brief, the water balance model incorporated baseline hydrology data collected in tributaries of Gordon and Farley lakes and in Farley Creek since 2015, climate data (e.g., precipitation, humidity) obtained from the Lynn Lake airport and the meteorological station installed by Alamos at the MacLellan site since 2015, and predicted changes in groundwater quantities based on the results of groundwater modelling (see Appendix E for details) to predict monthly changes in stream flows and water levels in lakes during each Project phase.

#### **Diversion Channel**

Elimination of the need for a new diversion channel between Gordon and Farley lakes will allow fish to continue to use habitat in the existing diversion channel. The existing channel is approximately 1.1 km long and 8 m wide with a <1% gradient and a V-shaped cross-section that is lined with >25 kg riprap. Fish passage between Gordon and Farley lakes will continue to be impeded by the numerous beaver dams present, if Alamos does not implement a beaver management plan during the construction, operation, and closure phases of the Project.

#### **Change in Lake Levels**

Results from the updated water balance model predicted less than 0.10 m change in average monthly water levels in Gordon Lake and Farley Lake during all Project phases. These results are the same as the predicted water level changes presented in the EIS. For this reason, potential effects to fish habitat in Gordon and Farley lakes are the same as those predicted in the EIS. The updated water balance model predicted changes of less than 0.01 m in average monthly water levels in Simpson Lake. While the EIS did not previously assess water levels in Simpson Lake, water level changes this small are not expected to have an adverse effect on fish habitat in Simpson Lake during any Project phase.

#### **Change in Stream Flows**

A comparison of the predicted changes in flow in Farley Creek, by Project phase, between the EIS and the NOA/NOC is provided in Table 3.31. On an annual and monthly basis, the updated water balance model for the NOA/NOC predicted flow changes in Farley Creek that result in:

- Smaller flow increases during construction and operation phases than predicted for the EIS
- Larger flow decreases during the decommissioning/closure phase when the pit is filling with water than predicted for the EIS
- Larger flow increases during post-closure than predicted for the EIS



**Lynn Lake Gold Project: Gordon Mine Plan Amendment Notice of Alteration / Notice of Change**

Section 3: Environmental Effects and Mitigation

October 6, 2025

*Table 3.31 Comparison of Percentage Monthly and Annual Flow Changes in Farley Creek Between the Environmental Impact Statement and the Notice of Alteration/Notice of Change*

Month	Existing Condition (m <sup>3</sup> /s)	Construction		Operation		Decommissioning/Closure (Pit Filling)		Post-Closure	
		Change from Existing (EIS)	Change from Existing (NOA/NOC)	Change from Existing (EIS)	Change from Existing (NOA/NOC)	Change from Existing (EIS)	Change from Existing (NOA/NOC)	Change from Existing (EIS)	Change from Existing (NOA/NOC)
Jan	0.038	+141%	0%	+191%	+39%	+11	-23%	+11	+50%
Feb	0.025	+248%	0%	+325%	+60%	+7	-30%	+17	+79%
Mar	0.013	+329%	+11%	+335%	+120%	+5	-43%	+23	+159%
Apr	0.024	+375%	+11%	+313%	+99%	+2	-30%	+27	+139%
May	0.232	+74%	+1%	+60%	+7%	-8	-11%	+8	+7%
Jun	0.239	+46%	+1%	+24%	+2%	-7	-11%	-2	0%
Jul	0.135	+46%	+1%	+16%	+9%	-7	-13%	-3	+8%
Aug	0.111	+43%	+3%	+11%	+11%	-7	-13%	-3	+10%
Sep	0.126	+43%	+3%	+11%	+11%	-7	-13%	-1	+12%
Oct	0.131	+34%	+4%	+10%	+10%	-7	-13%	+1	+12%
Nov	0.119	+44%	+5%	+12%	+10%	-5	-13%	+3	+11%
Dec	0.074	+82%	+11%	+29%	+18%	-3	-15%	+7	+21%
<b>Annual</b>	<b>0.106</b>	<b>+66%</b>	<b>+4%</b>	<b>+43%</b>	<b>+33%</b>	<b>-6</b>	<b>-19%</b>	<b>+2</b>	<b>+42%</b>

Note:

flow predictions are based on “average” climate scenario



The smaller annual and monthly flow increases in Farley Creek during construction are due to the previously proposed alternation to dewater the existing two open pits to the Hughes River instead of to Farley Lake. The smaller annual and monthly flow increases in Farley Creek during operation are due to refined groundwater interception well pumping patterns.

During decommissioning/closure when the pit is filling with water, the updated water balance model predicts flow reductions of up to 43% in winter and up to 13% during the open water season in Farley Creek. Flow reductions were predicted in Farley Creek in winter for the NOA/NOC, but not for the EIS, because of differences between surface water and groundwater inputs used in the two models as discussed below.

During post-closure when the pit is filled with water and discharging to Farley Lake, the updated water balance model predicts flow increases up to 159% during the winter months and up to 12% during the open water season. The larger predicted flow increases in Farley Creek for the NOA/NOC compared with the EIS are again due to differences between surface water and groundwater inputs used in the two models.

The updated changes in flows in Farley Creek are not expected to result in adverse effects on fish and fish habitat in Farley Creek because:

- Flows in Farley Creek are predicted to increase during construction, operation, and post-closure and not decrease; while flow increases can negatively affect fish and fish habitat in streams if they are high enough to alter the channel morphology, channel geometry, and sediment transport, flow decreases are generally more detrimental to fish and fish habitat than flow increases
- The low gradient (<0.5%), wide wetted channel width (up to 75 m on both sides of the central channel), dense peat hummocks within the wetted channel, and the abundance of beaver dams that characterize habitat conditions the majority (>95%) of habitat in Farley Creek substantially reduce the magnitude of water depth and water velocity changes that would occur due to the predicted increases and decreases during all phases of the Project
- The largest predicted changes in average monthly flow in winter (i.e., November to April) during decommissioning/closure (43% flow reduction) and post-closure (159% flow increase) only represent a 0.006 m<sup>3</sup>/s (6 litres per second [L/s]) decrease and a 0.020 m<sup>3</sup>/s (20 L/s) increase in average monthly discharge compared with baseline, respectively.
- The largest predicted changes in average monthly flow during the spring freshet (i.e., May and June) during decommissioning/closure (11% flow reduction) and operation and post-closure (7% flow increase) represent a 0.026 m<sup>3</sup>/s (26 L/s) decrease and a 0.016 m<sup>3</sup>/s (16 L/s) increase in average monthly discharge, respectively
- The largest predicted changes in average monthly flow during the summer (i.e., July to September) during decommissioning/closure (13% flow reduction) and post-closure (12% flow increase) represent a 0.016 m<sup>3</sup>/s (16 L/s) decrease and increase in average monthly discharge.



Farley Creek is known to be used by white suckers and northern pike in Swede Lake for spawning in spring and potentially by burbot in Swede Lake for spawning in winter. It is also used by brook sticklebacks year-round for spawning, rearing, foraging, and overwintering. Habitat for these life stages of these fish species is not expected to be negatively affected by the predicted changes in flow for the reasons stated above. However, as part of the AEMP, Alamos will monitor potential changes in fish habitat in Farley Creek during all Project phases by:

- Monitoring changes in the number of beaver dams present in Reach 1 of Farley Creek over time as determined from high resolution aerial imagery collected during pre-construction and at regular intervals during operation, decommissioning/closure and post-closure periods
- Monitoring changes in the average width of the central channel in Reach 1 of Farley Creek over time as determined from high resolution aerial imagery (verified with field-measured widths collected at transects established in Reach 1 of Farley Creek) collected during pre-construction and at regular intervals (e.g., every 5 m or at identifiable changes in channel geometry) during operation, decommissioning/closure and post-closure periods.
- Monitoring changes in average meander radius of the central channel in Reach 1 of Farley Creek over time as determined from high resolution aerial imagery collected during pre-construction and at regular intervals during operation, decommissioning/closure and post-closure periods.

If monitoring shows that habitat in Farley Creek is being negatively affected by changes to the flow regime, the following adaptive management actions may be triggered:

- Reducing pumping rates in the groundwater interceptor wells during operation to the extent possible without increasing inflows to the open pit or allowing water levels in Gordon and Farley Lake to decrease below trigger thresholds
- Increasing the number of discharge locations that groundwater from the interceptor wells is pumped to (e.g., Susan Lake, Pump Lake) or changing the discharge location to a larger waterbody (e.g., Swede Lake, Ellystan Lake) or stream (e.g., Hughes River) further downstream
- Adjusting pumping rates in the groundwater interceptor wells during decommissioning/closure to decrease inflows to the open pit and increase flows in Farley Creek, as required.
- Decreasing water withdrawals from Farley Lake during construction, operation, or decommissioning/closure, as required.

### **Comparison with the EIS**

In the EIS, the magnitude of residual effects to fish habitat at the Gordon site was characterized as high, due exclusively to the predicted increase in discharge of up to 375% in Farley Creek during construction and operation. However, this residual effect was not expected to extend beyond the local assessment area, not extend beyond operation (i.e., medium-term), and be reversible because flows in Farley Creek were predicted to return to near baseline flows in post-closure.

Because of the smaller changes in flow predicted in Farley Creek during construction and operation for this NOA/NOC compared with the EIS, and because the flow reductions now predicted to occur in Farley Creek during decommissioning/closure are relatively small compared with the volume of water within the



wetted channel of Farley Creek at any time, the magnitude of residual effects to fish habitat at the Gordon site is expected to be moderate (i.e., a measurable change in habitat area, monthly flows or lake surface area that is greater than the range of natural variability, but that does not affect the ability of fish to use the habitat to carry out one or more of their life processes).

No change in the characterization of residual effects to fish habitat at the Gordon site is required for the predicted changes to lake levels because average monthly water level predictions for Gordon Lake, Farley Lake, Swede Lake, and Ellystan Lake are unchanged from the EIS and average monthly water level predictions for Simpson Lake are <0.01 m, which is within the range of natural variability. Similarly, no change in the characterization of residual effects to fish habitat at the Gordon site is required for fish habitat affected by the mine footprint or zone of groundwater table draw-down. This is because the updated mine footprint will not overprint additional fish habitat that hasn't already been accounted for in the fish habitat offset plan and because the zone of groundwater table draw-down around the open pit has decreased compared with the EIS.

#### **3.3.5.4.2      *Change in Fish Health, Growth, or Survival***

Potential effects on fish health, growth, or survival due to predicted changes in water quality in the downstream receiving environment were assessed using the surface water quality model predictions for the Expected Case scenario (see Section 3.3.4.2). A summary of model nodes used in the surface water quality model at the Gordon site are shown in Figure 3.1. Assessment of potential effects on fish health, growth, and survival of each POPC identified by screening the predicted water quality concentrations against baseline water quality and the available provincial and federal water quality guidelines for the protection of freshwater aquatic biota is provided in the sections below. A comparison of the POPCs identified for the EIS and for the NOA/NOC, by location and Project phase, is provided in Table 3.26.

#### **Potential Effects due to Fluoride**

Fluoride concentrations are predicted to exceed baseline concentrations by at least 20% and the long-term CWQG-FAL for fluoride (0.12 mg/L; CCME 2002) in Farley Lake (east and west basins) during operation and post-closure. Fluoride concentrations are predicted to reach a maximum of 0.14 mg/L in Farley Lake (east and west basins) during operation, and maximums of 0.20 mg/L and 0.22 mg/L in Farley Lake (east and west basins) during post-closure. Exceedances of the fluoride CWQG-FAL are predicted to occur until the end of the modelled post-closure phase in Farley Lake (east and west basins) (Figures H-1 and H-3, Appendix G).

Despite these exceedances, predicted fluoride concentrations in Farley Lake (east and west basins) during operation and/or post-closure are not expected to result in adverse effects to fish health, growth, or survival for the following reasons:

- The CWQG-FAL for fluoride is an interim guideline that applies a safety factor of 100 to results of a study using caddisflies, where adverse effects (mortality after 144 hours of exposure) were reported at fluoride concentrations of 11.5 mg/L (CCME 2002). The safety factor was used because this study was based on acute lethality instead of sublethal effects on growth or reproduction after chronic exposure.



- The CWQG-FAL for fluoride is not dependent on other water chemistry parameters; however, the CCME (2002) notes that fluoride toxicity is affected by water hardness (i.e., decreasing toxicity with increasing hardness), which is consistent with the hardness-dependent fluoride guidelines derived by other jurisdictions such as British Columbia (British Columbia Ministry of Environment [BC MOE] 1990).
- Most studies have found that adverse effects of fluoride to fish and other aquatic biota, including secondary producers such as benthic invertebrates, begin at concentrations greater than 1 mg/L (BC MOE 1990, CCME 2002, Camargo 2003). While there are limited data on fluoride toxicity to aquatic organisms following long-term exposures, studies summarized by BC MOE (1990), CCME (2002), and Camargo (2003) suggest that adverse effects from long-term exposure to fluoride are unlikely to occur at concentrations below 0.5 mg/L in soft water, with the toxicity threshold for adverse effects likely to be higher in harder waters.

### **Potential Effects due to Total Iron**

Alterations to the approved Gordon site are not predicted to increase total iron concentrations above those predicted in the EIS. The reasons that total iron was identified as a POPC for this NOA/NOC, and not for the EIS, is because baseline total iron concentrations used in the NOA/NOC model were lower than those used in the EIS model due to changes in the predicted seepage from the historical north and south MRSAs and because total iron concentration predicted by the NOA/NOC model were compared with the more stringent FEQG that was issued by ECCC in 2024 (ECCC 2024) and not to the CWQG-FAL of 0.3 mg/L (CCME 2011) used for the EIS; the FEQG was not available for the EIS which was submitted in 2020.

Total iron concentrations predicted for the NOA/NOC exceed baseline concentrations by at least 20% and the pH and DOC dependent FEQG in Gordon Lake during closure and post-closure. Total iron concentrations are predicted to reach maximums of 1.27 mg/L and 1.28 mg/L in Gordon Lake during closure and post-closure, which exceed the pH and DOC dependent FEQG that ranges from 0.79 to 0.80 mg/L (ECCC 2024). Exceedances of the total iron FEQG are predicted to occur until the end of the modelled post-closure phase in Gordon Lake (Figure H-6, Appendix G).

Although higher than the FEQG, predicted total iron concentrations in Gordon Lake during closure may be over-estimated. This is because the model did not include any iron removal that is expected to occur due to aeration of the pumped groundwater prior to its discharge to Gordon Lake; aeration of the groundwater is expected to form iron oxides that will fall out of suspension in the collection pond prior to discharge. This is also true for construction and operation phases in Gordon Lake and for total iron concentrations predicted for all phases in Farley Lake (even though total iron was not identified as a POPC in Gordon Lake or Farley Lake during these phases).



The risks to the health, growth, and survival of fish and other aquatic biota (invertebrates are generally more sensitive to the effects of total iron than fish; ECCC 2024) from elevated total iron concentrations in Gordon Lake during post-closure may be lower than suggested by the guideline exceedances because:

- The guideline is for total iron, but dissolved iron is the more bioavailable fraction of iron (ECCC 2024). Dissolved iron concentrations represented, on average, only 37% of the predicted total iron concentrations in Gordon Lake during post-closure
- As required by the FEQG guidance document (ECCC 2024), DOC concentrations were capped at 10.9 mg/L when calculating the FEQG for total iron in Gordon Lake. However, baseline DOC concentrations in Gordon Lake ranged between 11.3 mg/L and 18.0 mg/L in 2015 and 2017 (Stantec 2020c); Gordon Lake is a shallow (<1.5 m) headwater lake with tannin-stained water and fine organic substrates throughout. Toxicity of iron decreases with increasing DOC so it is likely that the high DOC concentrations in Gordon Lake will lower the toxicity of total iron in Gordon Lake during closure and post-closure phases.
- Based on the Species Sensitivity Distribution (SSD) used in the FEQG (ECCC 2024), salmonid fish species (e.g., trout, salmon, whitefish) are more sensitive to iron than non-salmonid fish species (e.g., fathead minnows). Brook sticklebacks are the only fish species present in Gordon Lake, and although there are no iron toxicity data for brook sticklebacks, it is likely that brook sticklebacks would have a normalized effect concentration more like that of fathead minnow (1.5 mg/L) than the most sensitive salmonid species, Mountain Whitefish (0.2 mg/L)

Despite the above, chironomids (*Tanytarsini* sp. and Orthoclaadiinae) represented two of the seven most sensitive organism to iron in the SSD used to develop the FEQG (ECCC 2024) and chironomids represent one of three most abundant families of benthic invertebrates (the others being oligochaetes [round worms] and bivalves [freshwater clams]) found in Gordon Lake in 2015 and 2016 (Stantec 2020d). These midges provide an important food source for the brook stickleback population in Gordon Lake and any reduction in their number, distribution, or reproduction may adversely affect brook sticklebacks.

Because of potential effects on the benthic invertebrate community in Gordon Lake post-closure and the uncertainties associated with the toxicity of total iron compared with dissolved iron and the ameliorating effects of DOC concentrations on iron toxicity, Alamos will monitor total and dissolved iron concentrations in the groundwater collection pond and in Gordon Lake during all Project phases, will include a trigger response threshold and adaptive management plan for total iron in the SWMMP and a trigger response threshold for benthic invertebrates in Gordon Lake in the AEMP tied to the same adaptive management plan as in the SWMMP.

