Tenas Project

Section 13.0 Management Plans
Chapter 15 Reclamation and Closure Plan
Appendix 13.15-A Reclamation and Closure Plan for Lands within the Agricultural Land Reserve

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VERSION 1.0

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Tenas Project

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Appendix 13.15-A Reclamation and Closure Plan for Lands within the Agricultural Land Reserve

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

ABBREVIATIONS AND ACRONYMS

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
ALC	Agricultural Land Commission
ALCA	*Agricultural Land Commission Act,* SBC 2002, c 36 (Government of British Columbia [GovBC] 2002)
ALR	Agricultural Land Reserve
AQMP	Air Quality Management Plan (S13.0-C2)
Ardea	Ardea Biological Consulting
AWSC	available water-storage capacity
BC	British Columbia
BCCL	Bulkley Valley Collieries Ltd.
BC MOE	British Columbia Ministry of Environment
CLI	Canada Land Inventory
CCME	Canadian Council of Ministers of the Environment
CEMP	Construction Environmental Management Plan (S13.0-C4)
CMSTHP	Chemicals and Materials, Storage, Transfer, and Handling Plan (S13.0-C3)
CNR	Canadian National Railway
Code	Health, Safety and Reclamation Code for Mines in British Columbia ((British Columbia Ministry of Energy, Mines and Low Carbon Innovation [BC MEMLI] 2021) (Code)
EAC	Environmental Assessment Certificate
EC	Environmental Coordinator
EMP	Explosives Management Plan (S13.0-C1)
EDI	Environmental Dynamics Inc.
EMS	Environmental Management System (S13.0-C1)
FMSCP	Fuel Management and Spill Control Plan
IAPP	Invasive Alien Plant Program
IEG	Integral Ecology Group
JAIR	Joint Application Information Requirements for *Mines Act* and *Environmental Management Act* Permits (British Columbia Ministry of Energy, Mines and Petroleum Resources [BC MEMPR] and British Columbia Ministry of Environment and Climate Change Strategy [BC MECCS] 2019).
ML/ARD	metal leaching/acid rock drainage
MWMP	Minesite Water Management Plan (S13.0-C11)
NFUA	Provincial Agricultural Land Commission-Applicant Submission: Non-Farm Use
PAG	potentially acid generating
PAMP	Public Access Management Plan (S13.0-C14)
pH	parts hydrogen

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
POC/COC	Parameters of Concern/Contaminants of Concern
POPC/COPC	Parameters of Potential Concern/Contaminants of Potential Concern
Project	Tenas Project
PSD	particle-size distribution
PSP	permanent sample plot
QP	qualified professional
RCP	Reclamation and Closure Plan (S13.0-C15)
RCPLALR	Reclamation and Closure Plan for Lands within the Agricultural Land Reserve
RDBN	Regional District of Bulkley-Nechako
SEPSCP	Surface Erosion and Sediment Control Plan (S13.0-C17)
SMP	Soil Management Plan
SMU	soil map unit
TAC	Tenas Access Corridor
TARP	Trigger Action Response Plan
TCL	Telkwa Coal Limited
TN	total nitrogen
TSS	total suspended solids
VMP	Vegetation Management Plan (S13.0-C18)
VRMP	Visual Resources Management Plan (S13.0-C19)
WMP	Wildlife Management Plan (S13.0-C21)

UNITS OF MEASURE

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
%	percent
cm	centimetre
ha	hectare
kg	kilogram
km	kilometre
m	metre
mm	millimetre

EXECUTIVE SUMMARY

Telkwa Coal Limited (TCL) is proposing to develop the Tenas Project (Project), which is an open-pit surface metallurgical coal mine with an anticipated mine life of approximately 26.5 years and a footprint of 830.1 hectares (ha). The northeastern portion of the Project Footprint (49.1 ha, consisting of approximately 2.6 percent [%] of the total Project Area or 5.9% of the Project footprint) falls within areas designated as Agricultural Land Reserve (ALR) by the British Columbia (BC) government. The potential effects of the Project on agricultural production, operations, and infrastructure are expected to be both minimal and temporary, with approximately only 30.0 ha of the 49.1 ha of the total Project Area coinciding with current actual agricultural land use such as crops and pasture versus forested and lands. Following the Project's Operation Phase, these areas will be decommissioned and reclaimed to return to an average agricultural capability at lease equal to the pre-development landscape's agricultural capability, thus supporting future agricultural activities.

The purpose of this **Reclamation and Closure Plan for Lands within the Agricultural Land Reserve (RCPLALR)** is to provide guidance, prescriptions, and best practices to avoid or minimize potential effects of the Project on the existing vegetation and ecosystems within the ALR, and to ensure that efforts to mitigate the Project's effects are effective and remain so throughout the life of the Project including the Post-closure Phase. To accomplish this, Project reclamation planning has been integrated with overall mine, construction, and Project Development planning and design. The overarching objective of this RCPLALR is to reclaim ecosystems within the ALR after Project development to be like those that would be present if the Project did not occur. As such, TCL is committed to achieving an average agricultural capability at lease equal to the pre-development landscape's agricultural capability, thus supporting future agricultural activities .This RCPLALR is intended to support a supplemental information request from the Agricultural Land Commission North Division in response to TCL's **Provincial Agricultural Land Commission-Applicant Submission: Non-Farm Use (Appendix 13.15-A-A) (NFUA)**, submitted by TCL on December 29th, of 2020, and follows the criteria specified in Policy P-13 of the *Agricultural Land Commission Act* (ALC 2021). The RCPLALR also follows the Joint Application Information Requirements for *Mines Act* and *Environmental Management Act* Permits (British Columbia Ministry of Energy, Mines and Petroleum Resources [BC MEMR] and British Columbia Ministry of Environment and Climate Change Strategy [BC MECCS] 2019) (JAIR) for *Mines Act*, RSBC 1996, c 293 and *Environmental Management Act,* SBC 2003, c 53 (*MA/EMA*) permits under which provides direction in developing soil management and reclamation plans for mine projects**.**

The original technical support document for the NFUA that was submitted on December 29, 2020, based on provincial ratings of agricultural capability is provided in **Appendix 13.15-A-A** while an updated version of the **Tenas Project: Non-Farm Support Document to the ALC Update to Project Information** based on actual field surveys carried out for baseline characterisation of agricultural capability is included in **Appendix 13.15-A-B**

Mitigating potential effects on the end land use objective of achieving *average land capability not less than the average that existed prior to mining*, thus supporting future agricultural activities on ALR lands within the Project Area/footprint, is important to maintaining regulatory compliance, agreements with private landowners, and to avoid and minimize effects on the lands within the ALR. The RCPLALR and **Reclamation Closure Plan (Section [S] 3.0-Chapter [C] 15) (RCP)** have been developed following a review of Project specific baseline studies and the environmental assessments completed for Terrain and Soils, Vegetation, and Wildlife Valued Components (VCs). Through implementation of this RCPLALR, and adaptive management to address changing site conditions, TCL will use effective strategies and best management plans (BMPs) to avoid and minimize Project effects on the ALR land during all Project phases.

1. INTRODUCTION

1.1 Project Description and Setting

Telkwa Coal Limited (TCL) is proposing to develop the Tenas Project (Project) in the Bulkley-Nechako region of northwest British Columbia (BC), 25 kilometres (km) south of the town of Smithers and seven (7) km southwest of Village of Telkwa. The Project footprint would be approximately 830.1 hectare (ha) open-pit surface metallurgical coal mine with an anticipated mine life of approximately 26.5 years including Construction, Operation and Decommissioning and Reclamation phases, followed by an estimated 25-year Post-closure phase. Details of the Project are provided in the Tenas Project Description (TCL 2021), and Project phases and scheduling are provided in **1.2**.

The Project is located on a combination of provincial Crown Land and private land, the latter consisting of three (3) freehold land parcels (PID#014-965-682, 014-965-674, and 014-965-666) and a private land parcel owned by TCL (PID# 013-581-180) and four (4) private land parcels (PID #:010-652-043, 010-652-787, 028-406-869, and 013-496-751) owned by private citizens residing in the Regional District of Bulkley-Nechako (RDBN). The Crown Land is secured by a combination of nine (9) coal licenses owned by TCL and untenured or surveyed crown land between the private land parcels. The Project is situated within the Skeena Stikine Natural Resource District of the Skeena Natural Resource Region. Forest resources therein are managed/administered by the British Columbia Ministry of Forests, Lands and Natural Resource Operations and Rural Development (BC MFLNRORD). In the northeastern portion of the Project Footprint, lands occupied by the Bypass Road portion of the Tenas Access Corridor (TAC), and Rail Infrastructure Project components are within areas designated as Agricultural Land Reserve (ALR) by the BC government. Any non-agricultural (i.e., non-farm, transportation right-of-way (ROW), etc.) land uses therein are regulated by the Agricultural Land Commission (ALC) under the *Agricultural Land Commission Act*, SBC 2002, c 36 (Government of British Columbia [GovBC] 2002) (*ALCA*) and therefore, the Project must obtain approval from the ALC for these uses.

Project components within the ALR represents approximately 2.6 percent (%) (49.1 ha) of the total Project Area and 5.9% of the Project footprint. Project components in this area include the Rail Infrastructure (2.5 km), Rail Loop, fueling station, processed coal Rail Loadout, and stockpiles), the Bypass Road (a component of the Tenas Access Corridor [TAC] that will be constructed to avoid using publicly accessible roads to haul processed coal between the Coal Processing Plant [CPP] and Rail Infrastructure), and a Rock Quarry, (Map 1 in **Appendix 13.15-A-A Provincial Agricultural Land Commission-Applicant Submission: Non-Farm Use [NFUA]**). None of the Minesite components located in the southwestern portion of the, west of Goathorn Creek overlaps with ALR-designated lands. The Project components (footprint) within the ALR only represent 0.013% of the total ALR lands within the RDBN.

1.2 Project Phases and Scheduling

The Project is delineated by defined phases that correspond with specific design-build activities that consider final reclamation and end-land-use objectives for the entire Project (i.e., both ALR and non-ALR designated areas). A detailed description of phases and scheduling for the entire Project is outlined in the Tenas Project Overview (TCL 2021), and Project phases are summarized in **Table 1.2-1.**

Table 1.2-1: Temporal Boundaries for the Tenas Project

Phase	Year	Duration (years)	Description of Activities
Construction	-0.5 to 0	1.5	Site clearing, soil salvage, open pit development, building construction, service and haul road development, Rail Infrastructure construction, bridge construction and development of onsite utilities and services. Development of mine rock, and overburden storage piles, stockpiling of reclamation material such as soil, overburden and other materials suitable for reclamation. Development of water management systems and management ponds for storage of potentially acid generating (PAG) materials.
Operation	1 to 21	21	Development of the open pit through drilling, blasting, loading, and hauling functions. Development of mine rock, and overburden storage piles, stockpiling of reclamation material such as soil, overburden and other materials suitable for reclamation. Development of water management systems and management ponds for PAG storage. Conducting coal processing, stockpiling of raw coal prior to processing, and stockpiling of processed coal prior to shipping. Progressive reclamation will be accomplished during operation including, where available, reclamation activities such as sloping, topsoil placement and revegetation.
Decommissioning and Reclamation	22 to 25	4	Tear-down of infrastructure onsite plus reclamation activities, including sloping of storage piles, backfill materials, and placement of reclamation materials including growth media, overburden and non-PAG rock for management pond covers and revegetating surfaces that are planned to be reclaimed.
Post-closure	26 to 50	10	Active: This involves the filling of the open pit with water, monitoring of vegetation growth and water quality for both groundwater and surface water and wildlife. Control and sedimentation ponds may still be needed for settling of total suspended solid levels. The management ponds are left as dry land reclamation except for portions that will be left as open water.
		15	Passive: This stage is when the control and sedimentation ponds are no longer required for settling of total suspended solid (TSS) levels and the management ponds are left as dry land reclamation except for portions that will be left as open water. Telkwa Coal Limited (TCL) is now simply monitoring the site.