The principal mitigation measure for reducing effects of total iron in Gordon Lake will be to aerate the groundwater pumped from the interceptor wells during construction, operation, and closure phases. Currently, groundwater will be aerated as it flows over rocky riffles installed in the open collection channels constructed between the interceptor wells and the collection pond near the southeastern corner of Gordon Lake. If monitoring shows higher total or dissolved iron concentrations than expected in the collection pond or in Gordon Lake, aeration would be increased by lengthening the collection channel, adding more rocks to the collection channel, or added an air-line or aerator to the collection pond itself.



## **Potential Effects due to Nitrite**

Nitrite (as N) concentrations are predicted to exceed baseline concentrations by at least 20% and the long-term CWQG-FAL in West Farley Lake during operation. This is predicted to occur due to the accumulation of blast residues from the open pit in the contact water discharged to West Farley Lake from the collection pond. Nitrite (as N) concentrations are predicted to reach a maximum of 0.088 mg/L in West Farley Lake during operation, which exceeds the long-term (30-day average) CWQG-FAL for nitrite (as N) of 0.060 mg/L (CCREM 1987) by 1.5 times.

The long-term CWQG-FAL for nitrite (as N) was developed in 1987 (CCREM 1987). More recently, the British Columbia Ministry of Environment published maximum and long-term (30-day average) water quality guidelines for the protection of freshwater aquatic life for nitrite (as N) of 0.060 mg/L and 0.020 mg/L (as N), respectively, for waters with chloride concentrations <2 mg/L (BC MOE 2009); the maximum and long-term average nitrite water quality guidelines increase with increasing chloride concentrations because nitrite toxicity has been shown to decrease with increasing chloride concentration (BC MOE 2009). More recently however, Baker et al. (2022) calculated 5<sup>th</sup> percentile hazard concentrations (HC<sub>5</sub>) for sub-lethal (IC<sub>5</sub>) and lowest effect concentrations (LEC<sub>5</sub>) using an SSD based on nine freshwater species (three invertebrates, four fish, and two algae) to be 0.052 mg/L and 0.064 mg/L nitrite (as N) in waters with <5 mg/L chloride. This suggests that the long-term CWQG-FAL of 0.060 mg/L nitrite (as N) remains appropriate for comparison with predicted nitrite concentrations in West Farley Lake; chloride concentrations in West Farley Lake are predicted to be <2 mg/L during all phases. Other water quality parameters that may influence nitrite toxicity include bromide and calcium (Kroupova et al. 2005), but these modifying factors have not been included in any available guideline.

Risks to the health, growth, or survival of fish and other aquatic biota in West Farley Lake due to predicted nitrite concentrations above the CWQG-FAL during operation may be lowered by the following lines of evidence:

- Maximum nitrite concentrations are predicted to be only 1.5 times higher than the guideline during operation and guideline exceedances are predicted to occur in only 12% of all months during operation (Table 3.29 and Figure H-9, Appendix G).
- It was assumed that ammonium-nitrate fuel oil (ANFO) will be used as the explosive in the open pit in the surface water quality model, instead of the emulsion blend blasting product that Alamos intends to use as its first-choice explosive at the Gordon site; unlike ANFO which is highly water soluble, emulsions are water-resistant and, therefore, produce lower nitrogen residues after blasting, particularly in wet conditions.
- No attenuation or removal of nitrite was included in the updated water quality model, either in the collection pond or West Farley Lake. This is a conservative assumption since nitrite is readily oxidized into less toxic nitrate under aerobic conditions such as those likely to be present in the collection pond and known to be present in West Farley Lake



- Sublethal toxicological effects to fish in West Farley Lake (i.e., northern pike, yellow perch, white suckers, and brook stickleback) are not expected to occur below 0.100 mg/L nitrite (as N) based on the SSD developed by Baker et al. (2022) which is above the maximum predicted nitrite concentration of 0.088 mg/L
- the most sensitive species to nitrite in the SSD developed by Baker et al. (2022) was a mayfly (*Neocloeon triangulifer*), a species in the family of invertebrates comprising <5% of the benthic invertebrate community of Farley Lake in 2016 (Stantec 2020d)

Although adverse effects from elevated nitrite concentrations in West Farley Lake are not expected to occur, Alamos will monitor water quality in West Farley Lake as part of the SWMMP to determine if nitrite concentrations are exceeding the long-term CWQG-FAL, by how much and how often, and if adaptive management actions are required. Mitigation measures that Alamos could implement should monitoring show that nitrite concentrations are elevated and having an adverse effect on fish and aquatic biota in West Farley Lake include:

- Altering blasting plans to increase combustion rates, reduce misfires, and reduce nitrogenous wastes in the open pit (e.g., using compressed air to dewater drill holes prior to loading with explosive, using electronic detonators and blast hole liners, and using blasthole covers or stopping blasting during rain events)
- Re-evaluating the blasting quality assurance/quality control plan to optimize blast patterns and to improve accounting of explosive materials used in the pit.
- Evaluating passive and active treatment options for managing nitrogenous wastes including, but not limited to, increasing dissolved organic carbon concentrations and reducing conditions in the collection pond, pumping collection pond water to wetland areas for passive treatment, modular water treatment

### **Potential Effects due to Total Phosphorus**

Phosphorus concentrations are predicted to exceed baseline concentrations by at least 20% and the long-term MWQSOG-FAL in East Farley Lake during closure; no other exceedances of baseline phosphorus concentrations are expected. Phosphorus concentrations in East Farley Lake are predicted to reach a maximum of 0.0293 mg/L during closure, which exceeds the long-term MWQSOG-FAL of 0.025 mg/L (Manitoba Water Stewardship 2011).

The increased total phosphorus concentrations predicted to occur in East Farley Lake during closure are due to a lower basin volume during low flow months (i.e., June and November) coupled elevated total phosphorus concentration loading from West Farley Lake, which is predicted to have higher concentrations during the closure phase compared with operation and post-closure.



The MWQSOG for total phosphorus was set to protect freshwater aquatic biota, including fish and benthic invertebrates, from potential effects of eutrophication (i.e., a shift in trophic status due to increased production of photosynthetic algae). A moderate increase in trophic status can be beneficial in nutrient-poor systems. However, decomposition of phytoplankton and periphyton associated with increases in nutrients (such as phosphorus, nitrogen, or dissolved carbon) can lead to decreased oxygen concentrations in winter, which can affect the survival of fish (CCME 2004).

Although the maximum concentration of phosphorus in East Farley Lake during closure is predicted to exceed the long-term MWQSOG-FAL guideline, the maximum predicted concentration (0.029 mg/L), the long-term MWQSOG-FAL (0.025 mg/L) and the baseline maximum concentration (0.028 mg/L) are within the meso-eutrophic range of 0.020 to 0.035 mg/L, as defined for lakes in the Canadian Guidance Framework for the Management of Freshwater Ecosystems (CCME 2004). In addition, the average concentration of 0.020 mg/L during closure is predicted to be below the MWQSOG-FAL guideline of 0.025 mg/L. For these reasons, potential adverse effects on fish health, growth, or survival of fish in East Farley Lake due to predicted increases in phosphorus concentrations during closure are not expected to occur.

### **Comparison with the EIS**

In the EIS, fluoride was identified as a POPC in Gordon Lake, Farley Lake (east and west basins), and in Swede Lake during construction, operation, and decommissioning/closure phases while total phosphorus was identified as a POPC only in West Farley Lake and only during construction. These POPCs were expected to have a negligible effect on fish health, growth, or survival in the LAA because the predicted concentrations were lower than the toxicity benchmark considered more appropriate than the CWQG-FAL which included a 100 times safety factor (fluoride) and were not expected to be high enough to alter the trophic status of any lake (phosphorus). The effects on fish health, growth, and survival were characterized as long-term and irreversible because fluoride concentrations in West Farley Lake were predicted to remain above the CWQG-FAL in perpetuity but the ecological context of the residual effect was characterized as resilient because the fish and other aquatic biota in the potentially effects lakes have been previously exposed to changes in water quality caused by previous mining at the Gordon site and because fish populations are generally adaptable to water quality that is below toxicity thresholds.

Fluoride and total phosphorus are also predicted to be POPCs in Gordon and Farley lakes for this NOA/NOC, but it is the identification of total iron as a POPC in Gordon Lake during closure and post-closure and nitrite as a POPC in Farley Lake during operation that has resulted in a change in the characterization of residual effects to fish health, growth, or survival for this NOA/NOC. If modelled water quality predictions in Gordon and Farley lakes are proven accurate by the SWMMP and no other mitigation measures are implemented, the magnitude of residual effects on fish health, growth, or survival would be expected to be moderate (i.e., a measurable change in the abundance, structure, or health metrics in focal fish populations that is greater than the range of natural variability but not large enough to affect the productivity of the focal fish populations). The geographic extent, duration, timing, frequency, reversibility, and ecological context of the residual effects on fish health, growth, or survival would be expected to remain unchanged from the EIS (i.e., local, long-term, applicable, multiple regular events, irreversible, and resilient, respectively).



### **3.3.6 Vegetation and Wetlands**

The vegetation and wetlands VC includes native plant communities, wetlands, plant species and communities of conservation concern, and traditional use plant species (Stantec 2020a). The proposed alterations that may interact with the vegetation and wetlands VC and were therefore assessed as part of this NOA/NOC, include but are not limited to the changes in the PDA layout outlined in Table 2.1.

#### **3.3.6.1 Spatial Boundaries**

PDA – As outlined in Section 2.3, the PDA encompasses the immediate area in which Project activities and components occur plus a buffer and is the anticipated area of direct physical disturbance associated with the construction and operation of the Project. The PDA has changed from what was presented in the EIS and is now increased by 21.8 ha.

LAA – The LAA (4,141.2 ha) has changed from what was presented in the EIS because of groundwater drawdown and changes in the PDA. The LAA is based on a 100 m buffer around the furthest expected groundwater drawdown contour, a 1 km buffer around the updated NOA/NOC PDA extent, and a 1 km buffer around the PR 391 highway. These changes decrease the LAA by 123.5 ha from that presented in the EIS.

#### **3.3.6.2 Regulatory and Guideline Setting**

##### **3.3.6.2.1 Guideline Criteria**

The assessment of potential Project-related environmental effects on vegetation and wetlands includes the consideration of the federal *Species at Risk Act*.

Provincial legislation considered in the assessment of potential Project-related environmental effects on vegetation and wetlands includes the following:

- *The Water Rights Act*
- *The Conservation Agreements Act*
- *The Ecological Reserves Act*
- *The Endangered Species and Ecosystems Act*
- *The Environment Act*
- *The Forest Act*
- *The Forest Health Protection Act*
- *The Wildfires Act*
- *The Mines and Minerals Act*
- *The Noxious Weeds Act*



### **3.3.6.2.2 IAAC Decision Statement**

As per the IAAC Decision Statement, Alamos is required to adhere to the following conditions with respect to vegetation and wetlands:

*3.8.3 maintain, during all phases of the Designated Project, a buffer of undisturbed vegetation of at least 30 meters from the high-water mark, as follows:*

*3.8.3.1 around fish-bearing water bodies, including wetlands, within and adjacent to the Project development areas that are not required to be removed for construction of the Designated Project, in a manner that complies with any authorization issued under the Fisheries Act; and*

*3.8.3.2 around wetlands, within and adjacent to the Project development areas that are not required to be removed for construction of the Designated Project, unless not technically or economically feasible. If work within 30 meters of wetlands is required, the Proponent shall use weight-distributing materials under machinery to limit soil compaction and give preference to using existing access roads to access areas near wetlands.*

*3.13 The Proponent shall develop, prior to construction and in consultation with Indigenous groups, Fisheries and Oceans Canada, Environment and Climate Change Canada and any other relevant authorities, a follow-up program to verify the accuracy of the environmental assessment and determine the effectiveness of the mitigation measures as they pertain to adverse environmental effects of the Designated Project on water quantity. The Proponent shall implement the follow-up program during all phases of the Designated Project. As part of the follow-up program, the Proponent shall:*

*3.13.1 monitor, during all phases of the Designated Project, surface water instantaneous flows, lake levels and pH levels within Arbor Lake, Burge Lake, Cockeram Lake, Ellystan Lake, Farley Creek, Farley lake, Gordon Lake; the Keewatin River, the unnamed tributary of the Keewatin River, Minton lake, Payne lake, Susan lake, Swede lake, fish-bearing wetlands within the local assessment areas, the East and Wendy pit lakes, newly formed pit lakes, the tailings management facility, and contact water collection ponds to verify the environmental assessment predictions identified in Volume 2 Chapter 10 of the Environmental Impact Statement and Appendix A Attachment IAAC-48 of the Proponent's IR Responses Round 1, Package 1 (Canadian Impact Assessment Registry Reference Number 80140, document 11S4);*

*3.13.2 monitor, during all phases of the Designated Project, groundwater levels, gradients and hydraulic conductivity of all hydrogeological units, as identified in the groundwater model in Volume 5 Appendix E and G of the Environmental Impact Statement, with well depths ranging from near surface to a minimum of 115 meters below ground to characterize contaminant transport via groundwater at the depth of the groundwater model for the Designated Project. Monitoring wells shall be installed near the open pits, the tailings management facility, mine rock storage areas, ore and*



*overburden stockpiles, and fish-bearing wetlands within the local assessment areas that intersect with the Project development areas;*

*3.14.4 monitor, starting prior to construction and during all phases of the Designated Project, fish habitat quality and quantity end points for all species identified pursuant to condition 3.14.3, in Farley Creek, Farley lake, Gordon lake, the Keewatin River, Minton lake, the new diversion channel, fish-bearing wetlands within and downstream of the Project development areas, and any additional locations identified in consultation with Indigenous groups and relevant authorities.*

*5.2.2 provide opportunities to Indigenous groups, prior to construction and at times determined in consultation with each Indigenous group, to:*

*5.2.2.1 harvest and transplant, during seasons where plants can be identified and harvested, plant species used for traditional purposes from areas that will be cleared of vegetation*

*5.4 The Proponent shall develop, prior to construction, and implement, during all phases of the Designated Project, a protocol for inspecting and cleaning vehicles, machinery and equipment associated with the Designated Project that have come from other worksites in order to limit the introduction and spread of weed species within the Project development areas.*

*5.6 The Proponent shall, when implementing measures to limit the introduction and spread of weed species within the Project development areas, use measures other than broadcast spraying when applying herbicides to mitigate effects to plant species used for traditional purposes by Indigenous groups, unless the Proponent determines that these measures are ineffective at controlling the introduction and spread of weed species.*

*5.7 The Proponent shall undertake, in consultation with Indigenous groups and relevant authorities, progressive reclamation of areas disturbed by the Designated Project, in doing so, the Proponent shall:*

*5.7.1 identify, in consultation with Indigenous groups, plant species native to the local assessment areas and plant species used for traditional purposes, to use for revegetation*

*6.3 The Proponent shall develop, prior to construction and in consultation with Indigenous groups, Health Canada, Environment and Climate Change Canada and any other relevant authorities, a follow-up program to verify the accuracy of the environmental assessment as it pertains to adverse environmental effects from the Designated Project on air quality and country foods as it relates to the health of Indigenous peoples, taking into account available Indigenous knowledge provided by Indigenous groups related to current use of lands and resources for traditional purposes. The Proponent shall implement the follow-up program during all phases of the Designated Project. As part of the implementation of the follow-up program, the Proponent shall:*



*6.3.1 identify, in consultation with Indigenous groups, the species of fish, vegetation and wildlife consumed as country foods that may be adversely affected by the Designated Project and the locations where these species shall be monitored*

### **3.3.6.3 Environmental Effects**

#### **3.3.6.3.1 Construction**

Consistent with the EIS, vegetation clearing during construction will result in portions of native plant communities being lost or altered. As described in Section 11.4 of the EIS, it was assumed that all vegetation within the PDA would be removed during construction. Overall, the revised Gordon PDA is larger than what was assessed in the EIS, with the addition of several new Project components, including the proposed borrow source and collection pond effluent diffuser. The land cover within the PDA remains similar with shrubby fen dominating 16.2% of the PDA, followed by dense mixedwood forest (13.9%), sparse conifer forest (9.9%), and open and dense conifer forest (7.6% and 7.2%, respectively) (Table 3.32). The relative proportions of these cover classes have not changed from the EIS.

Both construction and operation may indirectly alter the native plant communities due to the introduction or establishment of invasive species. This effect has not changed from the EIS.

Indirect effects on wetlands from groundwater drawdown may include a change in wetland class, change in plant species composition, and a change in decomposition rate for those wetlands influenced by groundwater such as fens and swamps.

Construction and operation at the Gordon site will require dewatering of the open pit and will result in groundwater drawdown of at least 1 m over an area extending approximately 500 m to the north and 1,000 m to the southwest of the open pit. Groundwater drawdown during construction and operation may alter the class, plant species composition, and decomposition rates of 27.3 ha of fen, and 5.9 ha of swamp wetlands in the LAA (Table 3.33). The area of wetlands affected has increased by 10.8 ha from the EIS, however, the relative proportions of wetlands have not changed.

Construction will directly affect three known occurrence of plant species of conservation concern (SOCC): boreal locoweed (*Oxytropis borealis*), which was observed on a reclaimed mine rock stockpile near the proposed open pit area; eyed foam lichen (*Stereocaulon tomentosum*), which was observed within the proposed open pit and the potential mine rock storage areas; and northern ground cedar (*Diphasiastrum complanatum*), which was observed within the planned MRSA. Boreal locoweed is an S1S2 listed species (critically imperiled to imperiled). Eyed foam lichen is an SU listed species (unrankable due to the lack of information), and northern ground cedar is an S3S4 listed species (vulnerable to apparently secure) (NatureServe 2025).

Boreal locoweed was identified during preliminary site surveys. A summer rare plant and weed survey completed in 2022 could not confirm the occurrence of boreal locoweed, but did document the occurrences of eyed foam lichen and northern ground cedar (Stantec 2022; Appendix A Map 4).



Table 3.32 Land Cover Classes in the Gordon PDA and LAA

Cover Type	Land Cover Class	EIS Results				Updated NOA/NOC Results			
		PDA		LAA		PDA		LAA	
		Area (ha)	Proportion (%)	Area (ha)	Proportion (%)	Area (ha)	Proportion (%)	Area (ha)	Proportion (%)
Anthropogenic	Development	72.0	26.7	119.5	2.8	84.0	28.9	121.5	2.9
<b>Anthropogenic Subtotal</b>		<b>72.0</b>	<b>26.7</b>	<b>119.5</b>	<b>2.8</b>	<b>84.0</b>	<b>28.9</b>	<b>121.5</b>	<b>2.9</b>
Native Upland	Conifer Dense	22.2	8.2	1,094.5	25.7	21.1	7.2	1,080.9	26.1
	Conifer Open	20.4	7.6	463.8	10.9	22.3	7.6	447.3	10.8
	Conifer Sparse	28.4	10.5	355.8	8.3	28.8	9.9	306.7	7.4
	Mixedwood Dense	40.0	14.9	272.7	6.4	40.6	13.9	264.0	6.4
	Mixedwood Open	2.48	0.9	96.2	2.3	2.4	0.8	78.9	1.9
	Shrubland	5.9	2.2	141.6	3.3	6.1	2.1	136.8	3.3
<b>Native Upland Subtotal</b>		<b>119.4</b>	<b>44.3</b>	<b>2,437.9</b>	<b>57.2</b>	<b>121.2</b>	<b>41.6</b>	<b>2,314.6</b>	<b>55.9</b>
Water	Water	13.2	4.9	430.3	10.1	12.5	4.3	429.2	10.4
<b>Water Subtotal</b>		<b>13.2</b>	<b>4.9</b>	<b>430.3</b>	<b>10.1</b>	<b>12.5</b>	<b>4.3</b>	<b>429.2</b>	<b>10.4</b>
Wetland	Bog Shrubby	10.7	4.0	194.6	4.6	12.5	4.3	193.9	4.7
	Bog Treed	7.9	2.9	435.8	10.2	8.4	2.9	435.3	10.5
	Fen Shrubby	41.6	15.4	383.9	9.0	47.3	16.2	379.7	9.2
	Fen Treed	0.5	0.2	28.1	0.7	0.5	0.2	22.3	0.5
	Marsh	0.0	0.0	10.2	0.2	0.0	0.0	10.2	0.2
	Swamp Shrubby	1.8	0.7	42.2	1.0	2.4	0.8	42.2	1.0
	Swamp Treed	2.3	0.9	195.6	4.6	2.4	0.8	192.3	4.6
<b>Wetland Subtotal</b>		<b>64.8</b>	<b>24.0</b>	<b>1,290.4</b>	<b>30.3</b>	<b>75.6</b>	<b>25.3</b>	<b>1,275.9</b>	<b>30.8</b>
<b>Total</b>		<b>269.4</b>	<b>100.0</b>	<b>4,264.7</b>	<b>100.0</b>	<b>291.2</b>	<b>100.0</b>	<b>4,141.2</b>	<b>100.0</b>



**Table 3.33** Wetlands Potentially Affected by Groundwater Drawdown during Construction and Operation in the LAA

<b>Wetland Class</b>	<b>Area (ha)<sup>1</sup></b>	<b>Proportion of the LAA (%)</b>
Fen Shrubby	24.2	0.6
Fen Treed	3.1	0.1
Swamp Shrubby	3.5	0.1
Swamp Treed	2.4	0.1
<b>TOTAL</b>	<b>33.1</b>	<b>0.8</b>

Note:

<sup>1</sup> Area excludes the PDA.

Effects to undocumented SOCCs are unknown. Undocumented SOCCs occurrences may be present because for many species, the number of plants fluctuate in response to climatic conditions (e.g., annuals may not germinate in dry years) and occur in low numbers. This effect is consistent with what was presented in the EIS.

### **3.3.6.3.2**      **Operation**

Consistent with the EIS, road use, drilling, blasting and rock removal from open pit mines during operation will generate dust and likely result in dust deposition on surrounding native plant communities. The AQMMP was developed for Project construction and operation to monitor and manage the ambient air quality near the Project. Dust from the haul road is the largest source of particulate emissions and therefore more frequent road watering will be implemented. In addition, to mitigate effects due to dust, automatic alerts will be sent to notify environmental representatives of high winds (i.e., wind speed greater than 5 metres per second [m/s] or 18 kilometres per hour [km/h] or Beaufort 3 gentle breeze) and dry conditions (less than 2 millimetres [mm] of precipitation has occurred in the previous 24 hours and the temperature is greater than 15°C), which will trigger the implementation of additional dust mitigation measures.

Operation at the Gordon site may affect two known plant SOCC occurrences in the LAA, shrubby willow (*Salix arbusculoides*) and hairy butterwort (*Pinguicula villosa*), both found in a lakeside riparian shrubland north of the PDA. These occurrences may be indirectly affected by drawdown from dewatering of the open pit that will likely last through post-closure until the open pit fills. This effect may be reversible for shrubby willow if there are propagules available for reestablishment of this species. Shrubby willow produces a high abundance of seed and there are a variety of habitats the species can grow in (United States Department of Agriculture 2020). However, it is assumed that the loss of hairy butterwort is irreversible. The characterization of this residual effect differs from what was presented in the EIS, as hairy butterwort was not included in the EIS as its presence was not identified until the rare plant survey completed in 2022. Potential introduction or establishment of invasive species during operation may also indirectly alter native plant communities. The baseline conditions reported in the EIS and supporting



documents note the presence of one Tier 3 weed species, common dandelion (*Taraxacum officinale*), within the Gordon PDA. Since the Project is in a remote northern area of Manitoba surrounded by native plant communities, weed species are less likely to be encountered (United States Department of Agriculture 2007). In accordance with the Vegetation and Weed Management Plan (VWMP) the following mitigation measures (in order of priority) will be used to reduce the introduction and spread of weed species during Project construction, operation, and decommissioning/closure:

1. Keeping equipment free of soil and debris as equipment can spread propagules (e.g., seeds, rhizomes). Equipment and personnel (e.g., boots and clothing) will arrive at the Project site clean and free of soil and vegetative debris. Equipment will be inspected and if deemed to be in appropriate condition, will be approved for use and identified with a suitable marker or tag. Equipment that does not arrive at the Project site in appropriate condition will not be allowed within the construction footprint until it has been cleaned, re-inspected, and deemed suitable for use. Random inspections of equipment and personnel may also be completed. Cleaning stations will be established at the construction site. Cleaning stations will be lined by an impermeable liner to isolate the cleaning station from the surrounding area so that the water can be easily removed by hydrovac.
2. Monitoring topsoil and subsoil piles for regulated weed species establishment.
3. Monitoring newly disturbed areas for encroachment of weed species.
4. Controlling infestations of regulated weed species.
  - a. Tier 2 species infestations under five acres (two hectares) must be eradicated; whereas infestations larger than five acres must be controlled and kept from spreading.
5. Revegetating disturbed land with native vegetation.
6. Using certified clean seed.
7. Applying corrective measures to avoid the growth of regulated weed infestations.

### **3.3.6.3.3      *Decommissioning / Closure***

Consistent with the EIS, areas disturbed by the Project will be reclaimed during decommissioning/closure, 13 years post-construction. Areas of Project disturbance, other than the open pit and the existing access road, will be reclaimed to native plant cover. Reclaimed native upland will be revegetated by seeding with native plant species, including commercially available plant species of interest to Indigenous Nations. The goals of revegetation are to control erosion, improve aesthetics, and assist in returning the PDA to a self-sustaining community dominated by native plant species that are in similar dominant plant abundance to the surrounding upland and representative of early successional development as outlined in the EIS (Stantec 2020a). The VWMP does not specifically target the restoration of existing conditions in the PDA. The VWMP targets the establishment of native plants; however, the abundance and distribution are expected to differ from existing conditions. With mitigation and reclamation, the Project will result in an increase in 254.5 ha of reclaimed native upland (MRSA and areas of the PDA), which replaces a portion of the 121.2 ha of native upland vegetation cover classes lost in the LAA. The Project will result in an increase in 36.7 ha of water as the open pit fills over the course of 40 years. As these pits fill,



groundwater levels will slowly recover. The existing access road into the Gordon site will remain in place and not be reclaimed.

#### **3.3.6.3.4 Comparison with the EIS**

Updated Project effects on vegetation and wetlands to those outlined in Chapter 11.0 of the EIS include the addition of three plant SOCC occurrences that will be directly affected by construction or potentially affected by operation; no additional adverse effects on vegetation and wetlands are anticipated because of the footprint alteration.

#### **3.3.6.4 Summary of Mitigation Measures**

Proposed mitigation measures incorporated as part of this NOA/NOC include those standard practices and procedures identified in the EIS (Stantec 2020a) and associated technical review, as well as other general mitigation measures that are typically applied during construction and operation; all of which are discussed in the VWMP (Version 0, January 2025).

#### **3.3.6.5 Residual Effects**

During construction, alterations to the approved Gordon site will affect more land (an additional 21.8 ha) than predicted in the EIS. Effects from groundwater drawdown near the open pit during construction and operation is similar in comparison with the EIS with effects extending to at least 1 m depth within 500 m to the north and 1,000 m to the southwest of the open pit. Like the EIS, 27.2 ha of fen and 5.9 ha of swamp may be potentially affected by groundwater drawdown in the LAA.

During decommissioning/closure, upland and wetland areas disturbed by the Project will be revegetated to establish reclaimed native upland. The open pit will be allowed to fill naturally over 50 years and is predicted to be reclaimed to water. The existing access road into the Gordon site will remain in place and not be reclaimed. The MRSA will also be capped and seeded with a native seed mix. Additional details on the plant selection for revegetation is included in the VWMP. Loss of entire plant communities from the LAA is not expected. With mitigation and reclamation, the Project will result in an increase in 254.5 ha of reclaimed native upland, which replaces a portion of the 121.2 ha of lost native upland plant communities in the LAA. The Project will also result in the permanent loss of 75.6 ha of wetlands. Groundwater drawdown during construction and operation may alter the class, plant species composition and decomposition rates of 59.5 ha of fen and 8.4 ha of swamp wetland area.

The proposed alterations will not result in additional adverse effects on vegetation and wetlands at the Gordon site and there is no change to the EIS conclusions (Stantec 2020a).



### 3.3.7 Wildlife and Wildlife Habitat

Wildlife and wildlife habitat is a VC because it provides ecological, aesthetic, recreational, economic, and cultural value to stakeholders, the public, Indigenous Nations, local businesses, and government agencies (Stantec 2020a). The proposed alterations that may interact with the wildlife and wildlife habitat VC and were therefore assessed as part of this NOA/NOC include but are not limited to the changes in the PDA layout outlined in Table 2.1.

#### 3.3.7.1 Regulatory and Guideline Setting

##### 3.3.7.1.1 Guideline Criteria

The assessment of potential Project-related environmental effects on wildlife and wildlife habitat includes the consideration of the following federal legislation:

- The *Species at Risk Act* (SARA) provides protection for species at risk (SAR) in Canada. The legislation provides a framework to facilitate recovery of species listed as threatened, endangered, or extirpated and to prevent species listed as special concern from becoming threatened or endangered. SAR and their habitats are protected under SARA, which prohibits: 1) the killing, harming, or harassing of endangered or threatened SAR; and 2) the destruction of critical habitat of an endangered or threatened SAR.
- The *Migratory Birds Convention Act* provides protection for migratory birds, nests, and eggs. Protection is afforded to most native bird species with some exceptions, all of which are protected under provincial legislation. The updated Migratory Birds Regulations, 2022 (Government of Canada 2022) protect the nests of migratory birds only when they contain a live bird or viable eggs, with year-round protection for 18 species whose nests are commonly re-used by migratory birds.

The assessment of potential Project-related environmental effects on wildlife and wildlife habitat includes the consideration of the following provincial legislation:

- *The Endangered Species and Ecosystems Act* (ESEA) provides protection to threatened and endangered ecosystems and plant and animal SAR in Manitoba. The ESEA facilitates the management and development of recovery strategies for threatened, endangered, and extirpated or extinct species to prevent further declines and promote recovery.
- *The Wildlife Act* provides general provisions for regulating the activities relating to the take and trade of wild animals in Manitoba, which are defined as “an animal or bird of a species or type listed in Schedule A or declared by the regulations to be a wild animal.” Select amphibian, reptile, and mammal species and most bird species (including those not protected under the *Migratory Birds Convention Act*) known to exist in Manitoba are included.



### **3.3.7.1.2 IAAC Decision Statement**

As per the IAAC Decision Statement, Alamos is required to adhere to the following conditions with respect to wildlife and wildlife habitat:

*4.1 The Proponent shall carry out the Designated Project in a manner that protects migratory birds and avoids injuring, killing or harassing migratory birds or destroying, taking or disturbing their eggs, or damaging, destroying, removing or disturbing their nests, taking into account Environment and Climate Change Canada's Guidelines to avoid harm to migratory birds.*

### **3.3.7.2 Environmental Effects**

As described in Section 12.4.2.4 of the EIS, the complete loss of wildlife habitat in the Gordon site PDA (269.4 ha) was assumed. Overall, the revised Gordon site PDA (291.2 ha) has increased by 21.8 ha from EIS predictions and some Project components changed in size or have been added, such as a new 7.3 ha stockpile borrow source (Table 2.1). Development of these areas is not expected to affect sensitive wildlife features (e.g., raptor nests) because none were observed near the proposed footprint layout area. The revised Gordon site PDA will result in additional direct habitat loss and potential sensory disturbance to wildlife and wildlife habitat. However, the additional amount of native upland landcover directly affected is relatively small (1.8 ha more than predicted in the EIS) (Table 3.31). The revised PDA will also directly affect 10.8 more ha of wetlands than predicted in the EIS (Table 3.31), which will result in a slight reduction in habitat availability for amphibians as well as birds and mammals associated with wetlands.

Project effects on SAR are the same as described in Chapter 12.0 of the EIS. Bank swallow (*Riparia riparia*), a SAR listed as threatened under SARA, was not assessed because it was not known to regularly occupy the RAA and was unlikely to be affected because of a lack of suitable habitat. However, bank swallow breeding range overlaps the RAA (Garrison and Turner 2020), and breeding has been confirmed near Lynn Lake (Taylor 2018). The topsoil storage area and the excavated stockpile borrow source area (Map 2, Appendix A) could provide habitat for nesting bank swallows, which typically dig burrows in near-vertical sand and gravel pits and stockpiles of soil that are more than 2 m high and with slopes of at least 70 degrees (Environment and Climate Change Canada [ECCC] 2022). Topsoil deposition and borrow source excavation during the general mid-April to late August breeding season could result in nests being damaged, destroyed, disturbed, or removed, which is prohibited under the Migratory Bird Regulations, 2022 if they contain a live bird or viable egg; (ECCC 2023). Section 33 of SARA prohibits damaging or destroying the residence of a SAR, which for bank swallow is defined as the occupied burrow (Government of Canada 2019).

The borrow source area could also attract common nighthawk (*Chordeiles minor*), a SAR listed as special concern under SARA and threatened under ESEA, and other migratory bird species that nest on the ground in disturbed areas (e.g., killdeer [*Charadrius vociferus*]). Excavation during the general mid-April to late August breeding season could result in nests being damaged, destroyed, disturbed, or removed, which is prohibited under the Migratory Bird Regulations, 2022 if they contain a live bird or viable egg (Section 3.3.7.1; ECCC 2023).



After decommissioning, the topsoil deposition and borrow source areas could provide nesting habitat for bank swallow, common nighthawk, and other migratory bird species that nest in disturbed areas, depending on the state in which they are left.

### **3.3.7.3 Summary of Mitigation Measures**

Proposed mitigation measures incorporated as part of this NOA/NOC include those standard practices and procedures identified in the EIS (Stantec 2020a) as well as other general mitigation measures that are typically applied during construction and operation.