2. PURPOSE AND OBJECTIVES

The nature of mining activities has effects within the Project Area/footprint as well as the surrounding environment. TCL is committed to mitigating these effects and minimizing the terrestrial footprint of the Project to prevent significant residual effects on terrestrial and aquatic biota. As such, the purpose of this Reclamation Plan is to provide guidance, prescriptions, and best practices to avoid or minimize potential effects of the Project on vegetation and ecosystems within the ALR, and to ensure that efforts to mitigate the Project's effects are effective and remain so through the life of the Project, including Post-closure.

To accomplish this, Project reclamation planning has been integrated with overall mine, construction, and Project Development planning and design. The overarching objective of this **Reclamation and Closure Plan for Lands within the Agricultural Land Reserve (RCPLALR)** is to reclaim ecosystems occurring in the Project Area/Footprint within the ALR after Project development to an average agricultural capability at least equal to those that would be present if the Project did not occur. As such, TCL is committed to achieving an average agricultural land capability in these areas not less than what existed prior to Project development, to ensure that development associated with the Project does not effect future agricultural production.

This RCPLALR is intended to support a supplemental information request from the Agricultural Land Commission North Division in response to Telkwa Coal Limited's Tenas Project Non-Farm Use Application to the ALC, submitted by TCL on December 29th, of 2020, and follows the criteria specified in Policy P-13 of the *Agricultural Land Commission Act* (ALC 2021) and the JAIR related to soil and reclamation plans. The original **NFUA** was submitted as provided in **Appendix 13.15-A-A**. During the completion of the reclamation planning for the Project, an update was completed on the to account for the field work data that identified the agricultural capability areas within the Project Area/footprint while provincial sources were used for the original support document submitted in 2020. The revised technical support document based on actual field surveys versus provincial data is provided in **Appendix 13.15-A-B Tenas Project: Non-Farm Support Document to the ALC Update to Project Information**. As summarized in **Table 2-1** and **Table 2-2,** there was no significant change in agricultural capability identified by this update based on actual field surveys versus the provincial data and as such the conclusion remains the same that Project does not cause a measurable effects after accounting for mitigations specifically reclamation.

Table 2-1: Field Surveyed Agricultural Capabilities

Class*	Subclass*	Project Footprint Components
3	D	—
4	D/DI/DT	9.88 ha
5	A/AP/C/CP/CT/T/PT/X	34.24 ha
6	DI/I/IP/RA/T/TA/TI/W/WT	4.83 ha
7	OW/OI	0.15 ha
Total	**—**	***49.10 ha***
Descriptors		
Class 3	Land Requires Moderately Intensive Management Practices and/or Range of Crops Moderately Restricted	
Class 4	Land Requires Special Management Practices and/or Range of Crops Severely Restricted	
Class 5	Land Capability Restricted to Production of Perennial Forage Crops or Other Specially Adapted Crops	
Class 6	Land is Non-Arable, But Capable of Producing Native and/or Uncultivated Perennial Forage Crops	
Class 7	Land Holds No Capability for Agriculture or Sustained Natural Grazing	
Subclass A	Soil Moisture Deficiency — Adversely Affected by Drought Due to Soil and/or Climate Characteristics	
Subclass C	Adverse Climate — Thermal Limitations to Plant Growth.	
Subclass D	Undesirable Soil Structure — Soil Properties Restrict and/or Hinder Agricultural Use	
Subclass I	Inundation — Overflow by Streams/Lakes Causes Crop Damage or Restricts Agriculture Use	
Subclass M	Moisture — Low Moisture Holding Capacity Caused by Adverse Inherent Soil Characteristics	
Subclass P	Stoniness — Significant Coarse Fragments Pose Limitations for Agricultural Operations	
Subclass T	Topography — Slope Patterns and Steepness Restrict and/or Hinder Agriculture Use	
Subclass X	Other — Cumulative Minor Adverse Characteristics	
Subclass O	Organic Soils	
Subclass W	Excess Water — Limits Agricultural Uses; Due to Poor Drainage, High Water Table and/or Runoff.	

Note: *ha=hectare*

Table 2-2: Mapped Agricultural Capabilities

Class (Decile Ratio)	Subclass	Project Footprint Components
3 (100 %)	D	1.62 ha
3 (70 %) / 4 (30 %)	C/X	19.20 ha
4 (100 %)	D	3.84 ha
4 (100 %)	T	1.95 ha
4 (100 %)	X	13.00 ha
4 (70 %) / 5 (30 %)	X/PM	0.33 ha
4 (30 %) / 5 (70 %)	X/IM	0.25 ha
5 (100 %)	PM	8.47 ha
7 (100 %)	TC	2.65 ha
—	—	(Telkwa River) 0.03 ha
Total	**—**	***51.35 ha***

Descriptors	
Class 3	Land Requires Moderately Intensive Management Practices and/or Range of Crops Moderately Restricted
Class 4	Land Requires Special Management Practices and/or Range of Crops Severely Restricted
Class 5	Land Capability Restricted to Production of Perennial Forage Crops or Other Specially Adapted Crops
Class 7	Land Holds No Capability for Agriculture or Sustained Natural Grazing
Subclass C	Adverse Climate — Thermal Limitations to Plant Growth.
Subclass D	Undesirable Soil Structure — Soil Properties Restrict and/or Hinder Agricultural Use
Subclass I	Inundation — Overflow by Streams/Lakes Causes Crop Damage or Restricts Agriculture Use
Subclass M	Moisture — Low Moisture Holding Capacity Caused by Adverse Inherent Soil Characteristics
Subclass P	Stoniness — Significant Coarse Fragments Pose Limitations for Agricultural Operations
Subclass T	Topography — Slope Patterns and Steepness Restrict and/or Hinder Agriculture Use
Subclass X	Other — Cumulative Minor Adverse Characteristics

Note: *%=percent; ha=hectare*

3. SCOPE AND SCALE

The scope of this RCPLALR is defined within the Project footprint (Map 1 in **Appendix 13.15-A-A**). The RCPLALR applies to construction, mining activities and associated infrastructure occurring within the approximate 49.1 ha ALR overlap by the Project footprint. This RCPLALR is in effect during the Construction, Operation, Decommissioning and Reclamation, and Post-closure phase activities and ceases to be in force at the final closure of the Project as approved by regulatory authorities.

4. COMPLIANCE OBLIGATIONS

4.1 Regulatory Requirements

Provincial legislation, regulations, policy, and guidance documents applicable to the ALR lands within the Project and relevant to this RCPLALR are described in **Table 4.1-1**. This summary includes legislative requirements that are directly applicable to reclamation and closure in the ALR.

Table 4.1-1: Legislation and Guidelines Relevant to the Reclamation and Closure Plan for Lands within the Agricultural Land Reserve (RCPLALR)

Legislation, Regulations, and Guidelines	Applicable Information
Agricultural Land Commission Act, SBC 2002, c 36 (Government of British Columbia [GovBC] 2002)	Allows making regulations respecting farm uses and non-farm uses.
Agricultural Land Reserve Use Regulation, B.C. Reg. 30/2019. GovBC 2019)	Specifies land uses permitted in the Agricultural Land Reserve (ALR).
Bulkley Land and Resource Management Plan (LRMP) (GovBC 1998)	The Bulkley LRMP contains ALR lands within its 73,419.01 square kilometres (km^2). The Regional District of Bulkley-Nechako (RDBN) also has an agriculture site which explains the process for a non-farming application, which was utilized in this case.
Health, Safety and Reclamation Code for Mines in British Columbia (British Columbia Ministry of Energy, Mines and Low Carbon Innovation [BC MEMLI] 2021) (Code)	The Code stipulates the permitting, reclamation, and closure requirements for Mines in British Columbia (BC) and the reclamation standards within Part 10 of the Code.
Mines Act, RSBC 1996, c 293 (GovBC 1996)	The Act requires that mining operations comply with the Code.
Reclamation Plans for Aggregate Extraction. Policy P-13, April 2021. (Agricultural Land Commission [ALC] 2021)	Provides the required content for Reclamation Plans submitted to the ALC.

The Joint Application Information Requirements for *Mines Act* and *Environmental Management Act* Permits (British Columbia Ministry of Energy, Mines and Low Carbon Innovation [BC MEMLI] and British Columbia Ministry of Environment and Climate Change Strategy [BC MECCS] 2019) (JAIR) provides direction in

developing reclamation plans for Mine Projects**.** The **RCP** and this RCPLALR are designed to fulfill the requirements of *Mines Act*, RSBC 1996, c 293 and *Environmental Management Act,* SBC 2003, c 53 (*MA/EMA*) permits for British Columbia (BC).

Section 9.3 in the JAIR describes required details of a soil management plan to direct implementation of best management practices (BMP) during soil salvage, stockpiling, and application operations, and guide salvage monitoring and stockpile maintenance provisions, training, supervision, and quality assurance/quality control (QA/QC). This RCPLALR was used in developing an overall **Tenas Project Soil Management Plan (Appendix 13.15-C) (SMP)** that will be utilized during construction of the Rail Infrastructure and area, which includes land under the ALR.

Furthermore, specific to the regulatory requirements of the *Mines Act*, RSBC 1996, c 293 (GovBC 1996) and Health, Safety and Reclamation Code for Mines in British Columbia (British Columbia Ministry of Energy, Mines and Low Carbon Innovation [BC MEMLI] 2021) (Code) Section 10.7.4 (Land Use) of the Code, requires that:

> *The land surface shall be reclaimed to an end land use approved by the chief permitting officer that considers previous and potential uses.*

Section 10.7.5 (Capability) of the Code requires:

> *Excluding lands that are not to be reclaimed, the average land capability to be achieved on the remaining lands shall not be less than the average that existed prior to mining, unless the land capability is not consistent with the approved end land use or compromises long-term physical and/or geochemical stability.*

This RCPLALR describes how ALR end land use and land capability objectives and average agricultural land capability will be achieved on ALR lands by the end of the Project's Decommissioning and Reclamation and Post-closure Phases. This RCPLALR was based off the entire Project's **RCP** provided in **S13.15** with specific updates to meet the requirements of the ALC Policy P-13 of the *Agricultural Land Commission Act*, (ALC 2021).

4.2 Standard Practices and Procedures (SPPs)

All TCL Standard Practices and Procedures (SPPs) will conform to the Code. In addition to regulatory requirements, the Project will implement SPPs that meet or exceed the required laws and regulations.

5. RELATIONSHIP TO OTHER MANAGEMENT PLANS

The Project is governed by an **Environmental Management System (S13.0-C1) (EMS)**, an overarching management plan strategy comprising a set of processes and practices which enable TCL to manage its environmental and safety performance in a holistic way, within an integrated framework. While the management plans are part of the **EMS**, the **EMS** is not just a collection of management plans.

In addition to the overall guidance of the **EMS**, the RCPLALR for the Project has a relationship with other management plans that also present mitigation measures. Those management plans and their relationship to this Reclamation Plan are listed in **Table 5-1.** Management plans referenced therein will be made available to the ALC upon request.

Table 5-1: Management Plans with a Relationship to the Reclamation and Closure Plan for Lands within the Agricultural Land Reserve (RCPLALR)

Management Plans	Nature of Relationship
Environmental Management System (S13.0-C1) (EMS)	Project-specific management plans that inform this Reclamation and Closure Plan for Lands within the Agricultural Land Reserve (RCPLALR) are part of the **EMS.**
Air Quality Management Plan (S13.0-C2) (AQMP)	The **AQMP** provides dust mitigation measures which will be monitored under this RCPLALR by way of sampling programs to monitor trace element (metals) uptake in soils and vegetation within the Agricultural Land Reserve (ALR) and the remainder of the Project Area.
Chemical and Materials Storage, Transfer, and Handling Plan (S13.0-C3) (CMSTH)	This plan will apply to these items being used during the Decommissioning and Reclamation Phase of the Project and into Post-closure phase if required within the ALR and the remainder of the Project Area.
Construction Environmental Management Plan (S13.0-C4) (CEMP)	The CEMP describes the management processes and procedures associated with dealing specifically with the Construction Phase of the Project to allow the Project to be developed in a safe and environmentally responsible manner including soil salvage with the ALR and the remainder of the Project Area.
Minesite Water Management Plan (S13.0-C11) (MWMP)	This plan describes the surface water management strategies and procedures at the Project and is intended to mitigate potential environmental and safety issues related to surface water movement and storage onsite and within the ALR and the remainder of the Project Area.
Fuel Management and Spill Control Plan (S13.0-C7) (FMSCP)	This plan will apply to these items being used during the Decommissioning and Reclamation Phase of the Project and into Post-closure phase if required within the ALR and the remainder of the Project Area.
Public Access Management Plan (S13.0-C14) (PAMP)	This plan will apply to public access during the decommissioning and reclamation phase of the Project and into the Post-closure Phase if required within the ALR and the remainder of the Project Area.
Reclamation and Closure Plan (S13.0-C15) (RCP)	The RCP informs the objectives for reclamation activities for the Project and provides the strategy for progressive reclamation, and reclamation activities during the Construction, Operation, and Decommissioning and Reclamation phases, and the reclamation research and monitoring programs which is the key document used to develop this RCPLALR for both ALR and Project Area lands.

Management Plans	Nature of Relationship
	Furthermore, the **Soil Management Plan (SMP) (Appendix 13.15-B** of the **RCP**) and **Appendix 16.13-A-C** of this RCPLALR informs this RCPLALR by detailing a reclamation-materials balance based on surface soils available for salvage and projected demands for these materials. The SMP guides the salvage, storage, and placement of soil materials to maximize the retention and benefit of soil resources for reclamation and to provide a consistent approach to site-specific soil management within the ALR and the remainder of the Project Area.
Surface Erosion Prevention and Sediment Control Plan (S13.0-C17) (SEPSCP)	The relevant aspects of this plan will be applied during the decommissioning and reclamation phase of the Project within the ALR and the remainder of the Project Area.
Vegetation Management Plan (S13.0-18) (VMP)	The VMP informs this RCPLALR by indicating measures for vegetation retention strategies and use of invasive plant control within the ALR and the remainder of the Project Area.
Wildlife Management Plan (S13.0-C21) (WMP)	The WMP outlines the regulatory obligations and commitments to avoid or minimize Project effects on wildlife and wildlife habitat within the ALR and the Project Area.

6. EXISTING LAND USE AND POTENTIAL PROJECT EFFECTS

6.1 Existing Land Use

The Project Area/footprint within the ALR occurs primarily on undeveloped forested Crown land and identified agricultural uses on lands situated on private property, specifically, cultivated cropland and hayland along the Bypass Road portion of the TAC, and pasture within a portion of the Rail Infrastructure (Map 1, Appendix 6-A). The areas of identified agricultural uses are on lands comprised of five (5) private land parcels (PID #:010-652-043, 010-652-787, 028-406-869, 013-496-751, and 013-581-180); a summary of the total area and primary land use of each parcel is provided in **Table 6.2-1**.

6.2 Potential Project Effects on Existing Land Use

The potential effects of the Project on agricultural production, operations, and infrastructure are expected to be both minimal and temporary in nature as reclamation activities are expected to restore an average agricultural capability equal to pre-existing conditions. The total ALR overlap by the Project is 49.0 ha occurring on both private and crown lands, but less than 30.0 ha of this total area coincides with current identified agricultural land use based on discussions with the private landowners and field surveys. Construction of the Bypass Road and Rail Infrastructure will temporarily prevent a small amount of agricultural land from being used; until the Decommissioning and Reclamation phase is completed and the land is returned to a similar land use. The changes in area available for agricultural use in each parcel are reflected in **Table 6.2-1.** Following the Operation phase, the Bypass Road, Rock Quarry, and Rail Infrastructure will be decommissioned and reclaimed to return to an agricultural capability that is approximately equal to that of the pre-development landscape, thus supporting future agricultural activities.

Table 6.2-1: Existing Land Use and Project Effects of the Project Footprint within the Agricultural Land Reserve (ALR)

Parcel (PID)	Existing Agricultural Activity	Total Property Legal Area (ha)	Area Required Based On Legal Agreements With Private Landowner	Remaining Property Area Outside Of Legal Agreements (ha)	Total Area Affected By The Project Footprint Within Each Private Land Parcel (ha)	Existing Agricultural Capability of Area Affected**	Decrease in Area Available for Agriculture Due to the Project Footprint (%)
1 (010652787)	Crop (33%); pasture (67%)	64.0	3.23	61.27	2.0	5 (6,7)	3.12
2 (010652043)	Crop (25%); pasture (75%)	130.0	3.22	126.78	2.0	5 (6)	1.54
3 (028406869	Pasture (100%)	21.0	0.16	20.84	0.03	5 (N/A)	0.14
4 (013496751	Grazing (100%)	64.0	1.74	62.26	0.8	5 (6)	1.25
5 (013581180)	Pasture (100%)	62.0	19.18	42.82	14.4	4 (5,6)	23.22
Crown Land	Forestry and pasture	N/A	N/A	N/A	22.3	4,5 (6)	N/A
TOTAL		**341.0**	**27.53**	**313.47**	**49.1**	**Multiple**	**7.86**

** this is based on the areas provided in the legal agreements with the respective landowners*

*** The dominant agricultural capability of the Project footprint within each private land parcel is provided, with less prevalent agricultural capability units listed in parentheses.*

6.3 Potential Project Effects on Topography

As required by the ALC application process, **Figures 6.3-1, 6.3-2**, and **6.3-3** below, provide the stamped drawings by a professional engineer for the Rock Quarry within the ALR, while **Appendix 13.15-A-D** provides the **Detailed Plan Drawings and Cross Sections** related to the Rail Infrastructure, and the TAC, which show the proposed topography in relation to existing topographic conditions in both plan and section views. The drawings for the Rock Quarry are included below which include a site plan, and two (2) typical sections for this quarry. In summary, the plan is to excavate the quarry using a 3H:1V walls which will allow these to be reclaimed as is without any further sloping requirements during the Decommissioning and Reclamation Phase of the Project.