Additional proposed mitigation measures include:

- Contouring aggregate piles in the topsoil deposition and borrow source areas to have a slope of less than 70 degrees before and throughout the breeding season to avoid attracting nesting bank swallows (ECCC 2022).
- Maintaining a minimum buffer zone of 50 m (ECCC 2022) around an active bank swallow colony to protect it from disturbance from the date when adults are first seen entering or exiting the burrow to the date when an individual is last seen at the burrow (Government of Canada 2019).
- Searching the topsoil deposition and borrow source areas if they become active after a period of inactivity during the general mid-April to late August breeding bird period and maintaining the recommended buffer zone of 300 m around an active nest prescribed for common nighthawk (MB CDC 2021) to protect it from high disturbance level activities.

### **3.3.7.4 Residual Effects**

Alterations to the approved Gordon site are adverse for wildlife and wildlife habitat as an additional 21.8 ha of land will be affected than predicted in the EIS. Mitigation applied to the topsoil deposition and borrow source areas will reduce potential for areas to attract and support migratory birds including SAR. Project residual effects on wildlife and wildlife habitat at the Gordon site during construction and operation were characterized in the EIS as adverse, low magnitude, extending to the RAA, single event or continuous, short-term or medium-term, reversible, and disturbed ecological context. Project residual effects on mortality risk during construction and operation were characterized in the EIS as adverse, low, extending to the LAA, multiple irregular, short-term or medium term, reversible, and disturbed ecological context. Project residual effects on wildlife health during construction and operation were characterized in the EIS as adverse, negligible to low, extending to the LAA, continuous, long-term, reversible, and disturbed ecological context. Project effects on wildlife and wildlife habitat, mortality risk, and health during decommissioning were characterized in the EIS as adverse and/or positive, low or negligible to low, extending to the PDA or LAA, continuous or multiple irregular, long-term, reversible, and disturbed ecological context. The proposed alterations at the Gordon site will not change the characterization of Project residual effects on change in habitat and there is no change to EIS conclusions (Stantec 2020a).



### **3.3.8 Labour and Economy**

Labour and economy is a VC because employment and business support the economic livelihoods of residents, and provide associated social benefits related to employment and income (Stantec 2020a). The proposed alterations that may interact with the labour and economy VC and were therefore assessed as part of this NOA/NOC, include but are not limited to changes to the footprints of Project components, and mine production (mined tonnage) capacity.

#### **3.3.8.1 Regulatory and Guideline Setting**

##### **3.3.8.1.1 Guideline Criteria**

The assessment of potential Project-related environmental effects on labour and economy includes the consideration of the following federal and provincial legislation:

- The Canadian Environmental Assessment Agency (CEA Agency; now IAAC) Final Guidelines for the Preparation of an EIS (CEA Agency 2017) issued for the Project, which require assessment of effects on the human environment, including socio-economic conditions (encompassing a broad range of matters that affect communities in the study area in a way that recognizes interrelationships, system functions and vulnerabilities).
- The MECC *Environment Act* Proposal Report Guidelines (MECC 2023), which require consideration of Project effects on humans and socio-economic implications resulting from environmental effects.

##### **3.3.8.1.2 IAAC Decision Statement**

There are no conditions with respect to labour and economy as per the IAAC Decision Statement for Alamos to consider.

#### **3.3.8.2 Environmental Effects**

As described in Sections 13.4.2, 13.4.3, and 13.4.4, of the federal EIS and Section 6.8.2.1 of the provincial EAP Report, the assessment of potential environmental effects of the Project considered changes in the local and regional labour force, regional business, and regional economy. Demand for labour and regional expenditures are the primary pathways through which the Project may affect labour and economy. Project demand for labour has the potential to both beneficially and adversely affect local and regional labour forces. Beneficial effects include increases in local employment (direct, indirect, and induced) during construction, operation, and decommissioning/closure. Adverse effects primarily relate to decreased demand for labour as the Project transitions from operation into, through and after decommissioning/closure, resulting in loss of direct employment. Project spending has potential to both beneficially and adversely affect local and regional businesses. Beneficial effects include increases in business revenue, with the potential to support capital investment and hiring, resulting in increased capacity and capabilities for local and regional businesses. Potential adverse effects of Project spending on regional businesses primarily relate to increased demand for local labour, goods, and services, which



can lead to labour scarcity and increased labour costs. Project spending will result in overall increased economic activity (i.e., Gross Domestic Product [GDP]) in the LAA and RAA. The Project will also pay property taxes, or provide grants in lieu, to the Town of Lynn Lake and contribute to provincial and federal government revenues through taxation on labour, goods and services. The alterations, including change in mine production (mining tonnage) capacity, are not expected to affect labour and economy.

### **3.3.8.3 Summary of Mitigation Measures**

Proposed mitigation measures incorporated as part of this NOA/NOC include those standard practices and procedures identified in the EIS (Stantec 2020a) as well as other general mitigation measures that are typically applied during construction and operation.

### **3.3.8.4 Residual Effects**

Overall, the Project is expected to result in both positive and adverse effects. The residual effects on labour and economy were characterized in the EIS as low magnitude and moderate magnitude positive residual effects. Low magnitude positive residual effects are associated with increased direct, indirect, and induced employment and contributions to municipal government revenues (through taxation). Project expenditures within the LAA and RAA represent economic potential for local and regional businesses, not limited to supply and service contracts to the Project and goods and services provision to direct and indirect workers. Project expenditures on goods and services are likely to occur with a greater percentage in the RAA compared with LAA, due to the larger labour force of the RAA. Moderate magnitude positive residual effects are associated with anticipated Project contributions to GDP. Local and regional labour forces and businesses were characterized in the EIS as having positive residual effects and occurring within a non-resilient socio-economic context in the LAA and a resilient context in the RAA. Effects on the local and regional economy were characterized in the EIS as occurring within a resilient context (LAA and RAA). Effects occur continuously over the short-term during construction and medium-term during operation. Positive effects are reversible following the completion of each Project phase. There are no seasonal timing considerations to positive effects on labour and economy.

Adverse effects occur within the LAA and RAA. Adverse effects on local and regional business (i.e., increased competition for labour and contributions to wage inflation) were characterized in the EIS as occurring continuously over the short-term during construction and medium-term during operation. Adverse effects associated with losses in employment and contributions to GDP were characterized in the EIS as occurring continuously over the short-term during decommissioning/closure. Adverse effects on local and regional labour forces and businesses were characterized in the EIS as occurring within a non-resilient socio-economic context in the LAA and a resilient context in the RAA. Effects on the local and regional economy were characterized in the EIS as occurring within a resilient context (LAA and RAA). Construction and operational adverse effects on local and regional businesses (i.e., contributions to increased competition for labour and wage inflation) are reversible following the completion of each Project phase. Other adverse effects are irreversible (i.e., they only occur finitely within the context of the Project and end when the Project ends). There are no seasonal timing considerations to adverse effects on labour and economy.



The proposed alterations will not result in additional positive or adverse effects on labour and economy at the Gordon site from those described in Chapter 13.0 of the EIS and there is no change to EIS conclusions (Stantec 2020a).

### **3.3.9 Community Services, Infrastructure, and Wellbeing**

Community services, infrastructure, and wellbeing is a VC because construction, operation, and decommissioning/closure of the Project could increase demand for community services and infrastructure and affect (beneficially or adversely) community wellbeing (Stantec 2020a). The proposed alterations that may interact with the community services, infrastructure, and wellbeing VC and were therefore assessed as part of this NOA/NOC, include but are not limited to changes to the PDA layout, general infrastructure, and mine production (mining tonnage) capacity.

#### **3.3.9.1 Regulatory and Guideline Setting**

##### **3.3.9.1.1 Guideline Criteria**

The assessment of potential Project-related environmental effects on community services, infrastructure, and wellbeing includes the consideration of the following federal and provincial legislation:

- The CEA Agency (now IAAC) Final Guidelines for the Preparation of an EIS (CEA Agency 2017) issued for the Project, which require assessment of effects on the human environment, including socio-economic conditions (encompassing a broad range of matters that affect communities in the study area in a way that recognizes interrelationships, system functions and vulnerabilities).
- MECC 2023 *Environment Act* Proposal Report Guidelines, which require consideration of Project effects on humans and socio-economic implications resulting from environmental effects.
- Manitoba Health Seniors and Active Living's (MHSAL, formerly Manitoba Health and Healthy Living) 'Community Health Assessment Guidelines' (MHHL 2009a, 2009b), which provide a framework from which provincial health authorities develop region-specific Community Health Assessments

##### **3.3.9.1.2 IAAC Decision Statement**

There are no conditions with respect to community services, infrastructure, and wellbeing as per the IAAC Decision Statement for Alamos to consider.

#### **3.3.9.2 Environmental Effects**

As described in Sections 14.4.2, 14.4.3, 14.4.4, and 14.4.5 of the federal EIS and Section 6.9.2 of the provincial EAP Report, the assessment of potential environmental effects of the Project considered changes in housing and temporary accommodations, local and community services, infrastructure, and wellbeing. Potential changes to community services and infrastructure will result from an in-migration of Project workers to the LAA because of the Project, therefore increasing demand on existing services and infrastructure, including but not limited to health, emergency, education, recreation, and utilities. In the



LAA, the population has been decreasing due to mine closures and, as a result, community services and infrastructure have been scaled back. Most facilities are at least 40 years old and in need of repair, upgrading, or replacement.

During construction and operation, a temporary increase in population in the LAA is expected because of the Project, which has potential to place additional demands on local availability of housing and accommodations. However, implementation of a Project accommodation strategy, with workers primarily accommodated at a work camp at the Gordon site, will satisfy requirements for worker accommodation resulting in a negligible effect on housing and temporary accommodation. Most of the physical Project activities will not affect community services and infrastructure, except for wastes and emissions, movement of trucks, equipment, supplies, and personnel within the LAA. Camp utilities will be independent from the Town, with power being supplied by Manitoba Hydro, on-site wastewater treatment, and potable water treated on-site from the Keewatin River. However, Town infrastructure and utilities may experience increased strain from visiting on-site workers (e.g., to purchase supplies before returning home). An increased demand is also expected for healthcare and emergency services by temporary Project workers, and/or related to accidents or malfunctions of the Project activities during these phases. The construction and operation activities will also affect transportation services and infrastructure through the creation of additional traffic in the LAA and RAA. During decommissioning/closure, there will be a reduction in effects on community services and infrastructure as on-site workers move away due to diminishing employment. Traffic in the Town and along Provincial Road (PR) 391 between Thompson and Lynn Lake, utility use from on-site workers visiting the Town, and demand on local medical services and policing is expected to reduce. Potential changes in community wellbeing will result from a change in employment and income and change in population associated with each phase of the Project and its activities. The alterations, including change in mine production (mining tonnage) capacity, are not expected to affect community services, infrastructure, and well-being.

### **3.3.9.3 Summary of Mitigation Measures**

Proposed mitigation measures incorporated as part of this NOA/NOC include those standard practices and procedures identified in the EIS (Stantec 2020a) as well as other general mitigation measures that are typically applied during construction and operation.

### **3.3.9.4 Residual Effects**

With the implementation of Project mitigation and management measures, residual effects on community services and infrastructure were characterized in the EIS as being negligible to low magnitude, occurring in the LAA, continuous for the medium-term, and reversible. They will generally occur in a socio-economic context that was characterized in the EIS as resilient, except for housing and temporary accommodations, which has a socio-economic context that is not resilient. Residual effects on local services and infrastructure were characterized in the EIS as low due to the independent nature of works related to power, camp water, and wastewater systems. The Project will not place additional demands on that local infrastructure within the Town of Lynn Lake.



With the implementation of Project mitigation and management measures, positive effects on community wellbeing were characterized in the EIS as being low in magnitude during construction and operation, occurring within the LAA on a continual basis over the medium-term and reversible following the completion of decommissioning/closure. Positive residual effects of Project-related employment and income are likely to be inequitably distributed across the LAA population with vulnerable population less likely to realize benefits. Positive residual effects were characterized in the EIS as occurring within a non-resilient socio-economic context. Adverse residual effects were characterized in the EIS as being moderate in magnitude during construction and operation, occurring within the LAA on a continual basis over the long-term, and reversible following the completion of decommissioning/closure. Residual effects were characterized in the EIS as occurring within a non-resilient socio-economic context. Residual effects on community wellbeing were characterized in the EIS as negligible in magnitude during Project decommissioning/closure.

The proposed alterations will not result in additional positive or adverse effects on community services, infrastructure, and wellbeing at the Gordon from those described in Chapter 14.0 of the EIS, and there is no change to EIS conclusions.

### **3.3.10 Land and Resource Use**

Land and resource use includes activities and associated infrastructure related to the use of land and resources, including waterways for recreational, commercial, and navigational purposes within and adjacent to the PDA (Stantec 2020a). The proposed alterations that may interact with land and resource use and were therefore assessed as part of this NOA/NOC, include but are not limited to the changes in the PDA layout outlined in Table 2.1.

#### **3.3.10.1 Regulatory and Guideline Setting**

##### **3.3.10.1.1 Guideline Criteria**

The assessment of potential Project-related environmental effects on land and resource use includes the consideration of the following federal legislation:

- *The Explosives Act* requires that anyone working with explosives have a licence, certificate or permit issued by the federal Minister of Natural Resources.

The assessment of potential Project-related environmental effects on land and resource use includes the consideration of the following provincial legislation:

- *The Crown Lands Act* requires works permits for work conducted on provincial Crown lands. A lease or permit may also be required for the use or occupation of Crown lands. An easement or right-of-way would also be required for any works upon, over, under, or in respect of Crown lands.
- *The Forest Act* requires a permit for the cutting or removing of timber from Crown land in support of the Project.



- *The Water Rights Act* requires a licence for use of surface water or groundwater for industrial or other purposes.
- *The Wildfires Act* requires a Burn Permit for open burning activities in a Burning Permit Area during the wildfire season (April 1 to November 15).

### **3.3.10.1.2 IAAC Decision Statement**

There are no conditions with respect to land and resource use as per the IAAC Decision Statement for Alamos to consider.

### **3.3.10.2 Environmental Effects**

As described in Sections 15.4.2.1, 15.4.3.1 and 15.4.4.1 of the federal EIS and Section 6.10.2.3 of the provincial EAP Report, clearing and construction activities within the Gordon PDA will result in the loss or alteration of area and the restriction of access to provincial Crown lands. As indicated in 2.2, the proposed changes to the revised Gordon site PDA (291.2 ha) will be small, 21.8 ha (less than 10%) greater than anticipated in the EIS. Some Project component footprints have changed in size or have been added, such as the new 7.3 ha stockpile borrow source and an increase in the footprint of the collection pond discharge pipeline (2.3 ha), topsoil storage area (4.1 ha), and the overburden storage area (17.8 ha).

The operation of the stockpile borrow source and collection pond discharge pipeline will result in additional ground disturbance and have the potential to degrade land use within the PDA. The presence of the stockpile borrow source may result in visual disturbance effects (e.g., recreational user's quality of experience due to operation activities at the site) and restricted access to recreational use areas. During operation, noise emitted from Project activities at the stockpile borrow source and mobile vehicle and equipment use will result in a change in noise levels due to use of internal access roads (e.g., haul trucks).

Land clearing for the stockpile borrow area will remove a small portion of timber from the commercial forest area in Forest Management Unit 72 for the life of the Project. The removal of productive forest land from the commercial forest area could affect the determination of allowable annual cut levels. The loss of productive forest land resulting from the Project will contribute to the reduction in allowable annual cut. Sensory disturbance (e.g., noise, visual) from access to the area can affect the presence of wildlife. This could result in the reduction of harvesting success due to disruption of animals and furbearers, which could lead to greater pressure on game resources. Worker presence could increase the competition for species harvested by local hunters and trappers. The stockpile borrow source and collection pond discharge pipeline at the Gordon site could be visible to resource users operating in the area.



### **3.3.10.3 Summary of Mitigation Measures**

Proposed mitigation measures incorporated as part of this NOA/NOC include those standard practices and procedures identified in the EIS (Stantec 2020a) as well as other general mitigation measures that are typically applied during construction and operation.

### **3.3.10.4 Residual Effects**

Given the small area of provincial Crown land affected by the PDA, Project disturbance was predicted in the EIS to be of low magnitude. There is at least one remote cabin within the Gordon site LAA (occupancy unknown). During construction, low frequency noise and vibration effects are not expected at sensitive receptors because predicted levels are below applicable targets (Section 3.3.2). Overall, the residual effects for the Gordon site are anticipated to remain low (low to moderate for noise).

During construction, residual effects on recreation will primarily occur in the altered PDA where access to the location of the stockpile borrow source will be restricted, potentially resulting in a shift of recreational users to other areas of the LAA. The land within the altered PDA is not considered “prime” recreational land, given the former mine site in proximity, and there are alternative lands within the LAA available for recreational use. Residual effects described for the construction phase will continue throughout operation consisting of ongoing noise, and restriction in use of access roads at and to the site. The addition and presence of the stockpile borrow source and change to the collection pond discharge pipeline, topsoil storage area, and overburden storage area may result in some visual disturbance to recreational users. However, the stockpile borrow source would barely be visible or marginally so to recreational users.

The Project alteration will result in a decline in net merchantable timber in the RAA and LAA. During operation, sensory and visual disturbance effects described for the construction phase are expected to continue because of altered Project activities. The stockpile borrow source may be barely or marginally visible from certain vantage points.

With the implementation of mitigation measures, the residual effects on land and resource use for the approved Gordon site were characterized in the EIS to be adverse, low to moderate in magnitude, limited to the Gordon site PDA/LAA, short- to long-term in duration, single, irregular to continuous in frequency, and reversible upon Project decommissioning/closure. Overall, the proposed alterations will not result in additional adverse effects on land and resource use at the Gordon from those described in Chapter 15.0 of the EIS, and there is no change to EIS conclusions (Stantec 2020a).



### **3.3.11 Heritage Resources**

Heritage resources, including archaeological sites and objects, are a VC based on legislated requirements; scientific relevance and interest; Indigenous and public concern; and because archaeological sites and objects provide people from the past the opportunity to be heard in the present (Stantec 2020a). The proposed alterations may interact with the heritage resources VC and were therefore assessed as part of this NOA/NOC, are limited to the changes in the PDA layout outlined in Table 2.1.

#### **3.3.11.1 Regulatory and Guideline Setting**

##### **3.3.11.1.1 Guideline Criteria**

The assessment of potential Project-related environmental effects on land and resource use includes the consideration of the following provincial legislation:

- Under Section 12(2) of *The Heritage Resources Act*, if the Minister of Sport, Culture and Heritage has reason to believe that heritage resources or human remains are known, or thought likely to be present, on lands that are to be developed, then the owner/developer is required to conduct at his/her own expense, a heritage resource impact assessment (HRIA) and mitigation, if necessary, prior to the project's start.

##### **3.3.11.1.2 IAAC Decision Statement**

As per the IAAC Decision Statement, Alamos is required to adhere to the following conditions with respect to heritage resources:

*7.1 The Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, and implement, during all phases of the Designated Project, an archaeological and heritage resource management plan for any structures, sites or things of historical, archaeological, paleontological or architectural significance discovered within the Project development areas. As part of the archaeological and heritage resource management plan, the Proponent shall:*

*7.1.1 immediately halt work at the location of the discovery, except for actions required to be undertaken to protect the integrity of the discovery;*

*7.1.2 delineate an area of at least 50 metres around the discovery as a no-work zone;*

*7.1.3 inform the Agency and Indigenous groups in writing within 24 hours of the discovery, and allow Indigenous groups to monitor and participate in archaeological works;*



*7.1.4 have a qualified individual, whose expertise pertains to the requirements of Manitoba's Heritage Resources Act, conduct an assessment at the location of the discovery, including sampling and construction monitoring on landforms of similar historic potential to the discovery site(s) within the Project development areas that are planned for development, prior to development in these areas; and*

*7.1.5 consult with Indigenous groups and relevant authorities on the manner by which to comply with all applicable legislative or legal requirements and protocols respecting the discovery, recording, transferring and safekeeping of previously unidentified structures, sites or things of historical, archaeological, paleontological or architectural significance.*

### **3.3.11.2 Environmental Effects**

In 2015-2016, Stantec completed a HRIA of the Gordon site on behalf of Alamos for the Project under Heritage Permit A37-15. The results of this HRIA were used to inform the assessment of effects on the heritage resources VC as described in Chapter 16.0 of the EIS.

The HRIA included a review of previous archaeological studies, provincial and federal databases, satellite imagery, and peer-reviewed literature. Gaps and limitations with respect to general heritage resources and EA requirements were identified and recommendations were made to both satisfy these requirements and obtain a strong understanding of heritage resources in the Project area. Stantec's 2015 field program focused on relocating previously recorded archaeological sites and completing survey transects within each of the Project components and along the recently cleared access roads.

A permit report was submitted to Historic Resources Branch, Manitoba Culture, Sport and Heritage (HRB) in May 2016 (Stantec Consulting Ltd., 2016). The 2015 field program surveyed all components of the Project that were determined to have a medium to high heritage resource potential. The HRB approved the permit report in 2017 and provided clearance for the Project to proceed as planned.

### **3.3.11.3 Summary of Mitigation Measures**

No further assessment of the Project was recommended. No mitigation measures were required. A Heritage and Cultural Resource Protection Plan (HCRPP) has been developed according to Condition 7.1 by Alamos and will be applied during construction, operation, and decommissioning. The revised PDA was communicated to the HRB with the sharing of the HCRPP (Version 0, January 2025). The HCRPP was approved by HRB.

### **3.3.11.4 Residual Effects**

There are no residual effects on heritage resources. Review of the NOA/NOC plans indicate that no areas of heritage potential have been added to the Project footprint. The proposed alterations will not result in adverse effects on heritage resources at the Gordon site and there is no change to EIS conclusions (Stantec 2020a).



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

Current use of lands and resources for traditional purposes by Indigenous peoples (current use) is a VC because of the potential for the Project to affect traditional activities, sites and resources identified by Indigenous Nations (Stantec 2020a). The proposed alterations that may interact with current use and were therefore assessed as part of this NOA/NOC, include but are not limited to the changes in the PDA layout outlined in Table 2.1.

#### **3.3.12.1 Regulatory and Guideline Setting**

##### **3.3.12.1.1 Guideline Criteria**

The assessment of potential Project-related environmental effects on current use includes the consideration of the following federal and provincial legislation:

*Canadian Environmental Assessment Act* (CEAA 2012). The EIS (Stantec 2020a) was prepared under the, CEAA 2012 which required consideration of:

*“an effect occurring in Canada of any change that may be caused to the environment on the current use of lands and resources for traditional purposes”* (section 5(1)(c)(iii)).

Technical guidance for assessing effects on current use of lands and resources for traditional purposes (current use in this document) where the CEA Agency (now IAAC) is the responsible authority was provided in *Technical Guidance for Assessing the Current Use of Lands and Resources for Traditional Purposes under CEAA 2012* (CEA Agency 2015).

The Final EIS Guidelines (Appendix 4A of the EIS) also identified requirements for engagement with twelve Indigenous Nations (Chapter 17.0, Section 17.1.3), integrating TK in the assessment of environmental effects, provision of information regarding existing conditions to support the analysis of predicted effects on current use, and documenting specific suggestions raised by Indigenous Nations for mitigating effects of changes to the environment. These are:

- IAAC ‘Most Affected’ Indigenous Nations:
  - Treaty 5 First Nations
    - Barren Lands First Nation
    - Nisichawayasihk Cree Nation
    - O-Pipon-Na-Piwin Cree Nation
  - Treaty 6 First Nations
    - Marcel Colomb First Nation
    - Mathias Colomb Cree Nation
    - Peter Ballantyne Cree Nation



- Manitoba Métis Federation
- IAAC Indigenous Nations 'Affected to a Lesser Degree':
  - Treaty 5 First Nations
    - Northlands Denesuline First Nation
    - Sayisi Dene First Nation
  - Treaty 10 First Nation
    - Hatchet Lake First Nation
  - Métis Nation – Saskatchewan
    - Northern Region 1
    - Eastern Region 1
  - Chemawawin Cree Nation was added in May 2020.

MSD (now MECC) provides guidance in Information Bulletin – Environment Act Proposal Guidelines (MSD 2017). In the Description of Environmental and Human Health Effects of the Proposed Development, the guidelines require a description of potential effects of the development on Indigenous Nations, including, but not necessarily limited to:

- Direct effects on Indigenous Nations in the Project area.
- Resource use, such as hunting, fishing, trapping, and gathering.
- Cultural or traditional activities in the Project area.

### **3.3.12.1.2 IAAC Decision Statement**

As per the IAAC Decision Statement, Alamos is required to adhere to the following conditions with respect to current use:

*5.1 The Proponent shall develop, prior to construction and in consultation with Indigenous groups, measures to mitigate adverse impacts from the Designated Project on access to lands and resources used for traditional purposes, including the implementation of safe access point(s) and/or routes within the local assessment areas. The Proponent shall submit these measures to the Agency prior to construction.*

*5.2 The Proponent shall avoid disturbing sites of traditional or cultural importance within or near the Project development areas, except for the construction of Designated Project components. In doing so, the Proponent shall:*

*5.2.1 identify, in consultation with Indigenous groups, the location of sites of traditional or cultural importance within or near the Project development areas.*

*5.2.2 provide opportunities to Indigenous groups, prior to construction and at times determined in consultation with each Indigenous group, to:*



*5.2.2.1 harvest and transplant, during seasons where plants can be identified and harvested, plant species used for traditional purposes from areas that will be cleared of vegetation; an*

*5.2.2.2 conduct ceremonies for any sites of traditional or cultural importance that will be disturbed by any Designated Project activities.*

*5.3 The Proponent shall prohibit, during all phases of the Designated Project, Designated Project employees and contractors from fishing and hunting within the Project development areas or using the Project development areas to access surrounding areas with the intent to fish or hunt, unless an employee or contractor is provided access by the Proponent for exercising Aboriginal rights.*

*5.4 The Proponent shall develop, prior to construction, and implement, during all phases of the Designated Project, a protocol for inspecting and cleaning vehicles, machinery and equipment associated with the Designated Project that have come from other worksites in order to limit the introduction and spread of weed species within the Project development areas.*

*5.5 The Proponent shall identify days of traditional or cultural importance in consultation with Indigenous groups and modify the blasting schedule for the Designated Project to minimize or avoid disturbance to current use of lands and resources by Indigenous groups, unless not technically or economically feasible.*

*5.6 The Proponent shall, when implementing measures to limit the introduction and spread of weed species within the Project development areas, use measures other than broadcast spraying when applying herbicides to mitigate effects to plant species used for traditional purposes by Indigenous groups, unless the Proponent determines that these measures are ineffective at controlling the introduction and spread of weed species.*

*5.7 The Proponent shall undertake, in consultation with Indigenous groups and relevant authorities, progressive reclamation of areas disturbed by the Designated Project. In doing so, the Proponent shall:*

*5.7.1 identify, in consultation with Indigenous groups, plant species native to the local assessment areas and plant species used for traditional purposes, to use for revegetation.*

*5.7.2 establish performance standards for reclaimed areas, including that the areas be self-sustaining, reduce establishment of weed species, restore native species assemblages, and reduce erosion of exposed soils; and*

*5.7.3 monitor reclaimed areas for a minimum of five years during post-closure or until performance standards established pursuant to condition 5.7.2 are met.*



### **3.3.12.2 Environmental Effects**

As described in Sections 15.4.2.1, 15.4.3.1 and 15.4.4.1 of the federal EIS and Section 6.10.2.3 of the provincial EAP Report, clearing and construction activities within the Gordon PDA will result in the loss or alteration of area and the restriction of access to provincial Crown lands. As indicated in Table 2.2, the proposed changes to the revised Gordon site PDA (291.23 ha) will be small, 21.84 ha greater than anticipated in the EIS. Chapter 17.0, Section 17.1.4 of the EIS identifies the potential environmental effects on current use measured by:

Change to availability of resources (physical presence, abundance, and distribution of lands and resources) through:

- Vegetation clearing associated with Project construction could result in a loss of habitat for species of traditional importance, including plants and animals relied on for traditional hunting, trapping, or plant harvesting
- Loss or alteration of fish habitat resulting from disturbance to watercourses
- Sensory disturbance from Project operation has the potential to affect the availability of habitat for species traditional importance
- An increase in hunting or fishing pressure by non-Indigenous people has the potential to affect the availability of traditionally used species
- Potential effects on wildlife, fish, and vegetative health that could affect the availability of traditional resources; and

Change to ability to access lands and resources or alteration of lands and resources for current use activities through:

- Loss, alteration, or restriction of access (including trails and travelways) to current lands and resources

Change to the integrity of cultural and spiritual sites and areas that detract from use of the area or lead to avoidance of the area due to real and perceived disturbance of the environment through:

- Project construction and operation could result in a loss or alteration of identified current use harvesting sites, habitation areas, cultural and sacred sites
- Indirect effects on the experience of Indigenous peoples which adversely alter the perceived values of current use sites or areas

Effects on current use may incorporate both tangible values (e.g., biophysical or socio-economic resources and sites) and intangible values (e.g., spiritual, cultural, artistic, aesthetic, and educational elements).



Two elements of Section 6.3.4 of the Final EIS Guidelines (Appendix 4A of the EIS) required information about intangible values:

- Cultural value or importance associated with physical and cultural heritage.
- Cultural value or importance associated with traditional uses or areas.

Change to the environment that affects cultural value or importance associated with current use through:

- Indirect effects on the experience of Indigenous peoples which adversely alter the perceived value of access to traditional resources for current use or current use sites and areas
- Change to values or attributes of the area that make it important
- Presence of worker or increased access to the area by non-Indigenous peoples
- Sensory disturbance from Project construction and operation has the potential to affect cultural transmission through the experience of traditional practices.

Intangible values relate to beliefs, perceptions, values, and qualitative experience. Given the subjective and conditional nature of intangible values, these potential effects were considered only when an Indigenous Nation identified a related concern. Potential effects on experiential values often include changes to cultural transmission, language retention, governance systems, patterns of cultural behaviour, and the sensorial experience of traditional practices. Intangible effects can only be meaningfully evaluated by individuals and communities experiencing these values in their cultural context; however, such effects are difficult to mitigate or quantitatively assess by an external party. These effects are not amenable to conventional residual effects characterizations that were developed for the assessment of objective, measurable phenomena from a Western scientific perspective. In addition, intangible effects might not realistically be mitigated in the context of an EA. Therefore, potential effects on intangible values were not subject to a full effects assessment (e.g., that includes residual effects characterization). Rather, when an Indigenous Nation identified a related concern, the subjective and experiential components of current use that could not be measured were considered narratively. Both tangible and identified intangible values contributed to the conclusion for the current use assessment.

The potential interactions between Project activities and the environment were considered for the construction, operation, and decommissioning/closure phases of the Project. The identification of Project activities and their potential interactions were based on engagement with interested parties, the professional judgment of technical specialists involved in the assessment, and a review of existing conditions. The selection of interactions is also informed by the potential effects and effects pathways for each VC as described in Section 17.1.3.



### 3.3.12.3 Summary of Mitigation Measures

Mitigation measures that are relevant to availability of traditionally harvested resources are identical to the mitigation measures recommended in the EIS (Stantec 2020a) and described in the Country Foods Plan (Version 0, January 2025). No additional mitigation measures are required in relation to this NOA/NOC. Alamos is committed to the follow-up and monitoring, and adaptive management (if and as required) that is described in the Country Foods Plan.

### 3.3.12.4 Residual Effects

Project residual environmental effects on current use are assessed in Chapter 17.0 (Section 17.4) of the EIS. In summary, with the application of mitigation, Project residual effects on current use will be adverse through construction, operation, and decommissioning/closure. Because the PDA is within the disturbed context of existing mine sites and the current use LAA includes an existing road, magnitude is anticipated to be low with indirect effects, especially sensory disturbance, extending into the current use LAA. The effects will be long term, extending beyond the Project life until the PDA returns to its pre-Project state, except for the open pits and mine rock, which will be permanent features. While the timing of construction, operation, and decommissioning/closure may affect current use dependent on seasonal resources and access, effects on land-based cultural sites and areas are not conditioned by season. Effects on current use will be reversible with decommissioning/closure, except for the open pits and mine rock, which will be permanent features.

The IAAC's IR IAAC-R2-57 for the Project directed Alamos to describe baseline conditions for each Indigenous Nation participating in the Project. Citing the *Guidelines for the Preparation of an Environmental Impact Statement Pursuant to the Canadian Environmental Assessment Act, 2012* (CEAA 2012; Federal EIS Guidelines), IAAC required baseline information for each Indigenous Nation to inform the assessment of potential Project effects to Indigenous peoples. In response to IAAC-R2-57, Alamos provided a review and summary of the record of engagement with Indigenous Nations in one document. The intention of the review and summary was to report on engagement with each Indigenous Nation, describe baseline conditions, and demonstrate how Alamos has responded to the concerns and issues raised by each Indigenous Nation. Section 10 of the response presented Indigenous Nation-specific sections that consolidated available baseline information for each Indigenous Nation engaged on the Project with respect to the current use of lands and resources for traditional purposes, Indigenous health and socioeconomic conditions, Indigenous or Treaty Rights, including intangible aspects of rights such as governance rights, and physical and cultural heritage. The intention for each Indigenous Nation-specific section was to provide a stand-alone summary of information obtained by Alamos for each Indigenous Nation and review of how it has been considered in the assessment of potential effects of the Project. The response to IAAC-R2-57 supported the original conclusions of the EIS.

The proposed alteration of 21.84 ha of the PDA described in this report is small and will not materially change the amount of habitat lost, direct or indirect effects on traditional resources or result in measurable changes to access or effects on cultural or spiritual sites and areas within the current use LAA as addressed above at the Gordon site and there is no change to EIS conclusions (Stantec 2020a).



### **3.3.13 Human Health**

The assessment of potential changes in human health encompasses consideration of potential exposures for Indigenous and non-Indigenous people including sensitive members of the population (e.g., toddlers, women of child-bearing age). The proposed alterations that may interact with the human health VC and were therefore assessed as part of this NOA/NOC, include but are not limited to changes to the PDA layout, major infrastructure, and mine production capacity that could affect releases to the atmospheric environment and surface water.