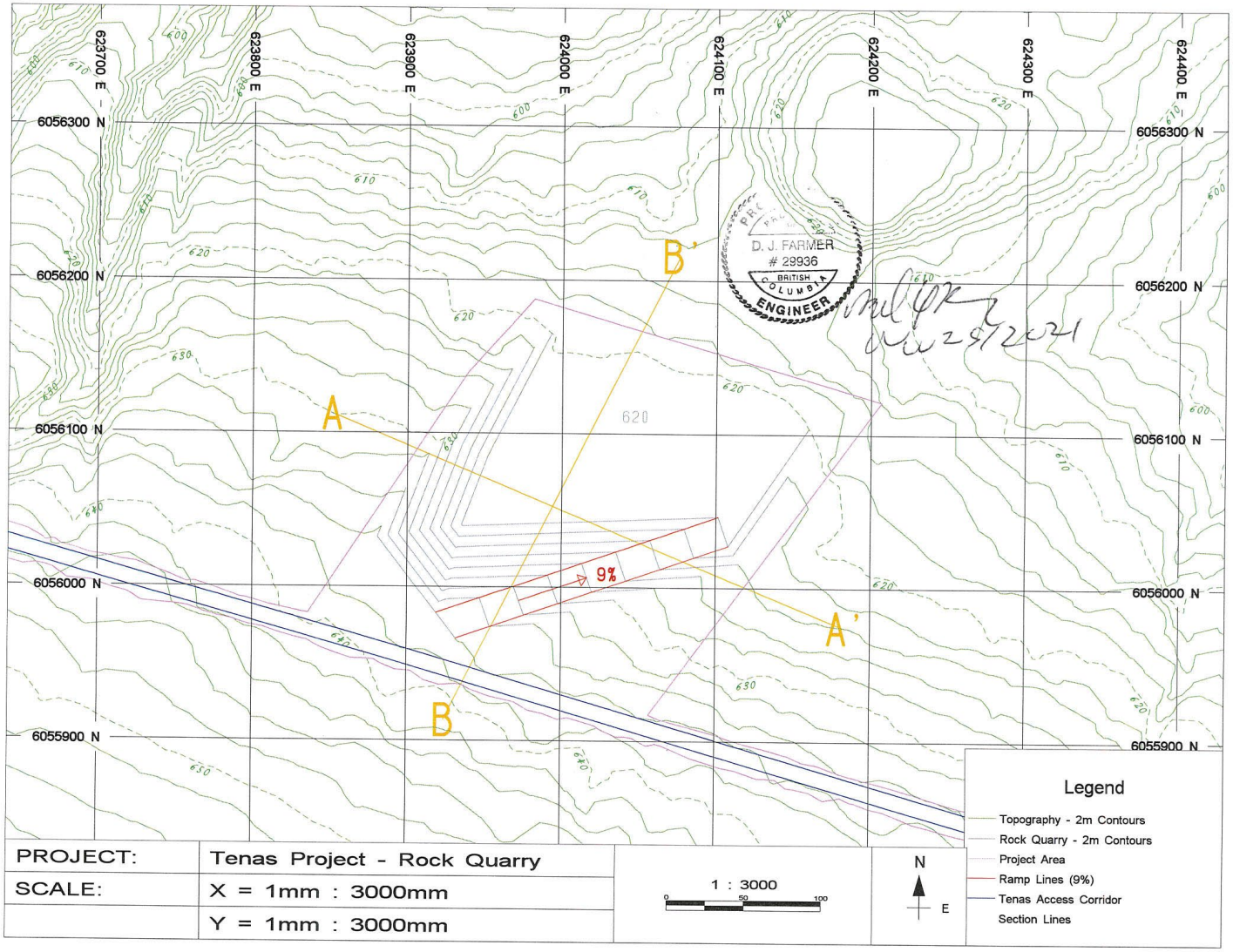


Figure 6.3-1: Plan view of Rock Quarry

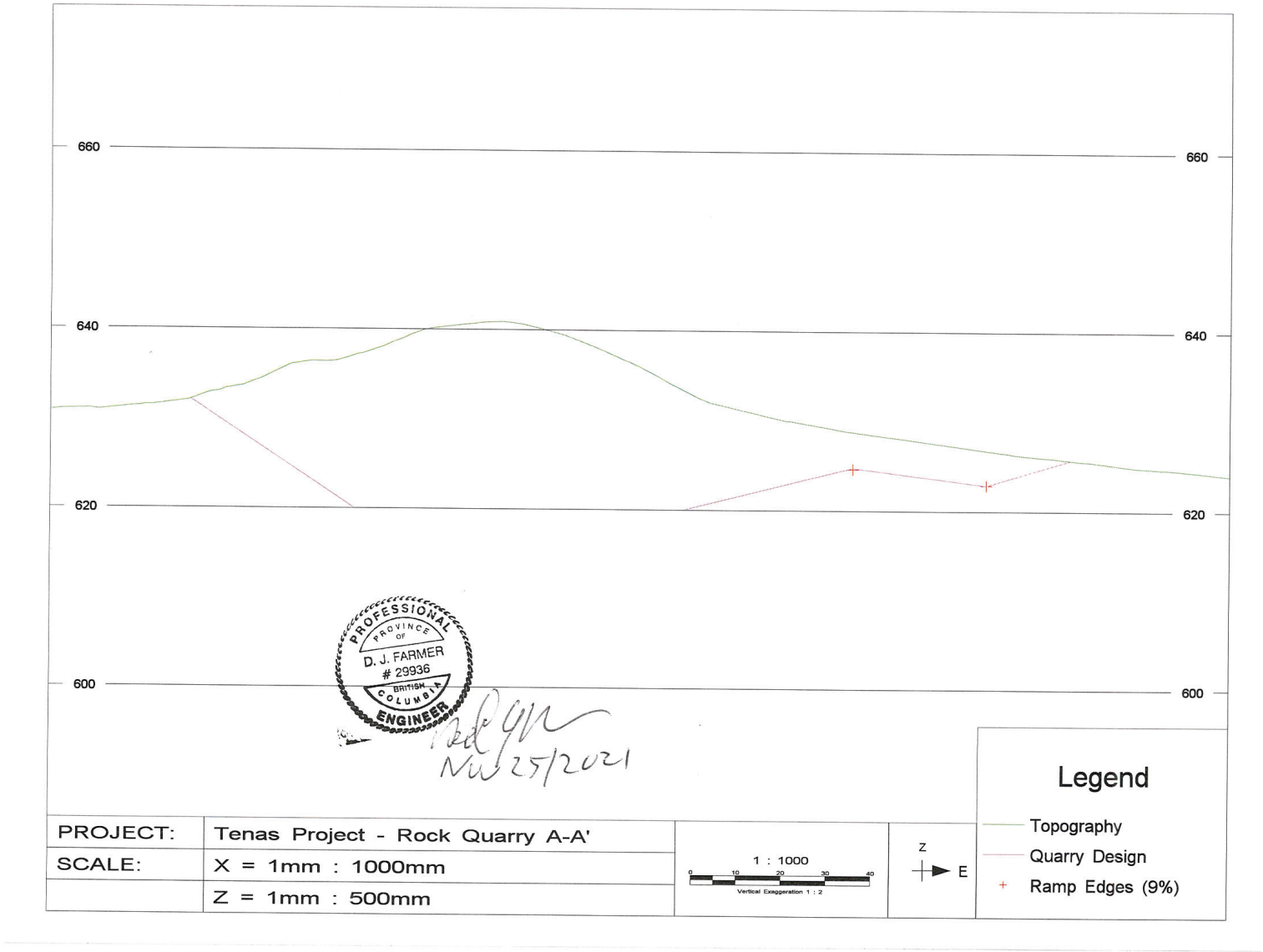


Figure 6.3-2: Section A-A' for the Rock Quarry

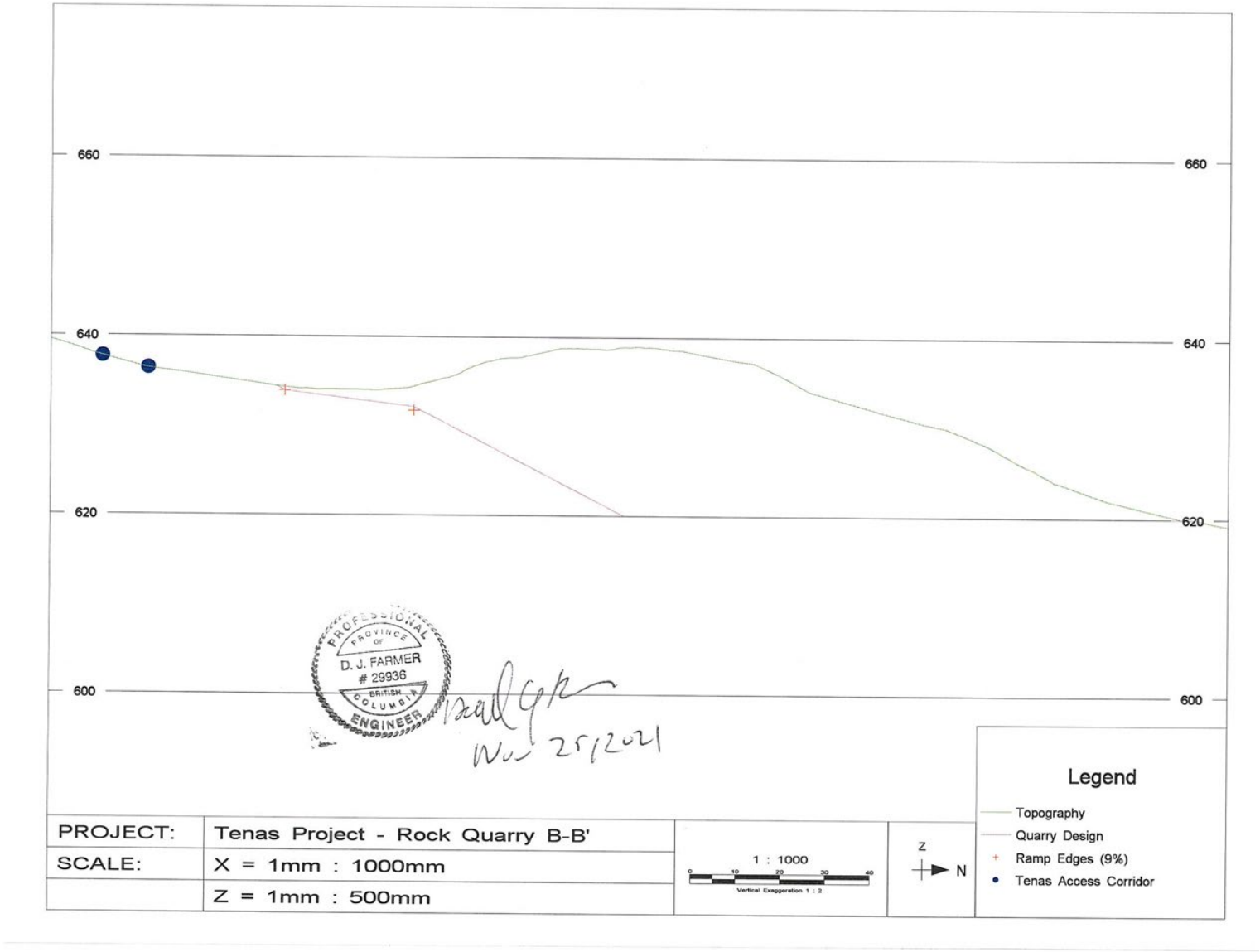


Figure 6.3-3: Section B-B' for the Rock Quarry

7. AGRICULTURAL CAPABILITY AND SURFACE SOILS

Characterisation of agricultural capability and surface soils within or adjacent to the Project footprint for the Project Area in the ALR is based on field surveys conducted by Ardea Biological Consulting (Ardea) between 2017 and 2019. A summary of this information is provided in the subsections below, and a comprehensive account is presented in the **Tenas Project Terrain and Soils Baseline Report** provided in **Appendix 13.15-A-E**.

7.1 Agricultural Capability Analysis

Agricultural land capability ratings and limitations within the Project Footprint and adjacent lands within the Project Area were classified according to provincial and federal guidelines outlined in the *Land Capability Classification for Agriculture in BC*[1] (Kenk and Cotic 1983) and the Canada Land Inventory (CLI) *Soil Capability Classification for Agriculture* (Canada MOE 1972). Field assessments of agricultural capability followed the criteria outlined in Policy P-10 of the *Agricultural Land Commission Act* (ALC 2017); field procedures are outlined in detail in the **Tenas Project Terrain and Soil Baseline Report** attached in **Appendix 13.15-A-E**. A description of agricultural land capability classes and subclasses is provided in Table 1 and Table 2 of **Appendix 13.15-A-B**, which compares the original non-farm application to the current understanding of agricultural land capability classes based on field surveys and concludes that the difference is minimal.

An updated map showing agricultural land capability ratings within the Project Area/footprint is provided in **Figure 3-4** of **Appendix 13.15-A-B**. Polygons intersecting the Rail Infrastructure area are predominantly class 5AP, limited by aridity, stoniness, and lack of fertility. Low-lying depressions are rated 5DI, limited by dense soil structure and a seasonal high water-table. Land at the east end of the Bypass Road is Class 4D, limited by dense soil structure. Cultivated fields and pasture above 600 metres (m), towards the west end of the Bypass Road are generally Class 5, limited by the short growing season at this elevation, and stoniness. Sloping terrain and wet draws are Class 6WP. Occasional steep slopes are Class 7T. Organic soil occurs to a very limited extent in small kettle-hole depressions. Lands within the Goathorn Creek area are mostly Class 5 and Class 6. Above 600 m, crop potential is limited by a short growing season. The bottom end of Telkwa Coalmine Road has sandy-gravelly soils that are limited due to stoniness, aridity, and lack of fertility. Seasonal inundation occurs along the Goathorn and Telkwa floodplains, most of which is Class 6.

7.2 Surface Soil Survey

Surface soils within the ALR were classified into soil map units (SMUs) as defined in the **Tenas Project Terrain and Soil Baseline Report** provided in **Appendix 13.15-A-E**. SMUs reflect groupings of soil with related properties, including soil texture, drainage, coarse-fragment content, degree of organic enrichment, slope position, parent materials, and average rooting depth. The SMUs provide a model of the most common soils within the Project Area/footprint, taking into consideration how soils have developed based on local parent materials, climate, topography and drainage, slope position, vegetation, and soil removal history.

[1] The seven classes within this system describe agricultural limitations of increasing intensity (i.e., from Class 1 to Class 7) that affect the range of suitable crops and associated management actions. Subclasses indicate additional limitations and hazards within a given land class.

Fine- to medium-textured, well to moderately drained soil derived from basal till (SMU 1.1) is the most common soil type in the Project Area within the ALR. Other dominant soil types in the ALR include coarse-textured, well- to rapidly drained, nutrient-poor soil derived from inactive, high-bench floodplain deposits (SMU 4.3), coarse-textured, well- to rapidly drained soil derived from glaciofluvial parent material (SMU 2), and fine-textured, moderately drained soil with zero coarse fragments (SMU 3.1). SMUs in and adjacent to the Project footprint for the Project Area within the ALR are presented by **Map 4 in Appendix 13.15-A-A**, and a summary of the corresponding attributes of each SMU occurring in the Project Area within the ALR are provided in **Table 7.2-1.**

Table 7.2-1: Soil Map Units (SMUs) for the Project Area within the Agricultural Land Reserve (ALR)

SMU	Parent Material	General Description	Topography	Soil Texture	Average Rooting Depth (cm)	Coarse Fragment Content (%)*
1.1	M	Medium textured, well- to moderately drained Orthic and Brunisolic Grey Luvisols, Eutric and Dystric Brunisols derived from tills, coarse fragment content from 10 to 40%. May have compacted Bt horizon. Limited organic enrichment.	Level to moderately steep	SiL, L, SiCL, (SL)	30	10–35
1.2	M (Fv)	Medium textured, Imperfectly- to poorly drained Humic Gleysols, Gleyed Grey Luvisols, Gleyed Melanic Brunisols, derived from tills on receiving slope positions. Organic enriched A layer is typical.	Lower receiving slope positions	SiL, SiCL, SiC, (SL, LS)	30	10–40
2	FG	Coarse textured, sandy, coarse-loamy to gravelly, well- to rapidly drained Dystric Brunisols, derived from glaciofluvial parent materials.	Level to Gently sloping	S, LS, (SL)	30	20–60
3.1	LG, (FG)	Fine-textured, moderately drained Orthic and Brunisolic Gray Luvisols, derived from glaciolacustrine parent materials. Zero coarse fragments, and relatively high clay content.	Level to Gently sloping	SiCL, SiL, Si	25	0
3.2	Fv [LG], LGp, Mp	Fine-textured, imperfectly- to poorly drained Gleyed Dark Grey Luvisols, Gleyed Brunisolic Grey Luvisols, Humic Luvic Gleysols. Organic enriched A layer > 10 cm. Often signs of prolonged water saturation.	Level to gently sloping and depressions	Si, SiCL, SiL	25	0–10

SMU	Parent Material	General Description	Topography	Soil Texture	Average Rooting Depth (cm)	Coarse Fragment Content (%)*
4.1	$F^{A}p$, Fp	Coarse textured, sandy-silty, well- to moderately drained Orthic and Cumulic Regosols on active floodplain deposits. Subsurface flooding or over-bank flooding. Organic enrichment variable.	Level to gently sloping	LS, S, SL, SiL	30	0–60
4.2	$F^{A}p$, Fp	Fine-textured, silty, imperfectly- to poorly drained Humic Regosols associated with floodplain deposits, often with organic enrichment. (Similar to SMU 3.2)	Level	SiL, SiCL, Si	25	0
4.3	Ft	Coarse-textured, sandy-silty, well- to rapidly drained Brunisols derived from inactive fluvial deposits. (Similar to SMU 2).	Level to gently sloping	SL, LS	25	0–40
5	Mv [R or D]	Shallow, well- to rapidly drained Dystric Brunisols over bedrock. Medium textured with high coarse fragments.	Gentle upper slopes and crests	SiL, FSL, SL	20	30–75
7	O	Organic soil, poor to very poorly drained. Veneers and blankets.	Level to depression	Fibric, mesic organics	30	N/A
8.1	Cbv, FGks	Well to moderately well drained Regosols, Brunisols, Luvisols on steep to moderately steep escarpment slopes, some active failures, and slumps.	Moderately steep, steep slopes	SiL, L, SiCL	30	25–80
8.2	Cfb	Humic Regosols with organic Ah horizons > 10 cm, situated in toe-slope receiving positions at base of escarpment slopes.	Gentle to moderate receiving slopes	SiL, L, SiCL	40	0–50

Source: *Adapted from Table 3-7 of the Tenas Project Terrain and Soils Baseline (TCL 2021) to include only SMUs found within the ALR usage by the Project.*
Notes: *%=percent; cm=centimetre*
** Coarse fragment content in rooting zone*

8. RECLAMATION PLAN

This section provides the Reclamation Plan for the Project Area/footprint located within the ALR. This plan is informed by the Project's overall **RCP**, and like the **RCP**, it is intended to be a living document that will guide the management processes and procedures associated with developing and reclaiming the Project Area/footprint within the ALR in a safe and environmentally responsible manner. This includes the development of reclamation and closure prescriptions and monitoring and maintenance programs.

8.1 Surface Soil Management Plan

Soil salvage and conservation for the entire Project (i.e., ALR and non-ALR designated areas) will primarily be guided by the **SMP**, with additional guidance provided by the **Vegetation Management Plan (S13.0-C18) (VMP)**, **Construction Environmental Management Plan (S13.0-C4) (CEMP)**, and the **Surface Erosion and Sediment Control Plan (S13.0-C17) (SESCP)**. The recommendations outlined in these management plans are provided in the following sections, and are intended to guide the salvage, storage, and placement of soil materials for reclamation to maximize the retention and benefit of soil resources and to provide a consistent approach to site-specific soil management for the entire Project Area. Although only a small portion of the Project coincides with identified agricultural land use based on discussions with private land owners and field survey work within the ALR (less than approximately 20 ha of the total 49.1 ha overlap), as outlined in Section 6.2 (**Table 8.1-1**):, these recommendations and TCL commitments are intended to minimize Project effects within the ALR and conserve agricultural land capability therein.

8.1.1 Suitability of Surface Soils

Suitability of available surface soils was assessed to enable incorporation of suitability considerations into calculations of reclamation-material supply. Suitability was evaluated using the SMUs defined in the **Tenas Project Terrain and Soil Baseline Report (Appendix 13.15-A-E)** and described in Section 7.2 of this report. Available water-storage capacity (AWSC) was used as the primary suitability criterion because soil water supply is a dominant control on the characteristics of an ecosystem, including its nutrient regime (Pojar et al. 1987; Baker et al. 2020).[2] The SMUs were grouped into suitability classes based on AWSC (calculated from particle-size distribution [PSD] and organic-matter content) and operational salvage constraints (steep slopes and shallow surface soils) as shown in **Table 6.1-1**. Detailed results of AWSC by SMU and relative abundance of each SMU are presented in the **SMP.**

Suitable surface soils are divided into three classes based on AWSC: low-AWSC mineral, high-AWSC mineral, and organic **(Figure 8.14-1).** Segregation of these classes will enable targeted creation of specific soil moisture regimes (and corresponding ecosystems) to promote heterogeneity on the post-closure landscape, and to return an equivalent agricultural land capability to areas within the ALR that are developed by the Project. The suitability classes correspond to parent-material types, with high-AWSC mineral surface soils formed from finer-textured parent materials (primarily morainal), and low-AWSC mineral surface soil formed from coarser-textured parent materials (primarily fluvial and glaciofluvial).

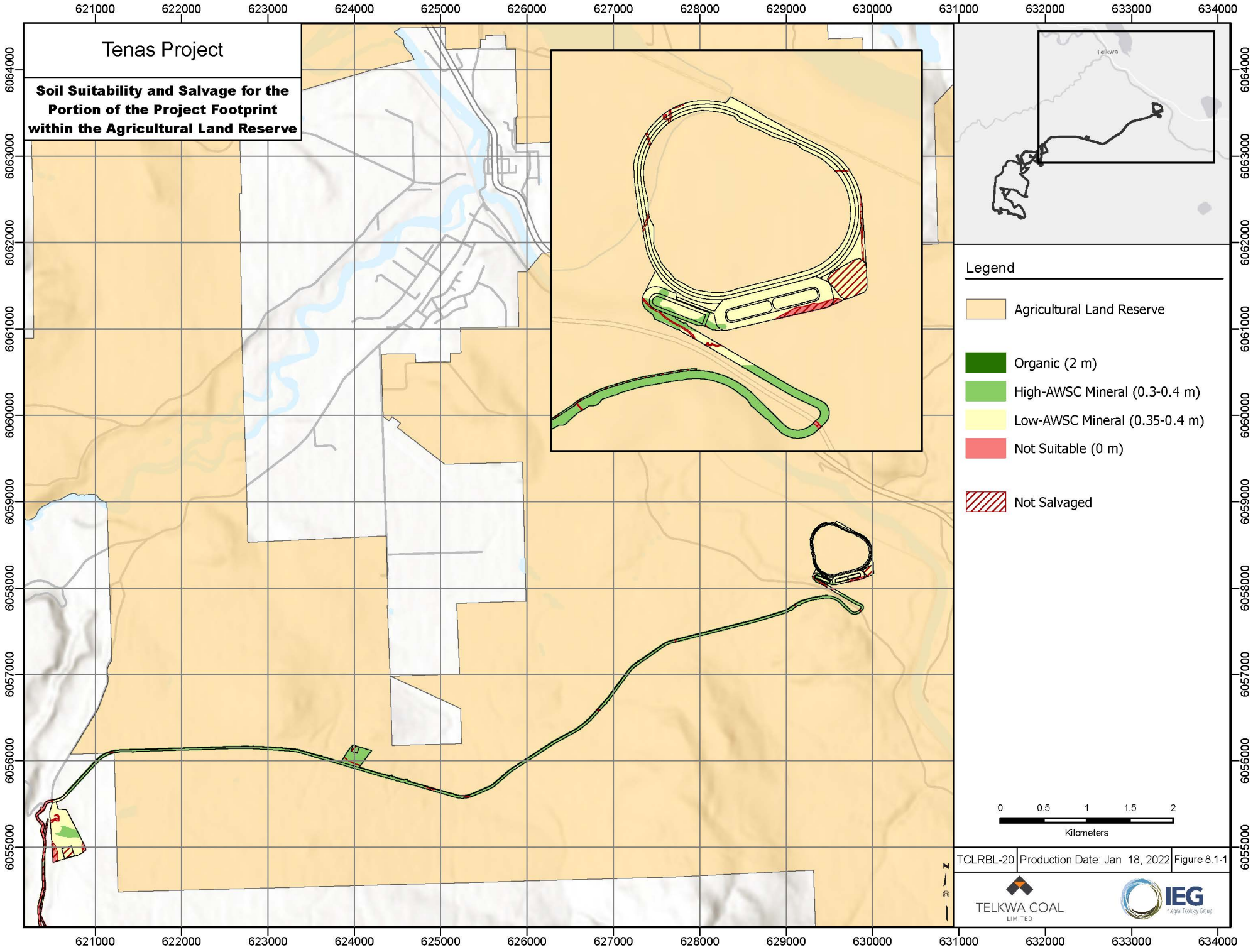
[2] AWSC is also a primary factor in the provincial land-capability classification guidelines (Kenk and Cotic 1983).

Table 8.1-1: Surface-Soil Suitability Classification

Suitability Class	Soil Map Units (SMUs)	Description
Unsuitable	5, 8.1, 8.2	SMUs were deemed unsuitable due to surface soil is that is too shallow to operationally salvage and of poor quality (SMU 5), skeletal surface soil (SMU 6), and terrain that is too steep for salvage (SMUs 8.1 and 8.2).
Coarse mineral	2, 4.1, 4.3	Coarse-textured, low-AWSC and low-nutrient surface mineral soils derived from fluvial, glaciofluvial, and ablation-till parent materials. Suitable for reclamation of submesic or drier ecosystems.
Suitable mineral	1.1, 1.2, 3.1, 3.2, 4.2	Finer-textured and high-AWSC surface mineral soils with a nutrient-rich Ah (humic) horizon present. Soils are derived from morainal, glaciolacustrine and silty-fluvial parent materials. Suitable for reclamation of mesic ecosystems.
Organic	7	Organic surface soils with high organic-matter content and nutrient availability. Useful as an organic amendment or for reclamation of wetlands and low-lying ecosystems.

Source: *Adapted from the Tenas Project* ***SMP*** *to include only SMUs present in ALR area used by the Project.*

Notes: *AWSC=available water-storage capacity*


Tenas Project
Soil Suitability and Salvage for the Portion of the Project Footprint within the Agricultural Land Reserve
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Legend
Agricultural Land Reserve
Organic (2 m)
High-AWSC Mineral (0.3-0.4 m)
Low-AWSC Mineral (0.35-0.4 m)
Not Suitable (0 m)
Not Salvaged
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8.1.2 Soil Salvage

- Surface soils along or within the Rock Quarry and Rail Infrastructure will be removed and salvaged. The Bypass Road coincides with portions of an existing road within which will require reduced clearing and surface soil salvage activities. Removal and placement of overburden is planned within the Project components that are within the ALR to allow for the construction of these components. The recommended surface-soil-salvage depths for Project components occurring within the ALR are listed below;[3]
- For the Bypass Road and Rock Quarry components, the recommended salvage depth is approximately 0.40 m for mineral surface soils (low- and high-AWSC);
- For the Rail Infrastructure area4, the recommended salvage depth is 0.35 m of low-AWSC surface soil. In localized areas where higher AWSC material is present (the Processed Coal Loading Pad, Rail Loop Area, Rail Perimeter Road, Reclamation Materials Stockpile and Rail Infrastructure Sedimentation Pond), 0.35 m of high-AWSC mineral surface soil may be salvaged;
- Dozers will be used to push surface soil into piles or windrows, from which it will be picked up by excavators and transported via trucks to designated stockpiles. Soil salvage will occur in a systematic way to avoid trafficking un-salvaged areas. Other equipment may be used to optimize travel time and distance for efficient soil salvage and schedule to deal with weather conditions. The overall objective in surface-soil salvage is to maximize salvage in operationally feasible conditions. Operational salvage by dozers is not possible on slopes steeper than 26° (or as designated unsafe by qualified Project personnel) and is not recommended in areas where the surface soil is consistently less than 50 centimetres (cm) deep to bedrock. Field assessments by a qualified professional (QP) will be required to verify areas where surface soil depths are sufficient for salvage. The best practices listed below are recommended to maintain the quality of salvaged soils and protect the adjacent environment;
- Surface-soil salvage in the ALR will be supervised by a QP with expertise in soils and reclamation;
- Avoid or minimize salvage during dry and/or windy conditions to prevent loss of fine-textured material and dust deposition on adjacent areas. If it is necessary to conduct salvage under these conditions, measures will be taken to minimize erosion and dust generation (e.g., water application);
- Avoid salvaging soils during excessively wet conditions to prevent loss of fine materials due to erosion and degradation of soil structure;
- Where possible, soil salvage will not occur if soil is frozen at salvage depth as it is challenging to accurately target the desired salvage depth and admixing may occur. However, in cases where there is a higher risk of erosion (i.e. in areas with moderate-to-fine textured topsoil), soil salvage and handling may occur under frozen conditions to mitigate the risk of erosion and sedimentation;
- Snow will be removed prior to salvaging to reduce undesired settling or erosion in stockpiles or reclamation areas;

[3] Recommended salvage depths have been refined from the salvage recommendations provided in Map 3 of the TCL Non-Farm Application to the ALC (Appendix 1-A), to apply salvage depths that are both operationally feasible and reflective of the soil characteristics of each Project feature.
[4] Baseline evaluation of the Rail Infrastructure area (Appendix 1-D) indicated boron concentrations in surface soils that were slightly elevated relative to the Canadian Council of Ministers of the Environment (CCME) agricultural guideline of 2 mg/kg (samples ranged from 2.3-3.6 mg/kg). These concentrations do not preclude use of these soil materials in reclamation programs but should be noted as being present prior to commencement of mining operations.