#### **3.3.13.1 Regulatory and Guideline Setting**

##### **3.3.13.1.1 Guideline Criteria**

The assessment of potential Project-related environmental effects on human health includes the consideration of Health Canada guidance for evaluating human health effects in impact assessment, namely:

- Guidance for Evaluating Human Health Effects in Impact Assessment: Human Health Risk Assessment (Health Canada 2023b)
- Guidance for Evaluating Human Health Effects in Impact Assessment: Air Quality (Health Canada 2023c)
- Guidance for Evaluation Human Health Effects in Impact Assessment: Drinking and Recreational Water Quality (Health Canada 2023d)
- Guidance for Evaluating Human Health Effects in Impact Assessment: Country Foods (Health Canada 2023e)

##### **3.3.13.1.2 IAAC Decision Statement**

As per the IAAC Decision Statement, Alamos is required to adhere to the following conditions with respect to human health:

*6.1 The Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, measures to mitigate emissions of dust and fugitive particulates within the Project development areas, taking into account the standards and criteria set out in the Canadian Council of Ministers of the Environment's Canadian Ambient Air Quality Standards and Manitoba's Ambient Air Quality Criteria. The Proponent shall implement these measures from construction through decommissioning. In doing so, the Proponent shall:*

*6.1.1 apply dust suppressants, including water, that do not contain chemicals and have the least potential for adverse environmental effects, on haul and access roads during periods when dust generation is expected or occurring, including periods of drought and high winds;*



*6.1.2 locate all stationary machinery and equipment used for processing ore indoors, where technically and economically feasible, including the crushing plant and conveyors feeding into the ore milling and processing plant;*

*6.1.3 ensure all equipment and vehicles used, including equipment and vehicles operated by third-party contractors, are serviced and maintained in accordance with the manufacturer's maintenance guidelines to meet or exceed applicable emission standards, including Tier 4 emission standards for off-road equipment with off-road diesel engines, pursuant to the Off-Road Compression-Ignition (Mobile and Stationary) and Large Spark-Ignition Engine Emission Regulations and Off-Road Compression-Ignition Engine Emission Regulations;*

*6.1.4 develop and implement policies to reduce the fuel consumption of equipment and vehicles operating in the Project development areas, including no idling and limited cold start policies; and*

*6.1.5 establish speed limits on the roads located in the Project development areas, taking into account the recommended speed limits in Environment and Climate Change Canada's Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities and by requiring and ensuring that speed limits are respected, including by installing signs indicating speed limits.*

*6.2 The Proponent shall implement measures, during all phases of the Designated Project, to avoid exceedances of the thresholds for noise and vibration, identified in Health Canada's Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise at sensitive receptors identified in the human health and ecological risk assessment in Volume 5 of the Environmental Impact Statement. In doing so, the Proponent shall:*

*6.2.1 develop, prior to construction, a protocol for receiving and addressing feedback related to the exposure to noise and vibration generated by the Designated Project. The Proponent shall provide the protocol to the Agency and Indigenous groups prior to construction and make the protocol publicly available online. As part of the protocol, the Proponent shall:*

*6.2.1.1 identify how a person may provide feedback, how the Proponent will handle the feedback received, including ranking and responding to feedback received according to the anticipated level of impacts, and how the Proponent may implement modified or additional mitigation measures(s) and/or follow-up requirement(s) in response to the feedback received;*

*6.2.1.2 record any feedback received as soon as feasible, no later than 48 hours after receiving the feedback; and*

*6.2.1.3 implement, as soon as technically feasible, any modified or additional mitigation measure and/or follow-up requirement that the Proponent deems necessary to respond to the feedback received.*



*6.3 The Proponent shall develop, prior to construction and in consultation with Indigenous groups, Health Canada, Environment and Climate Change Canada and any other relevant authorities, a follow-up program to verify the accuracy of the environmental assessment as it pertains to adverse environmental effects from the Designated Project on air quality and country foods as it relates to the health of Indigenous peoples, taking into account available Indigenous knowledge provided by Indigenous groups related to current use of lands and resources for traditional purposes. The Proponent shall implement the follow-up program during all phases of the Designated Project. As part of the implementation of the follow-up program, the Proponent shall:*

*6.3.1 identify, in consultation with Indigenous groups, the species of fish, vegetation and wildlife consumed as country foods that may be adversely affected by the Designated Project and the locations where these species shall be monitored;*

*6.3.2 monitor, beginning prior to construction and continuing through post-closure, contaminants of potential concern, including arsenic, copper, mercury, methylmercury and selenium, in the species and at the locations identified pursuant to condition 6.3.1;*

*6.3.3 monitor, throughout construction and operation, ambient air concentrations of total suspended particulates,  $PM_{10}$  and  $PM_{2.5}$  at locations identified in consultation with Indigenous groups, and upwind and downwind from the Project development areas, taking into account 24-hour and 1-hour thresholds in the Canadian Council of Ministers of the Environment's Canadian Ambient Air Quality Standards;*

*6.3.4 monitor, during all phases of the Designated Project, dust fall at locations identified in consultation with Indigenous groups, and upwind and downwind from the Project development areas;*

*6.3.5 monitor ambient air concentrations of nitrogen dioxide ( $NO_2$ ) at locations identified in consultation with Indigenous groups and relevant authorities, for at least two consecutive months during year 2 of operation, and continue to monitor during all phases of the Designated Project if the monitoring results exceed predicted levels in the atmospheric dispersion model in Volume 1 Chapter 6 of the Environmental Impact Statement;*

*6.3.6 monitor meteorological conditions (including wind speed, wind direction, temperature and relative humidity) upwind and downwind of the Project development areas, during construction and operation; and*



*6.3.7 if the monitoring results referred to in conditions 6.3.2 to 6.3.5 exceed predicted levels in the atmospheric dispersion model in Volume 1 Chapter 6 of the Environmental Impact Statement, taking into account the results of monitoring meteorological conditions pursuant to condition 6.3.6, the human health and ecological risk assessment in Volume 5 of the Environmental Impact Statement, or thresholds of the Canadian Council of Ministers of the Environment's Canadian Ambient Air Quality Standards, modify or implement additional mitigation measures pursuant to condition 2.8, and update the human health and ecological risk assessment in Volume 5 of the Environmental Impact Statement. The Proponent shall submit any updates to the human health and ecological risk assessment to the Agency and relevant authorities.*

*6.5 The Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, a follow-up program to verify the accuracy of the environmental assessment and determine the effectiveness of mitigation measures as it pertains to noise and vibration from the Designated Project on the health of Indigenous peoples. The Proponent shall implement the follow-up program during all phases of the Designated Project. As part of the follow-up program, the Proponent shall:*

*6.5.1 monitor noise and vibration levels at receptors identified in Volume 1 Chapter 7 Tables 7-7 to 7-10 of the Environmental Impact Statement, and at any other human receptors identified in consultation with Indigenous groups.*

### **3.3.13.2 Environmental Effects**

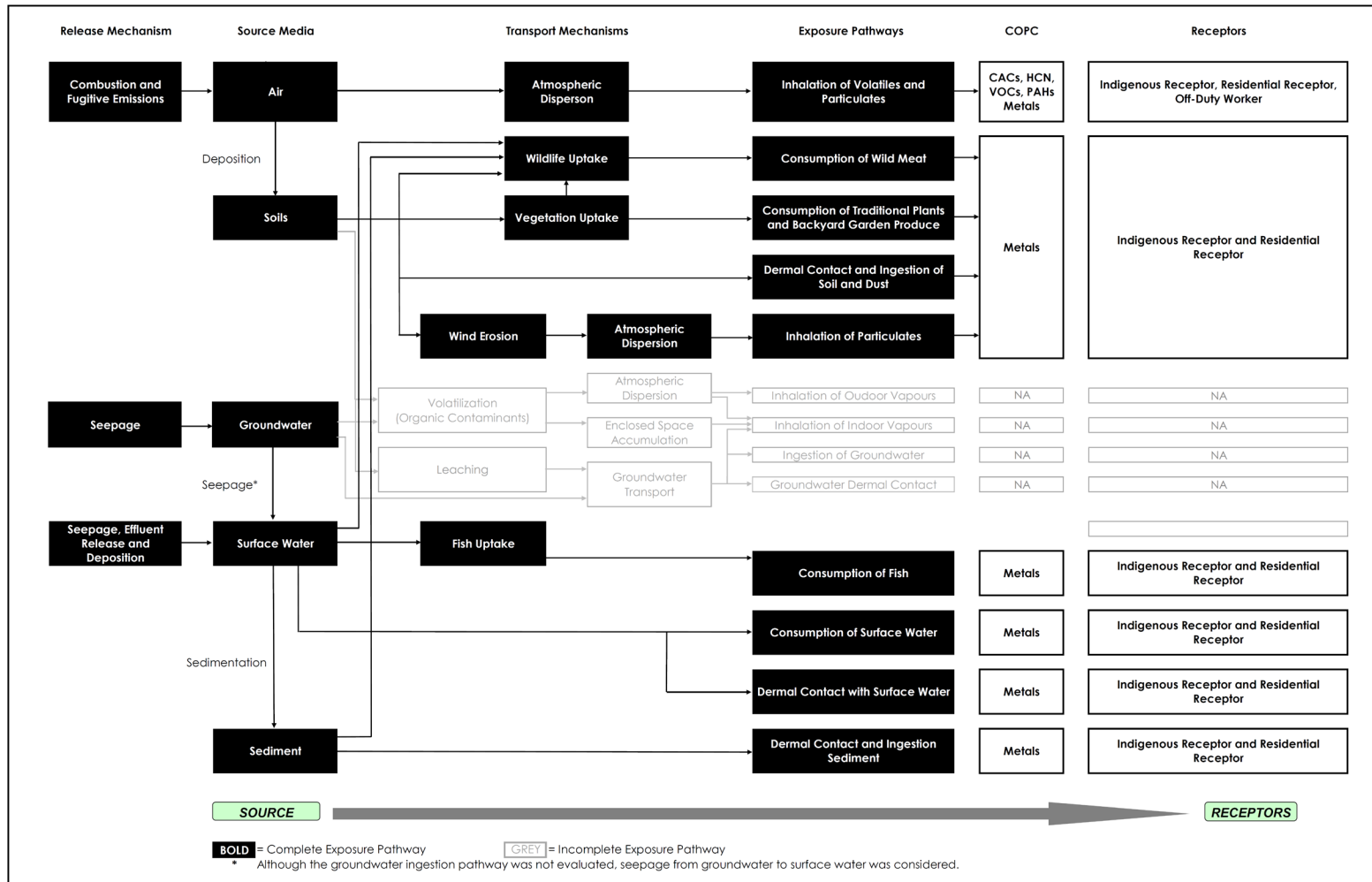
The construction, operation, and decommissioning/closure of the Project may affect the concentrations of chemicals in the air, soil, water, and biota near the Project. The EIS (Stantec 2020a) included a human health risk assessment (HHRA) to evaluate the potential effects to human health from modelled changes in environmental quality due to Project activities (EIS HHRA). The key components of the conceptual site model (CSM) for human health remain unchanged and are depicted in Figure 3.2.

Individuals most likely to be affected by changes in environmental quality include Indigenous people residing in or frequently visiting the area for food harvesting and non-Indigenous residents who may also engage in food harvesting. Chemicals of potential concern (COPCs) related to Project activities include criteria air contaminants (NO<sub>2</sub>, CO, SO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>), diesel particulate matter (DPM), HCN, volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and metals.

To assess the potential Project-related effects on human health due to the proposed alterations, the revised air and water model results were examined to understand how these new estimates of possible environmental quality changes might influence the original human health risk conclusions.



Figure 3.2 Conceptual Site Model for the Human Health Risk Assessment



### **3.3.13.2.1**      *Changes to Air Quality*

The updated assessment of Project-related effects on air quality is presented in Section 3.3.1. The update focuses on potential changes in the Project's air quality effects resulting from the 2023 design updates during the operation phase. Changes in the Project design that might affect air quality include updates to the PDA, Project layouts, mining production quantities, major mine equipment, and operation blast parameters. The air quality model for the operation phase was revised using the same approach as the EIS (Stantec 2020a) and was used to estimate concentrations of key COPCs in air at 45 locations in the Gordon region. These receptor locations were identified as part of the EIS HHRA, and represent places where receptors are likely to be present and could be exposed to emissions from the Project. The selection of receptor locations was based on considerations of land use and on input from local communities. Locations included residential developments, hunting and/or fishing camps, and potential Indigenous use locations.

The air quality effects were assessed for key COPCs (NO<sub>2</sub>, CO, SO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, and HCN) and dustfall. The maximum modelled concentrations of these key COPCs and dustfall for the Gordon site are detailed in the Summary of Air Dispersion Model Results for the Lynn Lake Gold Project Revised 2023 Mine Design memo (Appendix C) and summarized in Section 3.3.1. The other COPCs (VOCs, PAHs, metals) were not remodelled because the concentrations reported in the EIS HHRA were low (generally less than 1 µg/m<sup>3</sup> for annual average concentrations) and were typically orders of magnitude less than the health-based exposure limits. Based on these findings, it is reasonable to conclude that these other COPCs represent a negligible risk to human health via inhalation.

The COPCs NO<sub>2</sub>, CO, SO<sub>2</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> are air pollutants. Some of these COPCs are non-threshold contaminants, for which it is acknowledged that any increase in exposure may result in adverse health effects. However, the severity of effects increases incrementally with exposure concentration and exposure duration. The absence of clearly defined toxicological reference values (TRVs) for these air pollutants presents a technical challenge for health regulatory agencies and health risk practitioners on how to assess the incremental increase in health risk resulting from modelled or measured exposure concentrations. The EIS HHRA used comparisons to CAAQS to assess potential human health risks. Following updated guidance from Health Canada (2023b), inhalation exposure limits have been established based on data reviews that examine health effects from different levels of these parameters in ambient air, as summarized by Health Canada (2023b) and WHO (2021).

Based on this updated guidance, WHO ambient air quality guidelines (WHO 2021) have been adopted for this assessment as exposure limits for most of these parameters (Table 3.34). According to WHO (2021), these guidelines represent the lowest level of exposure for which there is evidence of adverse health effects. It is assumed that adverse health effects either do not occur or are minimal below this concentration level (WHO 2021).

For SO<sub>2</sub>, Health Canada (2016b) concluded that there is inadequate evidence to infer a causal relationship between long-term SO<sub>2</sub> exposure and cardiovascular effects, reproductive and development effects, total mortality, or cancer. As such, evaluation of the effects of chronic exposure to SO<sub>2</sub> was not conducted as part of the EIS (Stantec 2020a) or this assessment.



*Table 3.34 Modelled Maximum Ground-level Concentrations from Gordon Site Operation*

<b>COPC</b>	<b>Averaging Period</b>	<b>Maximum Concentration – Indigenous Receptor and Residential Receptor Locations (µg/m<sup>3</sup>)</b>	<b>Exposure Limit or TRV (µg/m<sup>3</sup>)</b>	<b>Reference</b>
NO <sub>2</sub>	1-hour <sup>a</sup>	<b>287</b>	200	(WHO 2021)
NO <sub>2</sub>	24-hour <sup>b</sup>	20	25	(WHO 2021)
NO <sub>2</sub>	Annual <sup>c</sup>	3.4	10	(WHO 2021)
CO	1-hour <sup>a</sup>	8,643	35,000	(WHO 2021)
CO	8-hour <sup>d</sup>	1,669	10,000	(WHO 2021)
SO <sub>2</sub>	24-hour <sup>b</sup>	8	40	(WHO 2021)
PM <sub>10</sub>	24-hour <sup>b</sup>	<b>60</b>	45	(WHO 2021)
PM <sub>10</sub>	Annual <sup>c</sup>	10	15	(WHO 2021)
PM <sub>2.5</sub>	24-hour <sup>b</sup>	13	15	(WHO 2021)
PM <sub>2.5</sub>	Annual <sup>c</sup>	3.7	5	(WHO 2021)
HCN	1-hour <sup>a</sup>	0.5	340	(OEHHA 2008)
HCN	Annual <sup>c</sup>	0.01	2.5	(US EPA 2010 as modified by OMECP 2015, 2022)
DPM	2-hour <sup>e</sup>	3.6	10	(Health Canada 2016a)
DPM	Annual <sup>c</sup>	0.023	5	(Health Canada 2016a)

**Notes:**

µg/m<sup>3</sup>: micrograms per cubic metre; NO<sub>2</sub>: nitrogen dioxide; CO: carbon monoxide; SO<sub>2</sub>: sulphur dioxide; PM<sub>10</sub>: particulate matter <10 microns; PM<sub>2.5</sub>: particulate matter <2.5 microns; HCN: hydrogen cyanide; DPM: diesel particulate matter; TRV: toxicological reference value

Values in **BOLD** are higher than the exposure limit or TRV

- a. The maximum 1-hour concentration after eliminating 8 highest meteorological hours in each year
- b. The 99<sup>th</sup> percentile (4<sup>th</sup> highest) of 24-hour concentrations
- c. The maximum arithmetic average concentrations over a single calendar year of all 1-hour average concentrations
- d. The maximum 8-hour average concentrations after eliminating the 1st highest meteorological hour in each year
- e. The maximum 2-hour average concentrations after eliminating the 1st highest meteorological hour in each year

The TRVs for HCN and DPM remain the same as the EIS HHRA (Table 3.34). The toxicologically relevant averaging periods for HCN are 1-hour (for short-term exposures) and average annual (for long-term exposures) while DPM are 2-hour (for short-term exposures) and average annual (for long-term exposures).