- Where the water table is within 50 cm of the surface (e.g., wetlands), drain salvage areas using trenching[5] prior to salvage;
- As per the **Surface Erosion Prevention and Sediment Control Plan (S13.0-C17) (SEPSCP)**, establish erosion and sediment controls on stripped areas to reduce erosion risk and protect water quality, such as:
  - apply seed or other temporary covers on exposed areas that will not promptly have mine facilities constructed on them;
  - use berms, waterbars, and ditches to direct runoff away from rivers and streams;
  - create sediment ponds to allow settling of sediments during higher-runoff events; and
  - install silt fencing, straw wattles and check dams for additional sediment capture.

8.1.3 Reclamation Material Stockpiling

Surface soil of different suitability classes stockpiled at the Rock Quarry and Rail Infrastructure will be stored within one (1) stockpile at each area, but at different ends of stockpiles to limit mixing and dilution of specific properties—this is anticipated to be feasible given the small size of these stockpiles. The Bypass Road stockpile is a windrow running adjacent to the road. During reclamation, surface soil stored in the windrows will be pushed back onto the road, thereby maintaining the pre-development heterogeneity and distribution of surface-soil suitability classes.

8.1.3.1 Best Management Practices (BMPs)

Over time, erosion can reduce the quality and quantity of stockpiled soil. Invasive or unwanted plant species can also become established and may create a source of these species for adjacent and future reclamation areas. The following best practices will be followed to maintain and protect materials stockpiled within the ALR:

- Stockpiling surface soils in the ALR will be supervised on-site by a QP with expertise in soils and reclamation;
- Select stable stockpile locations that are not at risk of rehandling or intrusion by machinery over the stockpile life prior to use;
- Ensure that stockpiles are located at least 10 m from any materials that could negatively affect the quality of the materials;
- Segregate different suitability classes of surface soils into separate stockpiles or separate portions of stockpiles;
- Construct stockpiles to minimize wind and water erosion, as prescribed by the **CEMP** and to meet the geotechnical stability standards required by Code and engineering designs, including:
  - Storage on stable, level, well-drained ground, and stockpiles not exceeding 6 m in height where possible or use overall slopes of horizontal (H) to vertical (V) 3H:1V for the stockpile with a catch bench of 10 m between lifts;
  - Surface Soil Stockpiles will be located at least 15 m from any watercourse, runoff pathways to ditches or watercourses, and other sensitive environmental features to reduce the risk of sediment transport to downstream environments;

[5] Trenches are dug along the edges of a salvageable wetland area and allowed to fill with water. Drained surface soil can then be salvaged and stockpiled.

- Reduce erosion and establishment of invasive species by seeding stockpiles with non-propagating grass species, native grasses, and forbs, and planting with tree and shrub species such as Sitka alder and trembling aspen (unless sufficient natural regeneration is occurring). Aggressive agronomic species should be avoided, as they will be transferred with the reclamation materials during placement and may not meet end land use objectives. Seeding or planting soil stockpiles with species intended for the closure landscape can also help build a seedbank in the reclamation material;
- Clearly sign stockpile locations and material types and ensure that personnel are aware of their presence, to prevent inadvertent contamination, burial, or removal;
- Maintain a reclamation-materials balance which will account for current stockpiles and will detail:
  - when a new stockpile is established, along with its initial volume;
  - material type of each stockpile; and
  - when material is added to or removed from an existing stockpile, with the resulting volume of the stockpile.

8.1.4 Material Application for Reclamation

8.1.4.1 Surface Soil Requirements and Cover Design

Surface soil will be replaced to a depth that is approximately equivalent to pre-Project depths and replaced surface soil will have an AWSC approximately equivalent to surface soil present prior to Project development to restore a land condition and capability like that of the pre-development landscape. Planned surface-soil cover depths for Project components occurring within the ALR are listed below.

- The Rail Infrastructure will have 0.35 m of mineral surface soil placed. This will primarily consist of low-AWSC surface soil, though a small amount of high-AWSC surface soil may be salvaged from localized areas and placed (see **8.1.2**). This cover design reflects the soil depth and characteristics present in this area prior to Project development;
- The Rock Quarry will have 0.30 m of high-AWSC mineral surface soil placed; and
- The portion of the Bypass Road being reclaimed will have a 0.40 m of surface soil placed, consisting primarily of high-AWSC mineral surface soil with lesser amounts of low-AWSC mineral soil and organic soil. Because surface soil salvaged along the Bypass Road will be stored in windrows adjacent to the Road, the cover material in this area will have the same characteristics as the pre-development surface soils.

A summary of planned surface soil salvage depths and corresponding volumes, and cover depths and corresponding volume requirements by Project component in the ALR are shown in **Table 8.1-2** It is estimated that 153,900 cubic metres (m^3) of surface soil will be required for reclamation of Project Components within the ALR, as follows:

- 117,134 m^3 of high-AWSC soil;
- 36,419 m^3 of low-AWSC soil; and
- 347 m^3 of organic soil.

Table 8.1-2: Surface Soil Requirements and Cover Design for Project Component Footprints within the Agricultural Land Reserve (ALR)

Project Component	Area (ha)	Pre-development Agricultural Capability[6]	Soil Suitability Class	Area (ha) Salvaged	Salvage Depth (m) / Volume (m^3)	Area Replaced (ha)	Replacement Depth (m)/ Volume (m^3)	Balance between Salvage and Replacement (m^3)***	Final Proposed Agricultural Capability[7]
Rail Infrastructure	14.3	5	Low-AWSC mineral	12.8[8]	0.35 / 40,962	11.29	0.35 / 39,200	3,525	5
			High-AWSC mineral	1.0	0.40 / 1,763				
Rock Quarry	4.6	5	High-AWSC mineral	4.5	0.40 / 17,994	4.5	0.30 / 13,500	4,494	5
Bypass Road*	25.6	4	Low-ASWC mineral	0.9	0.40 / 3,769	25.3	0.40 / 101,200	293	4 (east end) 5 (west end)
		4 (east end) 5 (west end)	High-AWSC mineral	24.3	0.40 / 97,377				
		5	Organic	0.02	2.0 / 347				
Soil Stockpiles (windrow)[10]	4.5	4	Low-ASWC mineral	0	0 / 0	0	0 / 0	0	4 (east end) 5 (west end)
		4 (east end) 5 (west end)	High-AWSC mineral						
		5	Organic						
Totals	**49.1**	**Multiple**	**Multiple**	**43.5**	**162,212****	**41.0**	**153,900****	**8,312**	**Multiple-**

Notes: *AWSC=available water-storage capacity; ha=hectare; m^3=cubic metre*
**Bypass Road area and associated surface soil salvage and replacement volumes represent only the portion of the Bypass Road occurring within ALR and exclude portions of the TAC and Bypass Road located outside of the ALR boundary*
****Any balance material that is remaining will be used to provide additional diversity in the final reclaimed landform*

[6] Pre-development agricultural capability is based on the dominant agricultural capability of polygons intersecting and adjacent to Project components in the ALR (Map 2, Appendix 6-B).
[7] Final proposed agricultural capability is based on the dominant agricultural capability of polygons intersecting and adjacent to Project components in the ALR (Map 2, Appendix 6-B). Because surface soils will be returned to the same area from which they were salvaged, at approximately the same cover depth, it is expected that the agricultural capability of these areas will be conserved.
[8] A septic field, the soil stockpile area, and existing buildings in the Rail Infrastructure are exempt from soil salvage.
[9] Surface soil will not be replaced at the soil stockpile and the Rail Infrastructure Sedimentation Pond.
[10] Refers to the windrowed stockpile located adjacent to the Bypass Road. Soil under the windrow will not be salvaged or replaced.

8.1.4.2 Soil Materials Balance

A detailed materials balance for soil is presented in **Table 8.1-3**, showing required and available surface soil broken down by soil stockpile and Project component within the ALR. Soils salvaged at these Project features will be stockpiled at each location and replaced following mining, as outlined in **8.1.4.1**. This approach is efficient for minimizing hauling of soil and enables the soil types and capabilities present in the ALR pre-mining to be conserved.

Table 8.1-3: Surface Soil Materials Balance by Stockpile

Stockpile/Project Component	Surface Soil Suitability Class	Stockpiled Surface Soils by Suitability Class (m^3)	Total Available Surface Soils in Stockpiles (m^3)	Surface Soils Required for Reclamation (m^3)	Balance* between Reclamation Requirements and available Surface Soils (m^3)
Rock Quarry	High-AWSC mineral	17,994	17,994	13,500	4,494
Tenas Access Corridor - Bypass Road Portion Only**	High-AWSC mineral	97,377	101,493	101,200	293
	Low-AWSC mineral	3,769			
	Organic-mineral mix	347			
Rail Infrastructure	High-AWSC mineral	1,763	42,725	39,200	3,525
	Low-AWSC mineral	40,962			
TOTAL	High-AWSC mineral	117,134			
	Low-AWSC mineral	44,731			
	Organic-mineral mix	347			
GRAND TOTAL	**Multiple**	**162,212**	**162,212**	**153,900**	**8,312**

Notes: *AWSC=available water-storage capacity; m^3=cubic metres*
**Any surface soils that is remaining after landforms are covered will be used to provide additional diversity in the final reclaimed landform*
*** (110,400 m^3 is the total for entire Tenas Access Corridor [TAC])*

8.1.4.3 Best Management Practices (BMPs)

Reclamation materials will be placed as facilities acquire their final topography through deposition and landform grading. Placement within +/- 20 cm of target depths is acceptable; achievement of target ecosystems is not expected to be compromised if overall average depths for each hectare are to specifications. To the maximum extent practicable, placement operations will avoid excessively dry conditions to reduce dust generation and excessively wet conditions to reduce the risk of erosion and compaction.

Placement of reclamation materials will be accomplished using large equipment, primarily bulldozers, in a manner that generates microtopography to improve microsites for plants and reduces erosion. Stakes flagged to the specified soil replacement thickness for each area will be used to guide the machine operator. Equipment operators should not seek to create planar surfaces with exact material depths, rather it is preferable to have surface roughness and undulations. Dozer and/or excavator ripping, surface loosening and/or mounding with an excavator bucket, or other means of site preparation may be applied if additional decompaction is necessary or further creation of microtopography is desired. Where applicable, site

preparation will occur in consultation with the landowner (if on private land) or land management agency (if on Crown land).

The following practices will be followed to maintain the quality of replaced surface soils and maximize achievement of reclamation objectives:

- Surface-soil replacement will be supervised on-site by a QP with expertise in soils and reclamation;
- Clean equipment used in placement and spreading/contouring prior to use to prevent establishment of invasive species;
- Avoid placing reclamation materials in excessively wet conditions to reduce material compaction, material loss to erosion and instability of placed materials;
- If reclamation materials are placed in excessively dry and/or windy conditions, apply water to materials to reduce the risk of dust generation and loss of fine material;
- Remove snow prior to placement if feasible, to prevent mixing, uneven placement, and material instability;
- Policy P-13 of the *Agricultural Land Commission Act* (ALC 2021) recommends screening of surface soils when coarse fragment content is greater than (>) 5%;
- Where applicable, reclamation areas may be top-dressed with a suitable organic matter (e.g. cereal/forage cover crop);
- Follow erosion and sediment controls described in the **Surface Erosion Prevention and Sediment Control Plan (S13.0-C17) (SEPSCP)** to reduce erosion risk in reclaimed areas and protect waterways, such as:
  - using slope contouring and landform grading to direct runoff;
  - creating microtopography on the surface to shorten flow-path lengths on reclaimed slopes;
  - revegetation;
  - armouring channels in reclaimed areas as needed;
  - using mulch, rolled erosion control product or polyethylene covers on areas with elevated erosion risk;
  - using berms, waterbars, and ditches to direct runoff away from erosion-susceptible areas;
  - creating sediment ponds to allow settling of sediments during higher-runoff events; and
  - installing silt fencing, straw wattles and check dams for additional sediment capture.

If the Project Area/footprint areas being reclaimed is not scheduled to immediately return to agricultural use, the following seedbed preparation and surface rehabilitation measures may be taken if applicable:

- Till the seedbed immediately prior to seeding. Avoid tilling in conditions that are excessively wet, dry, or windy to reduce material compaction, material loss to erosion and instability of placed materials. Till across slopes to reduce runoff velocity and rill formation;
- Equipment used for tilling will be selected based on the soil condition specific to each area. In areas with thin topsoil (i.e., the Rail Infrastructure area), cultivators and harrows will be used rather than plows or deep discs to avoid mixing topsoil with the underlying subsoil; and

- Seed with an appropriate agronomic species and fertilize as soon as possible to reduce erosion and the establishment of invasive species. The selection of seeding rate, mix, and fertilizer will be guided by a QP.

8.1.5 Trigger Action Response Plan (TARP)

- A Trigger Action Response Plan (TARP) is provided in **Table 8.1-4** to guide implementation of best practices during salvage, stockpiling, and placement of surface soils.

Table 8.1-4: Trigger Action Response Plan for Surface Soil Salvage and Placement

Activity	Issue	Normal		Caution		Stop Work	
		Trigger	Action	Trigger	Action	Trigger	Action
Surface-Soil Salvage	Rain	No precipitation	Salvage as per SMP	Ongoing or recent light to moderate rain; soil not sticking to equipment (e.g., excavator bucket)	Notify supervisor; monitor precipitation gauges and soil conditions	Ongoing or recent heavy rain; soil not sticking to equipment (e.g., excavator bucket)	Notify EC; stop salvage; implement **SEPSCP** measures
	Wind	No or light wind	Salvage as per SMP	Moderate (some surface soil lifted, typically < 30 km/h)	Notify supervisor; monitor wind levels	Heavy wind erosion (e.g., location hazardous to personnel, substantial soil is being lifted)	Notify EC; stop salvage; implement **SEPSCP** and **AQMP** measures
	Snow / frozen soil	No snow present; soil not frozen	Salvage as per SMP	Snow may or may not be present; soil not frozen at salvage depth	Remove any snow present	Soil frozen at salvage depth	Notify EC; stop salvage until no longer frozen to salvage depth
	Steep slope	Located on flat surface	Salvage as per SMP	Located on slope (<26°)	Ensure machinery is stable and operator is trained for task	Location hazardous to personnel (slope ≥ 26°)	Notify EC; plan for mitigation or avoidance
Surface-Soil Stockpiling	Wind erosion	No visible wind erosion	Stockpile as per SMP	Moderate (some surface soil lifted, typically < 30 km/h)	Notify supervisor; monitor wind levels	Heavy wind erosion (e.g., location hazardous to personnel, substantial soil is being lifted)	Notify EC; stop stockpiling; implement **SEPSCP** and **AQMP** measures
	Water erosion	No visible water erosion	Stockpile as per SMP	Visible water erosion (e.g., rills)	Notify supervisor; assess existing water catchment features and vegetation on stockpile	Heavy water erosion (e.g., structural damage to surface)	Notify EC; stop stockpiling; implement **SEPSCP** measures
	Rain	No precipitation	Stockpile as per SMP	Ongoing or recent light to moderate	Notify supervisor; monitor precipitation	Ongoing or recent heavy rain; soil not	Notify EC; stop stockpiling

Activity	Issue	Normal		Caution		Stop Work	
		Trigger	Action	Trigger	Action	Trigger	Action
				rain; soil not sticking to equipment (e.g., excavator bucket)	gauges and soil conditions	sticking to equipment (e.g., excavator bucket)	
	Snow	No snow present	Stockpile as per SMP	Starting to snow or snow in forecast	Monitor snowfall	Snow present	Stop stockpiling; remove snow prior to further placement
Reclamation Material Placement	Wind erosion	No visible wind erosion	Place soil as per SMP	Moderate (some surface soil lifted, typically <30 km/hr)	Notify supervisor; monitor wind levels	Heavy wind erosion (e.g., location hazardous to personnel, substantial soil is being lifted)	Notify EC; stop placement; implement **CEMP** or **SEPSCP** and **AQMP** measures
	Water erosion	No visible water erosion	Place soil as per SMP	Visible water erosion (e.g., rills)	Notify supervisor; assess existing water catchment features and vegetation on slope	Heavy water erosion (e.g., structural damage to surface)	Notify EC; stop placement; implement **CEMP** OR **SEPSCP** measures
	Rain	No precipitation	Place soil as per SMP	Ongoing or recent light to moderate rain; soil not sticking to equipment (e.g., excavator bucket)	Notify supervisor; monitor precipitation gauges and soil conditions	Ongoing or recent heavy rain; soil not sticking to equipment (e.g., excavator bucket)	Notify EC; stop placement
	Snow	No snow present	Place soil as per SMP	Starting to snow or snow in forecast	Monitor snowfall	Snow present	Stop placement; remove snow prior to further placement

Notes: *<=less than; AQMP=Air Quality Management Plan; CEMP=Construction Environmental Management Plan; EC=Environmental Coordinator; km/hr=kilometres per hour; SEPSCP=Surface Erosion and Sediment Control Plan; SMP=Soil Management Plan*

8.2 Fill Certification Procedures

Gravel, rock, and other subgrade materials (i.e., fill) will be used to achieve the final designed grades illustrated in **Appendix 13.15-A-D** during construction of the Bypass Road and Rail Infrastructure while no fill is required to construct the Rock Quarry as provided previously by **Figures 6.3-**1 through **6.3-3**. An estimated volume of 103,750 m^3 of material will be placed as fill including overburden (72,500 m3 not including overburden) but not including surface soils within the footprint for the Rail Infrastructure and Bypass Road. These materials, and the criteria against which they have been deemed acceptable for use in Project components within the ALR are described below for Rail Infrastructure.

- Gravel fill (approximately [~] 7,000 m^3) sourced from the Project's Gravel Quarry compacted to at least 98% proctor density. Quality of this material has been deemed acceptable given that it originates from the same predominant parent materials and holds the same characteristics as the placement locations. Verification testing will be completed during excavating this material for use. Verification testing will be completed during actual excavation in the construction phase to ensure material meet Project specifications and material is deemed acceptable for fill within the ALR;
- Clean rock ballast (~11,000 m^3) sourced from the Kulum Quarry, which is located offsite. Materials from the Kulum Quarry have been approved by Canadian National Railway (CNR) for construction of the Rail Infrastructure and are used extensively throughout the region including on lands within the ALR. Verification testing will be completed during actual excavation in the Construction Phase to ensure material meet Project specifications and material is deemed acceptable for fill within the ALR;
- Overburden fill (~22,000 m^3) excavated from the within the footprint of the Rail Infrastructure and used with this same footprint for construction activities. This material is already within the ALR, so it has been deemed acceptable to use;
- An estimated 30,000 tonnes or 30,000 m^3 of processed coal from site will be temporarily placed for storage until these stockpiles are completely shipped offsite prior to the Decommissioning and Reclamation phase; and
- Topsoil (~42,725 m^3) salvaged from site and holding the same characteristics as the placement locations. Surface soils will be salvaged and placed for reclamation purposes.

For construction of the TAC of which the Bypass Road is a part of the following volumes will be sourced either from approved British Columbia Ministry of Transportation and Infrastructure (BC MOTI) Quarries in the region or from deposits controlled by TCL;

- Reclamation materials (soil) ~110,000 m^3 (approximately 90% is associated with the Bypass Road portion only within the ALR) of topsoil salvaged from site and holding the same characteristics as the placement locations. Soil will be salvaged and placed for reclamation purposes;
- ~22,000 m^3 (approximately 75% is associated with the Bypass Road portion only within the ALR) of high fines surface aggregate compacted to at least 98% proctor density sourced from one of three locations, the Project's Gravel or Rock Quarries, or an offsite MOTI approved quarry. Verification testing will be completed during actual excavation in the construction phase to ensure material meet Project specifications and material is deemed acceptable for fill within the ALR;
- ~16,000 m^3 (approximately 75% is associated with the Bypass Road portion only within the ALR) of Well Graded Base (WGB) compacted to at least 98% of proctor density sourced from one of three locations, the Project's Gravel or Rock Quarries, or an offsite BC MOTI approved quarry.

Verification testing will be completed during actual excavation in the construction phase to ensure material meet Project specifications and material is deemed acceptable for fill within the ALR;

- ~10,000 m^3 (approximately 75% is associated with the Bypass Road portion only within the ALR) of Open Graded Base (OGB) compacted to at least 98% of proctor density sourced from one of three locations, the Project's Gravel or Rock Quarries, or an offsite BC MOTI approved quarry. Verification testing will be completed during actual excavation in the construction phase to ensure material meet Project specifications and material is deemed acceptable for fill within the ALR; and
- ~37,000 m^3 (approximately 75% is associated with the Bypass Road portion only within the ALR) of overburden excavated from within the footprint of the Bypass Road and used within this same footprint for construction activities. This material is already within the ALR, so it has been deemed acceptable to use.

8.3 Erosion and Sedimentation Management

Guidance, prescriptions, and best practices for proactive management of runoff, erosion, and sedimentation for the entire Project Area/footprint (i.e., both ALR and non-ALR designated lad areas) during the Construction, Operation, Decommissioning and Reclamation, and Post-closure phases are provided by the **CEMP**, **SEPSCP** and the **Minesite Water Management Plan (S13.0-C11) (MWMP)**. Additional management processes and procedures specifically related to the Construction phase of the Project are described in the **CEMP**. Key elements of effective erosion and sediment control planning as outlined in the **SEPSCP** and **CEMP** include:

- minimizing Project footprints;
- implement runoff, erosion, and sediment control in that order of priority;
- protecting streams and stabilizing runoff paths;
- establishing non-contact water diversions to minimize volume of contact water generated;
- phased construction to minimize soil exposure;
- vegetative buffer retention downslope of Project components;
- stabilizing exposed soils as soon as practical;
- educating and training employees and contractors of the CEMP and SEPSCP and make sure they are familiar with the implementation, inspection, and maintenance of the required practices;
- maintain proper communications with the Independent Environmental Monitor (IEM) and EAO during construction;
- continually inspect and maintain practices, complete risk assessments as construction proceeds and update the **CEMP** and **SEPSCP** accordingly; and
- build contingency measures into the **SEPSCP** to address events such as substantial rainfall or rain on snow and winter shutdowns.

Risk factors, erosion potential, and best management practices for Project components located within the ALR are outlined in the following subsections.

8.3.1 Bypass Road (Portion of the Tenas Access Corridor [TAC])

Unpaved and active road surfaces provide a unique challenge to erosion and sediment control management as they can cross large areas and encounter diverse environmental conditions and sensitivities, including streams, wetlands, seepage areas and steep terrain. The Bypass Road is in areas that are flat, but active road surfaces can mobilize sediment which pose a risk to downstream aquatic habitats. This risk is more of an issue at stream crossings and in the Goathorn Creek Valley.

The Bypass Road is new construction (11.0 km) required by the TAC and has several watercourse crossings, and some of the watercourses are fish bearing. The Bypass Road will be in place throughout the Operation, Reclamation and Decommissioning, and for a portion of the Post-closure phases of the Project. Soils typically encountered along the Bypass Road are medium to fine-textured silts, clays, and loams. Areas with elevated erosion risk and proximity to watercourses have been noted and will require robust temporary measures including runoff, erosion, and sediment control applications during construction subphases until permanent measures can be implemented.

BMPs for the construction and maintenance of the Bypass Road are provided below:

- Road and channel grades will be minimized to the extent practical to reduce erosion potential;
- Roads will be graded to produce a crown, and in-slope or out-slope design will be undertaken to avoid puddling. Grader operators will be instructed not to blade road material or snow into stream channels or diversion channels;
- Runoff will be collected in channels and directed to basins, small settling ponds and vegetated areas, where practical. During construction, appropriate ditching, kickouts, culverts, shallow water bars and grading will be implemented to direct runoff away from watercourses;
- Small sumps and sediment catch basins will be used to protect the upstream end of culverts from plugging with sediment and debris. The culvert will be installed deep enough to prevent it from being crushed by traffic loads;
- If the stream is fish-bearing, the culvert will be sized for 1 in 200-year flows;
- Culvert inlets and outlets will be armoured up to just below the road surface;
- If possible small pools for water velocity control will be constructed at the inlets and outlets of culverts;
- Direct connection of permanent roadside channels to watercourses will be avoided where possible. If ditches must be connected to watercourses, sufficient erosion control will be implemented in the ditch bottom using standard best management practices (provided in the **CEMP**);
- Road surfaces will be capped with appropriate material in areas where sensitive environmental features are present or on steep gradients; and
- Maintenance will include grading and replacement of surface material as required to avoid wash-boarding, potholes, and puddling of surface water.