A summary of the maximum modelled concentrations for the human receptor locations (defined as the locations where Indigenous and non-Indigenous receptors are most likely to be exposed) is provided in Table 3.34.



In the EIS HHRA, the assessment of human health risks from non-carcinogenic chemicals was conducted using concentration ratios (CRs) for the inhalation pathway. The CRs were calculated by dividing the appropriate statistical interpretation of the chemical concentrations in air by the exposure limit and comparing that result with a CR of 1.0. As noted in the EIS HHRA, if the CR is less than or equal to the target benchmark ( $CR \leq 1.0$ ), human health risks related to the Project are considered to be negligible. Concentration ratios greater than one do not necessarily indicate that adverse health effects are expected to occur, or that the health risks are considered unacceptable, but it does require further evaluation of the implication of the estimated risks, including assumptions built into the toxicity and exposure assessments.

The maximum human health risks associated with inhalation exposures to the key COPCs for Indigenous Receptor and the Residential Receptor (i.e., the maximum CR values of the 45 special human receptor locations in the Gordon region) are provided in Table 3.35.

*Table 3.35 Maximum Human Health Risks Associated with Inhalation Exposures from Gordon Site Operation*

<b>COPC</b>	<b>Averaging Period</b>	<b>Maximum Concentration Ratio (CR) – Indigenous Receptor and Residential Receptor</b>
<b>NO<sub>2</sub></b>	1-hour	<b>1.4</b>
	24-hour	0.8
	Annual	0.3
<b>CO</b>	1-hour	0.2
	8-hour	0.2
<b>SO<sub>2</sub></b>	24-hour	0.2
<b>PM<sub>10</sub></b>	24-hour	<b>1.3</b>
	Annual	0.7
<b>PM<sub>2.5</sub></b>	24-hour	0.9
	Annual	0.7
<b>HCN</b>	1-hour	0.00
	Annual	0.0
<b>DPM</b>	2-hour	0.4
	Annual	0.005

Notes:

NO<sub>2</sub>: nitrogen dioxide; CO: carbon monoxide; SO<sub>2</sub>: sulphur dioxide; PM<sub>10</sub>: particulate matter <10 microns; PM<sub>2.5</sub>: particulate matter <2.5 microns; HCN: hydrogen cyanide; DPM: diesel particulate matter; CR: Concentration Ratio  
 Values in **BOLD** are higher than the benchmark of 1.0



## Nitrogen Dioxide (NO<sub>2</sub>)

As shown in Table 3.35, the CRs associated with annual average concentrations of NO<sub>2</sub> meet the benchmark of 1.0; however, the CRs associated with 1-hour concentrations are greater than the benchmark at one or more locations. Of the 45 special receptor locations, only one location (Trapping Area 2) has a concentration ratio greater than 1, as shown in Table 3.36. At this location, consideration is given to the magnitude, frequency and likelihood of exposure in the evaluation of potential human health risks.

Table 3.36 Receptor Locations where Concentration Ratios of NO<sub>2</sub> Are Greater than Benchmark (CR > 1.0)

	Concentration Ratio (CR)
<b>NO<sub>2</sub> (1-hour)</b>	
Trapping Area 2	1.4

Trapping Area 2 represents a location that people could reasonably be expected to be present; however, the frequency of exceedances is expected to be low since the maximum 98th percentile of NO<sub>2</sub> daily maximum 1-hour average concentrations at a human health location of 91.1 µg/m<sup>3</sup> (see Table 8, Appendix C) is well below the exposure level of 200 µg/m<sup>3</sup>.

As reported by the WHO (2006), in experiments, researchers found that breathing in NO<sub>2</sub> at 560 µg/m<sup>3</sup> can directly affect the lungs of people with asthma. Other studies show that people with asthma become more sensitive to NO<sub>2</sub> at levels starting from 200 µg/m<sup>3</sup> (WHO 2006). Based on these studies, if people with asthma are present at Trapping Area 2 when concentrations are greater than the exposure limit of 200 µg/m<sup>3</sup>, they may experience respiratory effects. Although the maximum 1-hour concentration at this location is greater than the exposure limit, maximum modelled concentrations for 24-hour and annual average exposures meet the exposure limits. The WHO notes that when the air quality meets the long-term exposure limits, the health burden related to a few incidents above the short-term exposure limit corresponds to a very small fraction of the total air pollution-related burden (WHO 2021).

Based on the results, it is reasonable to conclude that occasional exceedances above the 1-hour NO<sub>2</sub> exposure limits do not represent an unacceptable human health risk for people who may be in the area. These findings are consistent with the EIS HHRA.

Isopleths of the 1-hour (98<sup>th</sup> percentile), frequency of exceedance of the 1-hour (98<sup>th</sup> percentile) concentrations relative to the CAAQS, 24-hour (98<sup>th</sup> percentile) and annual concentrations of NO<sub>2</sub> are provided on Map 2, Map 3, Map 4 and Map 5, respectively, in Appendix C.



### Carbon Monoxide (CO)

As shown in Table 3.35, the concentration ratios associated with 1-hour CO concentrations meet the benchmark of 1.0 at the human health receptor locations. Because adverse health effects are not expected to occur or are minimal below the exposure limit, there are no unacceptable risks to human receptors expected from inhalation of CO.

Isopleths of the 1-hour (9<sup>th</sup> highest) concentrations of CO are provided on Map 6, Appendix C.

### Sulphur Dioxide (SO<sub>2</sub>)

As shown in Table 3.35, the concentration ratios associated with 24-hour SO<sub>2</sub> concentrations meet the benchmark of 1.0 at the human health receptor locations. Because adverse health effects are not expected to occur or are minimal below the exposure limit, there are no unacceptable risks to human receptors expected from inhalation of SO<sub>2</sub>.

Isopleths of the 24-hour (98<sup>th</sup> percentile) concentrations of SO<sub>2</sub> are provided on Map 11, Appendix C.

### Particulate Matter (PM<sub>10</sub>, PM<sub>2.5</sub>)

As shown in Table 3.35, the CRs associated with annual exposures to particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) and 24-hour exposure to PM<sub>2.5</sub> meet the benchmark of 1.0; however, the maximum CR associated with 24-hour concentrations of PM<sub>10</sub> is greater than the benchmark of 1.0 at one or more locations. These locations are limited to two human receptor locations, as shown in Table 3.37. At these locations, consideration is given to the magnitude, frequency and likelihood of exposure in the evaluation of potential human health risks.

*Table 3.37 Receptor Locations where Concentration Ratios of Particulate Matter Are Greater than Benchmark (CR > 1.0)*

	Concentration Ratio (CR)
<b>PM<sub>10</sub> (24-hour)</b>	
Trapping Area 2	1.3
Trapping Area 3	1.1

The two trapping areas represent locations that people could reasonably be expected to be present. The WHO (2006) suggests that when evaluating particulate matter, the WHO guidelines for annual average takes precedence over the 24-hour average since, at low levels, there is less concern about remaining episodic excursions. As the annual average concentration of PM<sub>10</sub> at these locations meet the exposure limit, and concentrations of both 24-hour and annual average PM<sub>2.5</sub> meet the exposure limit at the 45 human health receptor locations evaluated, there are no unacceptable risks to Indigenous Receptors or Residential Receptors from inhalation of particulate matter.



Isopleths of the 24-hour (98<sup>th</sup> percentile) concentrations of PM<sub>10</sub> are provided on Map 19, Appendix C while isopleths of the 24-hour (98<sup>th</sup> percentile) and annual concentrations of PM<sub>2.5</sub> are provided on Map 21 and Map 22, respectively, in Appendix C.

### **Hydrogen Cyanide (HCN)**

As shown in Table 3.35, the concentration ratios associated with both short-term and long-term HCN concentrations meet the benchmark of 1.0 at the human receptor locations. These results indicate a negligible risk to human health from inhalation of HCN.

Isopleths of the 1-hour and annual concentrations of HCN are provided on Map 13 and Map 15, respectively, in Appendix C.

### **Diesel Particulate Matter (DPM)**

As shown in Table 3.35, the concentration ratios associated with both short-term and long-term DPM concentrations meet the benchmark at the human receptor locations. These results indicate a negligible risk to Indigenous Receptors and Residential Receptors from inhalation of DPM.

### **Dustfall**

Although dustfall itself is not considered a COPC, it serves as an indicator of possible deposition from air to soil. As depicted in Figure 3.2, this deposition can affect soil quality and result in human exposure through direct dermal contact and ingestion of soil and dust. Additionally, exposure can occur indirectly via wind erosion and subsequent inhalation of particulates from soil, and uptake by vegetation and wildlife, subsequently leading to the consumption of traditional plants, backyard garden produce, and wild meat.

The maximum predicted dustfall values are 33% to 36% higher than those reported in the EIS; however, the maximum predicted annual rates of dustfall at human health receptor locations are anticipated to increase by 13% (refer to Table 8, Appendix C). Isopleths of maximum modelled annual average dustfall depositions are provided on Map 24, Appendix C.

The EIS HHRA concluded that project-related changes to these media posed a negligible risk to human health. Specifically:

- The calculated non-cancer risks from direct exposure to COPCs in soil were well below the threshold of 0.2, with the maximum estimated risk for arsenic showing a minimal increase from 0.018 (Baseline) to 0.019 (Future Case).
- The estimated cancer risk from arsenic in soil was 7.4E-08, substantially below the threshold of 1E-05.
- Project-related health risks from ingestion of traditional plants, garden produce, and wild meat were also negligible, with no substantive difference between Baseline and Future Cases.



Even if the 13% increase in dustfall were to proportionally increase COPC concentrations in soil and biota, the resulting Project-related health risks would remain negligible. Therefore, the updated design is not expected to materially alter the original HHRA conclusions that Project-related changes to soil, terrestrial vegetation, and terrestrial wildlife represent a negligible risk to human health.

### **3.3.13.2.2      *Changes to Surface Water Quality***

The updated assessment of Project-related effects to surface water quality are presented in Section 3.3.4. The updated NOA/NOC water quality model (the updated model) used the same assessment nodes and approach as the EIS surface water quality model (EIS model) with some slight modifications, as described in Section 3.3.4. Within the EIS HHRA, potential pathways related to surface water included direct pathways (consumption of surface water, direct contact with surface water) and indirect pathways (consumption of fish).

Although the CSM (Figure 3.2) identifies that humans could come in direct contact with sediment, the EIS HHRA concluded that risks related to sediment contact are considered minor. No public beaches or areas of shoreline where high intensity activities occur were identified in the Gordon region. Locations where humans could be exposed to sediment are considered remote and exposure would be infrequent. Consistent with the EIS HHRA, exposures associated with direct contact with sediment are not assessed further.

The following provides an assessment of the human health risks associated with the surface water-related pathways based on the updated model results.

#### **Ingestion and Dermal Contact with Surface Water**

In certain instances, individuals might consume water directly from local lakes. However, information collected through various engagements suggest that such occurrences are rare, as people generally do not source their drinking water directly from these lakes. Consistent with the EIS HHRA, the updated modelled concentrations of metals in lakes in the Gordon region were based on the maximum 12-month running average surface water concentrations for the Expected case for waterbodies in the surface water LAA for the Gordon site. These concentrations were compared with Canadian drinking water quality guidelines (Table 3.38). Preference was given to guidelines from Health Canada (2025); in the absence of Health Canada guidelines, guidelines from other jurisdictions (e.g., Ontario) were selected. Modelled concentrations of metals in the applicable lakes in the Gordon region were less than the applicable guidelines, except for manganese. The updated Baseline and Project Case concentrations of manganese is higher than the maximum acceptable concentration of 0.12 mg/L for potable water supplies.



Table 3.38 Comparison of Surface Water Concentration to Drinking Water Guidelines

COPC	Units	Updated Concentrations – Gordon Region		Drinking Water Quality Guideline	Source
		Baseline Case	Project Case		
Antimony	mg/L	0.000095	0.00030	0.006	Health Canada (2025)
Arsenic	mg/L	0.00050	0.00105	0.01	Health Canada (2025)
Barium	mg/L	0.015	0.020	2	Health Canada (2025)
Beryllium	mg/L	0.00009	0.00011	0.004	OMECP (2011)
Cadmium	mg/L	4.4E-06	5.9E-06	0.007	Health Canada (2025)
Chromium	mg/L	0.00015	0.00016	0.05	Health Canada (2025)
Cobalt	mg/L	0.00012	0.00015	0.003	OMECP (2011)
Copper	mg/L	0.00038	0.00059	2	Health Canada (2025)
Lead	mg/L	6.4E-05	7.5E-05	0.005	Health Canada (2025)
Manganese	mg/L	<b>0.17</b>	<b>0.29</b>	0.12	Health Canada (2025)
Mercury	mg/L	1.4E-06	1.7E-06	0.001	Health Canada (2025)
Molybdenum	mg/L	0.0005	0.0014	0.07	OMECP (2011)
Nickel	mg/L	0.00032	0.00044	0.1	OMECP (2011)
Selenium	mg/L	0.00006	0.00011	0.05	Health Canada (2025)
Silver	mg/L	6.5E-06	7.8E-06	0.01	OMECP (2011)
Strontium	mg/L	0.054	0.078	7	Health Canada (2025)
Thallium	mg/L	4.0E-05	5.1E-05	0.002	OMECP (2011)
Uranium	mg/L	0.00010	0.00066	0.02	Health Canada (2025)
Vanadium	mg/L	0.00020	0.00022	0.0062	OMECP (2011)
Zinc	mg/L	0.0014	0.0019	5	Health Canada (2025)

Notes:

Values in **BOLD** are higher than the drinking water quality guideline

As noted by Health Canada (2019), manganese occurs naturally in the environment and is an essential element for human health; however, studies suggest an association between exposure to manganese in drinking water and neurological effects in children. The drinking water guideline of 0.12 mg/L was derived by Health Canada to be protective of bottle-fed infants (0 to 6 months of age) consuming 0.75 litres of water a day. As noted in the EIS HHRA, the lakes in the Gordon region are not used as a potable water supply and, based on information gathered through engagement, people do not obtain drinking water directly from the lakes within the surface water LAA. As a result, consumption of water from the lakes is expected to be rare and use for infant formula very unlikely. Based on these findings, it is reasonable to conclude that the presence of manganese in the lake water, under existing (baseline) conditions and for the 2023 Project design, do not represent an unacceptable human health risk for people who might consume water directly from local lakes.



## **Consumption of Fish**

The EIS HHRA assumed that people in the Gordon region obtain a portion of their local fish from Swede Lake. Baseline metal concentrations in fish were based on 33 muscle tissue samples collected from Swede Lake in 2015 and 2016 and 95% upper confidence limit of the mean (UCLM) concentrations were adopted as the baseline concentration for each metal. Project-related changes in fish tissue concentrations were estimated using the predictive concentrations from surface water modelling, specifically, the maximum 12-month running average surface water concentrations in Swede Lake for the Expected case.

The EIS HHRA determined that the calculated non-cancer health risk for methyl mercury in fish for the Project Case (hazard quotient [HQ] of 0.38) was greater than the target benchmark of 0.2 but was not substantially different than the Baseline Case (HQ of 0.38). The non-cancer health risks for all other COPCs via consumption of fish were less than the target benchmark of 0.2 (ranging from 0.000011 for chromium to 0.067 for thallium). Arsenic was the only COPC in fish that is considered a carcinogen. The EIS HHRA determined that the calculated carcinogenic risk associated with ingestion of fish was  $8.5E-06$  (or 0.85 in 100,000), which is below the target threshold of  $1E-05$  (or 1 in 100,000). As a result, the EIS HHRA concluded that the modelled Project-related changes represent a negligible change in health risk.

Because uptake to fish tissues is modelled as being directly proportional to modelled changes in surface water concentrations, it is reasonable to assume that:

- If the updated model concentrations (for the maximum 12-month running average surface water concentrations in Swede Lake for the Expected case) are like or less than those in the EIS HHRA, there would be no changes to the HHRA conclusions.
- The percent difference between the modelled concentrations used in the EIS HHRA and the updated model concentrations are an indication of the potential increase in risk to human health via ingestion of fish.

As indicated in Table 3.39, the updated model concentration of barium, chromium, vanadium, and zinc in surface water are less than the concentrations assessed in the EIS HHRA, indicating that there would be no change to the EIS HHRA conclusions. The updated model concentrations for other COPCs ranged from a 1% increase (strontium) to a 228% increase (manganese). However, even if health risks for these other COPCs were to increase by 228%, the non-cancer health risks from the consumption of fish would remain less than the target of 0.2, except for methyl mercury.

The EIS HHRA found that the Project would not substantially affect the methyl mercury risk from fish consumption, with mercury surface water concentrations of  $9.9E-07$  mg/L for both baseline and EIS model cases. The updated baseline and updated modelled mercury concentration for Swede Lake are both  $1.19E-06$  mg/L, suggesting that exposure may be higher from the updated results but the conclusion that the risk from the Project is not substantially different from the Baseline Case remains unchanged.



*Table 3.39 Changes in Model Concentrations at Swede Lake – Project Case*

<b>COPC</b>	<b>Units</b>	<b>EIS Model Concentrations</b>	<b>Updated Model Concentration</b>	<b>Increase in Concentration (%)</b>
Antimony	mg/L	2.18E-04	3.28E-04	50%
Arsenic	mg/L	7.07E-04	9.37E-04	33%
Barium	mg/L	1.68E-02	1.64E-02	-2%
Beryllium	mg/L	9.28E-05	1.01E-04	8%
Cadmium	mg/L	4.91E-06	5.47E-06	11%
Chromium	mg/L	1.68E-04	1.58E-04	-6%
Cobalt	mg/L	8.77E-05	1.04E-04	19%
Copper	mg/L	5.78E-04	7.25E-04	25%
Lead	mg/L	6.07E-05	6.57E-05	8%
Manganese	mg/L	3.26E-02	1.07E-01	228%
Mercury	mg/L	9.92E-07	1.19E-06	20%
Molybdenum	mg/L	1.18E-03	1.49E-03	26%
Nickel	mg/L	2.74E-04	3.63E-04	33%
Selenium	mg/L	7.22E-05	1.13E-04	56%
Silver	mg/L	6.24E-06	7.67E-06	23%
Strontium	mg/L	7.34E-02	7.42E-02	1%
Thallium	mg/L	3.89E-05	4.75E-05	22%
Uranium	mg/L	1.95E-04	4.41E-04	126%
Vanadium	mg/L	2.45E-04	2.26E-04	-8%
Zinc	mg/L	3.53E-03	3.23E-03	-8%

As noted, arsenic was the only COPC in fish that is considered a carcinogen. A 33% increase in surface water concentrations of arsenic could result in a cancer risk of 1.1E-05, which is slightly above the target of 1E-05. When estimating exposure to arsenic in fish tissue, it was assumed that the arsenic was present only in its inorganic form, which is more toxic to humans. This assumption was made even though fish tissues typically contain organic arsenic compounds (e.g., arsenocholine and arsenobetaine), which have been determined to be relatively non-toxic (Health Canada 2006). In a study conducted by the Canadian Food Inspection Agency in 2018/2019 (CFIA 2019), total and inorganic arsenic concentrations were measured in 92 domestic fish samples from local and regional retail locations from six cities across Canada. The study found that inorganic arsenic made up a small portion (approximately 0.1%) of the arsenic analyzed in fish (the remaining being organic arsenic). As a result, the slightly higher estimated cancer risk (1.1E-05 versus the previous 0.85E-05 estimated in the EIS HHRA) does not affect the conclusion that consumption of fish from Swede Lake represents a negligible risk to human health but does highlight the importance of the fish tissue monitoring program.



### **3.3.13.3 Summary of Mitigation Measures**

The mitigation measures to reduce environmental effects of the Project (e.g., as described in Sections 3.3.1 and 3.3.4) also serve to address potential human health effects through the potential exposure pathways previously described. Considering the current wind conditions and measured ambient concentration levels, suitable and effective mitigation options will be implemented to reduce Project emissions to air. This approach to managing emissions is referred to as “adaptive management”. Since emissions of NO<sub>2</sub> and PM<sub>10</sub> are dependent on the types of vehicles and equipment used, as well as how and when they are used, adaptive management is considered an effective means to mitigate exposures for people who may be present at Trapping Area 2 and Trapping Area 3. Additionally, monitoring of surface water quality and country foods will be conducted to provide an understanding of Project-related effects to environmental media of importance of human health and to identify if additional mitigation measures are needed.

### **3.3.13.4 Residual Effects**

In comparison with the EIS results, the air quality effects from the Project activities slightly increased at some receptor locations. These changes were evaluated in the context of newer guidance and health-based targets (Health Canada 2023b and 2023c; WHO 2021). In instances where the updated modelled concentrations are above the current guidelines, the associated risks were generally limited to short-term exposures (1-hour, 24-hour), with a low frequency of exposures to concentrations above the guidelines.

Based on the 2023 design, dustfall levels at some human receptor locations are expected to be higher than assessed in the EIS; however, even if the predicted 13% increase in dustfall were to proportionally increase the COPCs concentrations in soil and biota, the resulting Project-related health risks would remain negligible.

The updated assessment of Project-related effects to surface water quality resulted in higher modelled concentrations of some metals within the Gordon region, for both baseline and modelled cases. Concentrations are expected to meet drinking water guidelines except for manganese for both Baseline and modelled Project Case. However, as the lakes are not used as a potable water supply, the occasional consumption of the lake water does not represent an unacceptable human health risk.

Similarly, in comparison with the EIS results, surface water quality resulted in higher modelled concentrations of some metals in Swede Lake, where people may fish. The 2023 Project design is not expected to affect the conclusion that consumption of fish from Swede Lake represents a negligible risk to human health, but the modelling does highlight the importance of the fish tissue monitoring program.

After applying the mitigation measures, including adaptive management for air emissions, the proposed alterations at the Gordon site will not change the characterization of Project residual effects on human health and there is no change to the EIS conclusions (Stantec 2020a).



### **3.3.14 Indigenous Peoples**

The section provides further consideration of effects to Indigenous or Treaty Rights (Stantec 2020a). The proposed alterations that may interact with the Indigenous peoples VC and were therefore assessed as part of this NOA/NOC, include but are not limited to the PDA layout.

#### **3.3.14.1 Regulatory and Guideline Setting**

##### **3.3.14.1.1 Guideline Criteria**

The assessment of potential Project-related environmental effects on Indigenous health conditions, Indigenous socio-economic conditions, and Indigenous physical and cultural heritage, current use of lands and resources for traditional purposes (current use) and Indigenous or Treaty Rights includes the consideration of the following federal and provincial legislation:

Section 6.1.9 of the Final EIS Guidelines) (Appendix 4A of the EIS) required assessment of Project effects to health, social conditions, and physical and cultural heritage of Indigenous peoples as required by CEAA 2012 Paragraph 5(1)(c).

The Government of Manitoba *Northern Affairs Act* (1966 most recent revision in 2006) coordinates interprovincial and interjurisdictional initiatives, policies, and strategies affecting northern Manitoba.

Manitoba's Department of Indigenous and Northern Relations (MINR) interim provincial policy for Crown consultation (MINR 2019) recognizes Manitoba's duty to consult with First Nations, Métis Nations, and other Indigenous Nations when any proposed action has the potential to adversely affect the exercise of Indigenous or Treaty Rights.

In Manitoba, public health is the responsibility of the Manitoba Ministry of Health, Seniors and Active Living, in accordance with *The Public Health Act*. Health Canada's mandate includes the protection of human health from exposure to chemicals in the environment.

##### **3.3.14.1.2 IAAC Decision Statement**

As per the IAAC Decision Statement, Alamos is required to adhere to the following conditions with respect to health and Socio-economic conditions of Indigenous peoples:

*6.1 The Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, measures to mitigate emissions of dust and fugitive particulates within the Project development areas, taking into account the standards and criteria set out in the Canadian Council of Ministers of the Environment's Canadian Ambient Air Quality Standards and Manitoba's Ambient Air Quality Criteria. The Proponent shall implement these measures from construction through decommissioning. In doing so, the Proponent shall:*



*6.1.1 apply dust suppressants, including water, that do not contain chemicals and have the least potential for adverse environmental effects, on haul and access roads during periods when dust generation is expected or occurring, including periods of drought and high winds;*

*6.1.2 locate all stationary machinery and equipment used for processing ore indoors, where technically and economically feasible, including the crushing plant and conveyors feeding into the ore milling and processing plant;*

*6.1.3 ensure all equipment and vehicles used, including equipment and vehicles operated by third-party contractors, are serviced and maintained in accordance with the manufacturer's maintenance guidelines to meet or exceed applicable emission standards, including Tier 4 emission standards for off-road equipment with off-road diesel engines, pursuant to the Off-Road Compression-Ignition (Mobile and Stationary) and Large Spark-Ignition Engine Emission Regulations and Off-Road Compression-Ignition Engine Emission Regulations;*

*6.1.4 develop and implement policies to reduce the fuel consumption of equipment and vehicles operating in the Project development areas, including no idling and limited cold start policies; and*

*6.1.5 establish speed limits on the roads located in the Project development areas, taking into account the recommended speed limits in Environment and Climate Change Canada's Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities and by requiring and ensuring that speed limits are respected, including by installing signs indicating speed limits.*

*6.2 The Proponent shall implement measures, during all phases of the Designated Project, to avoid exceedances of the thresholds for noise and vibration, identified in Health Canada's Guidance for Evaluating Human Health Impacts in Environmental Assessment: Noise at sensitive receptors identified in the human health and ecological risk assessment in Volume 5 of the Environmental Impact Statement. In doing so, the Proponent shall:*

*6.2.1 develop, prior to construction, a protocol for receiving and addressing feedback related to the exposure to noise and vibration generated by the Designated Project. The Proponent shall provide the protocol to the Agency and Indigenous groups prior to construction and make the protocol publicly available online. As part of the protocol, the Proponent shall:*

*6.2.1.1 identify how a person may provide feedback, how the Proponent will handle the feedback received, including ranking and responding to feedback received according to the anticipated level of impacts, and how the Proponent may implement modified or additional mitigation measures(s) and/or follow-up requirement(s) in response to the feedback received;*



*6.2.1.2 record any feedback received as soon as feasible, no later than 48 hours after receiving the feedback; and*

*6.2.1.3 implement, as soon as technically feasible, any modified or additional mitigation measure and/or follow-up requirement that the Proponent deems necessary to respond to the feedback received.*

*6.3 The Proponent shall develop, prior to construction and in consultation with Indigenous groups, Health Canada, Environment and Climate Change Canada and any other relevant authorities, a follow-up program to verify the accuracy of the environmental assessment as it pertains to adverse environmental effects from the Designated Project on air quality and country foods as it relates to the health of Indigenous peoples, taking into account available Indigenous knowledge provided by Indigenous groups related to current use of lands and resources for traditional purposes. The Proponent shall implement the follow-up program during all phases of the Designated Project. As part of the implementation of the follow-up program, the Proponent shall:*

*6.3.1 identify, in consultation with Indigenous groups, the species of fish, vegetation and wildlife consumed as country foods that may be adversely affected by the Designated Project and the locations where these species shall be monitored;*

*6.3.2 monitor, beginning prior to construction and continuing through post-closure, contaminants of potential concern, including arsenic, copper, mercury, methylmercury and selenium, in the species and at the locations identified pursuant to condition 6.3.1;*

*6.3.3 monitor, throughout construction and operation, ambient air concentrations of total suspended particulates, PM<sub>10</sub> and PM<sub>2.5</sub> at locations identified in consultation with Indigenous groups, and upwind and downwind from the Project development areas, taking into account 24-hour and 1-hour thresholds in the Canadian Council of Ministers of the Environment's Canadian Ambient Air Quality Standards;*

*6.3.4 monitor, during all phases of the Designated Project, dust fall at locations identified in consultation with Indigenous groups, and upwind and downwind from the Project development areas;*

*6.3.5 monitor ambient air concentrations of nitrogen dioxide (NO<sub>2</sub>) at locations identified in consultation with Indigenous groups and relevant authorities, for at least two consecutive months during year 2 of operation, and continue to monitor during all phases of the Designated Project if the monitoring results exceed predicted levels in the atmospheric dispersion model in Volume 1 Chapter 6 of the Environmental Impact Statement;*

*6.3.6 monitor meteorological conditions (including wind speed, wind direction, temperature and relative humidity) upwind and downwind of the Project development areas, during construction and operation; and*



*6.3.7 if the monitoring results referred to in conditions 6.3.2 to 6.3.5 exceed predicted levels in the atmospheric dispersion model in Volume 1 Chapter 6 of the Environmental Impact Statement, taking into account the results of monitoring meteorological conditions pursuant to condition 6.3.6, the human health and ecological risk assessment in Volume 5 of the Environmental Impact Statement, or thresholds of the Canadian Council of Ministers of the Environment's Canadian Ambient Air Quality Standards, modify or implement additional mitigation measures pursuant to condition 2.8, and update the human health and ecological risk assessment in Volume 5 of the Environmental Impact Statement. The Proponent shall submit any updates to the human health and ecological risk assessment to the Agency and relevant authorities.*

*6.4 The Proponent shall develop, in consultation with Indigenous groups, and implement a follow-up program to verify the accuracy of the environmental assessment and determine the effectiveness of the mitigation measures as it pertains to adverse effects on the socio-economic conditions of Indigenous peoples from changes to the environment caused by the Designated Project. The Proponent shall solicit and incorporate additional information provided by Indigenous groups when monitoring these effects. The Proponent shall implement the follow-up program during all phases of the Designated Project. As part of the follow-up program, the Proponent shall:*

*6.4.1 monitor, based on the information provided by Indigenous groups that are trapping, harvesting, fishing or hunting within the local assessment areas, including Marcel Colomb First Nation and holders of registered trap lines:*

*6.4.1.1 the ability of trappers, harvesters, fishers and hunters to relocate, if required to do so, to new trapping, harvesting, fishing and hunting sites used for traditional purposes, including registered trap lines;*

*6.4.1.2 the quantity and quality of resources obtained through trapping, harvesting, fishing and hunting activities; and*

*6.4.1.3 the changes in socio-economic conditions of Indigenous groups, including any additional financial costs incurred by Marcel Colomb First Nation and holders of registered trap lines, as they relate to the relocation of trapping, harvesting, fishing and hunting activities.*



*6.5 The Proponent shall develop, prior to construction and in consultation with Indigenous groups and relevant authorities, a follow-up program to verify the accuracy of the environmental assessment and determine the effectiveness of mitigation measures as it pertains to noise and vibration from the Designated Project on the health of Indigenous peoples. The Proponent shall implement the follow-up program during all phases of the Designated Project. As part of the follow-up program, the Proponent shall:*

*6.5.1 monitor noise and vibration levels at receptors identified in Volume 1 Chapter 7 Tables 7-7 to 7-10 of the Environmental Impact Statement, and at any other human receptors identified in consultation with Indigenous groups.*

Condition 7.1 regarding Physical and Cultural Heritage is described above in Section 3.3.11 heritage resources.

*7.2 The Proponent shall develop, prior to construction and in consultation with Indigenous groups, nation-specific measures to address the effects described in the Environmental Assessment Report caused by the Designated Project on cultural heritage, including tangible and intangible losses to culture. The Proponent shall implement the measures during all phases of the Designated Project and submit these measures to the Agency prior to implementing them, while ensuring that confidential information is protected. The Proponent shall report its discussions with Indigenous groups as part of the annual report referred to in condition 2.10, including the level of satisfaction of Indigenous groups with the implementation of the measures. As part of the measures, the Proponent shall:*

*7.2.1 develop and/or contribute to Indigenous-led program(s) and/or initiative(s) to preserve and enhance cultural heritage, including the transfer of intergenerational knowledge; and*

*7.2.2 develop, in collaboration with Indigenous groups, cultural awareness training for all employees associated with the Designated Project, including the cultural setting and providing an understanding of cultural practices, protocols and considerations.*

Condition 5, current use of lands and resources for traditional purposes is described in Section 3.3.12 above.



### 3.3.14.2 Environmental Effects

#### 3.3.14.2.1 Change to Indigenous Health Conditions

The effect pathways carried forward for Indigenous health conditions were addressed in the current use (Chapter 17.0) and human health (Chapter 18.0) assessments of the EIS. These are tabulated below with reference to relevant section of the EIS, the potential effect, and the effect pathways.

Table 3.40 Indigenous Health Conditions Effect Pathways

Valued Component	Potential effect assessed in related VC	Effect pathways carried forward for Indigenous health conditions
Current Use (Chapter 17.0, Sections 17.4.2- 17.4.4)	Change in availability of lands and resources currently used for traditional purposes	Project construction and operation have the potential to affect Indigenous health conditions through a reduction in the quantity of country foods to harvest.
	Change in access and resources currently used for traditional purposes	Project construction and operation have the potential to affect Indigenous health conditions through a change in access to country foods to harvest.
	Change to traditional cultural and spiritual sites and areas	Construction and operation activities have the potential to affect Indigenous health conditions through a reduction in the value and perceived quality of country foods.
Human Health (Chapter 18.0, Section 18.4.2)	Change to human health	Construction and operation of the Project may affect Indigenous health conditions through changes in air quality, changes in noise, changes in water quality, and country foods.

#### 3.3.14.2.2 Change to Indigenous Socio-Economic Conditions

The effect pathways carried forward for Indigenous socio-economic conditions were addressed in the assessments of labour and economy (Chapter 13.0), community services, infrastructure, and wellbeing (Chapter 14.0), and land and resource use (Chapter 15.0) assessments of the EIS. These are tabulated below with reference to relevant section of the EIS, the potential effect, and the effect pathways.