Additional BMPs for the construction, maintenance, and upkeep of structures associated with road construction and maintenance, such as ditches, cross drains, culverts, and bridges, are provided in the **CEMP** and in the **SEPSCP**.

8.3.2 Rail Infrastructure

The Rail Infrastructure will be developed on private land owned by TCL. The Rail Infrastructure will be located on an inactive, stable part of the Bulkley River floodplain with no evidence of annual flooding or overbank flow, based on past storm events. The Rail Infrastructure will be built on gentle slopes and is not associated with watercourse crossings and is considered to have a lower risk of erosion and sedimentation, but as an active Rail Infrastructure facility, exposed soils and coal accumulation could pose a risk to downstream aquatic habitats.

During the Construction phase, forest clearing will occur first, and suitable mineral surface will be salvaged and retained for use during reclamation (**Section 8.1.2**). Clearing and grubbing will be limited to the areas needed for safe construction of the Rail Infrastructure; pockets of undisturbed ground and vegetation will be retained in the centre of the Rail Loop to the extent practical.

Contact water will be directed to the Rail Infrastructure Sedimentation Pond and subsequently discharged via an engineered spillway and/or a pumping system to an unnamed tributary of the Bulkley River. Predominant soils at the discharge location are coarse sands and silt that are well drained; however, there is a component of fine-textured, silty clay soils that are poorly drained, as they lack coarse fragments. Topography slopes east to west and cuts and fills will be required to construct a near zero grade rail loop. Sediment-laden water generated during construction will be captured using temporary ditching and sumps strategically placed in areas where infiltration is more likely to occur. The culvert outlet and spillway will be armoured using suitable erosion protection material to prevent scouring and downcutting.

8.3.3 Rock Quarry

The Rock Quarry will be developed within Crown Land along the Bypass Road **(8.3**) to support road construction. Quarry development will involve clearing and grubbing, removal of overburden followed by excavation, crushing, and stockpiling of rock materials. BMPs for quarry sites are outlined below.

- organic and fine-grained soils removed from the quarry locations will be stockpiled for use in future reclamation;
- the Rock Quarry will be developed with slopes that are in a stable configuration and reclaimable and re-vegetated or otherwise reclaimed after construction is complete; and
- perimeter ditches or berms will be placed upslope of the area prior to the start of construction to divert non-contact water from entering the Rock Quarry, where feasible.

8.4 Drainage and Water Management

The drainage and water-management plan for the ALR usage by the Project is informed by both the **MWMP** and the **Discharge Management Plan (S13.0-C5) (DMP).** The objectives of the water-management system include water monitoring and BMPs to minimize the potential effects on the downstream environment within and beyond the Project Area such that water-quality and water-quantity objectives and/or regulated discharge parameter limits and rates are achieved.

Diversion channels designed to route runoff from undisturbed areas (non-contact water) around Project infrastructure into adjacent creeks and rivers will be implemented, maintaining pre-existing watershed drainage conditions wherever feasible. Collection channels are designed to collect runoff from mine areas (contact water) for suspended-solids treatment prior to discharge to the environment. Erosion protection for channels and ponds was selected based on the design life of each structure and the expected velocities

during design flood events. Many of the water channels are lined with turf reinforcement mats for erosion protection to promote vegetation growth, if channels are permanent and as specified for erosion, while higher-risk structures (i.e., steeper channel segments, channels with design lives extending post-closure, and spillway channels) are lined with riprap.

In addition, sedimentation ponds will be situated downstream of pads and working areas, including the Rail Infrastructure area within the ALR. Sedimentation ponds are designed in accordance with the British Columbia Ministry of Environment (BC MOE) Technical Guidance 7 in Environmental Management: Assessing the Design, Size, and Operation of Sediment Ponds Used in Mining (BC MOE 2015) to control sediment release from the Project to the environment. The Rail Infrastructure Sedimentation Pond will be discharged via an engineered spillway and/or a pumping system to an unnamed tributary of the Bulkley River.

During the Post-closure Phase, the following water-management reclamation activities will take place in the Project Area/footprint, including the ALR portion of the Project Area/footprint:

- diverting water around working areas and collecting water within working areas during the Decommissioning and Reclamation Phase;
- removing culverts in spillways and replacing with wide trapezoidal spillway geometry;
- establishing vegetation within permanent engineered channels that are lined with turf reinforcement mats, rip rap and/or other erosion specifications, if required by the design;
- monitoring of water quality during decommissioning of the Rail Infrastructure area in the associated sedimentation pond. After decommissioning of upstream infrastructure is complete, and water quality meets discharge criteria, the sedimentation pond will be breached. The Rail Infrastructure Sedimentation Pond will be either be filled in or left as a natural water feature, and
- decommissioning pumping systems and removing equipment offsite.

8.5 Vegetation Management Plan (VMP)

The **VMP** provides guidance, prescriptions, and best practices to avoid or minimize potential effects of the Project on vegetation and ecosystems for the entire Project Area/footprint (i.e., both ALR and non-ALR designated areas). The **VMP** will be in place during the Construction, Operation, Decommissioning and Reclamation, and Post-closure phases of the Project and will be subject to ongoing management review and revision as required. If monitoring identifies a need for additional or revised mitigation measures, a process of adaptive management will be triggered.

A set of best management practices to minimize Project effects, including within the ALR on vegetation and ecosystems is outlined in the **VMP** and is provided in the list below.

- Place temporary and permanent infrastructure and Project features within existing disturbance for the Project Area and limit clearing of vegetation within Project Area, where possible;
- Avoid clearing of vegetation and salvage of soils by clearly delineating Project footprint boundaries (e.g., with the use of fencing, staking, or flagging), adhering closely to construction plans and schedules, and by restricting offsite machine use;
- Locate and construct temporary workspaces or laydown areas within existing disturbance or on previously compacted soils, where practicable. In areas requiring clearing only, avoid grubbing and

retain roots and groundcover to the extent feasible. Do not dispose of vegetation debris in any waterbody;

- Where practical, minimize the potential for windthrow along the edges of the Project Area by retaining windfirm trees, feathering edges, and topping/pruning individual trees;
- Maintain hydrological connectivity by providing unobstructed passage of water in drainage channels through fill materials (e.g., using free-span bridges or culverts at water body crossings) in accordance with the **DMP**;
- Implement the **SEPSCP**, including constructing sediment-control facilities such as diversion and collection channels and sediment ponds;
- Use progressive reclamation techniques to limit the amount of exposed area at a given time by sequencing open pits and piles to the extent feasible, backfilling of open pit, where possible, directly placing growth media, and placing materials on previously disturbed areas;
- Salvage growth media for later use, in accordance with **8.1.2**, the **RCP** and **SMP**;
- Vegetate temporary surface soil stockpiles with vegetation to minimize erosion and sediment release, to prevent subsequent effects to water quality, and to prevent losses of growth media and if necessary, implement the Invasive Plant Management Plan in **8.6;**
- Implement progressive reclamation on embankments, buttresses, backfills, and other Minesite components where possible to minimize fugitive dust emissions;
- Shape and contour the reclaimed landscape to achieve variations of slope steepness, slope length, aspect, and form like that of the pre-development conditions, to assist in creating equivalent agricultural land capability in the post-development landscape;
- De-compact soil materials, as necessary, to establish suitable conditions for revegetation;
- Cover/resurface/recontour terrain features (e.g., highwalls) with non-potentially acid generating (non-PAG) rock and overburden where possible; and
- Revegetate with native plant species appropriate for the target ecosystems in areas not used for agricultural purposes, and with appropriate agronomic species in agricultural areas that are not immediately returned to agricultural use (**8.1.4.3**). Planting and/or seeding prescriptions should be appropriate with the region and land use and should be selected in consultation with the landowner (private land) or land management agency (Crown land).

8.6 Invasive Plant Management Plan

Vegetation clearing and soil salvage and replacement is expected to create favourable habitat for the introduction and proliferation of invasive plants. Vehicles and construction equipment can inadvertently transport seeds and other invasive-plant propagules in tires or the undercarriage to previously unaffected areas. Invasive plants can also be contained in seed mixes used during reclamation.

Mitigation measures to avoid or minimize the introduction and proliferation of invasive plants (including noxious weeds) into the ALR during Project phases are guided by the **VMP**, and are summarized below:

- Equipment and vehicles will arrive at the Project Area clean, and will be inspected for soil, plant material, and seeds to limit the potential for the introduction of invasive plants;
- Limit clearing of vegetation and soil salvage within the Project Area and footprint, where possible;

- Salvage growth media for later use **(8.1.2)**, in accordance with the **RCP**;
- Vegetate temporary growth media stockpiles to minimize erosion and sediment release, to reduce downstream effects to water quality, and to prevent losses of growth media;
- Gravel, fill, straw matting, or similar materials to be used for erosion control will be inspected to minimize the potential for seeds or propagules of invasive plants being brought to site;
- Avoid areas with a high risk for the potential spread of invasive plants (i.e., within or adjacent to existing infestations) to the extent practicable; if work must occur in these areas, implement invasive-plant management in accordance with **10.2 (Invasive Plants)** of the **VMP**;
- Invasive-plant occurrences will be documented using standard field forms such as the Site & Invasive Plant Inventory Record from the Invasive Alien Plant Program (IAPP) Database (BC MFLNRORD 2020). Use of standard field forms will support consistent data collection in accordance with current provincial standards;
- Seed used during revegetation will be certified weed free, with a valid “Certificate of Seed Analysis”; and
- Use progressive reclamation techniques to limit the amount of footprint at a given time by sequencing open pits and piles to the extent feasible, backfilling of open pit, where possible, directly placing growth media, and placing materials on previously disturbed areas.

9. RECLAMATION AND CLOSURE PRESCRIPTIONS

TCL is committed to the timely and effective reclamation of Project features in the ALR, and as such, will implement reclamation and closure prescriptions at the final closure of the Project as approved by regulatory authorities that are intended to restore affected areas to pre-development average capability. Reclamation and closure prescriptions for Project components and infrastructure within the ALR are provided in the following subsections. Reclamation performance will be assessed during the Post-closure phase of the Project, using monitoring prescribed by the RCP and soil, vegetation, and topographical conditions of adjacent, undisturbed areas of the ALR as indicators of target land capability and conditions.

9.1.1 Rail Infrastructure

The Rail Infrastructure occurs on Private land owned by TCL consisting of both undeveloped forest and hayland/pasture. At post-closure, the Rail Infrastructure will be decommissioned and reclaimed, unless there is interest in retaining it from other users in the region, such as CNR. Powerlines and facilities will be removed. The Rail Infrastructure Sedimentation Pond will be left as a natural water feature once water quality monitoring shows TSS levels meet regulatory requirements for a period provided by regulatory agencies.

After decommissioning infrastructure, surface soil that was salvaged during construction will be replaced **(8.1.4**). This area will be reclaimed back to forested land (through seeding or planting of native species) and/or to pasture/hayland (through seeding of mixed forage species) to enhance agricultural land use by achieving capability for sustained perennial forage species and/or grazing.

9.1.2 Bypass Road

The Bypass Road is primarily located on Crown Land, and on a lesser amount of private land. The current land use is mostly undeveloped forest, in addition to a small portion of hayland/pasture and cultivated cropland mainly within the private land portions.

At post-closure, the Bypass Road will be ripped, recontoured, resloped, and salvaged surface soils (stored in windrows) will be replaced unless there is interest from the Region to retain this feature. The Bypass Road will primarily be reclaimed to forested land through seeding and/or planting of native species; land management will comply with the Code and other applicable land management requirements. The small portion coinciding with agricultural land use on private land parcels will be reclaimed to cultivated cropland or the given land use and cover vegetation at the time of reclamation.

9.1.3 Rock Quarry

At closure, the Rock Quarry will be decommissioned, backfilled using materials that have been deemed acceptable for use in Project components within the ALR (as described in **8.2**), and resloped to a stable configuration. The Rock Quarry is located on Crown Land, will be reclaimed back to forested land through seeding and/or planting of appropriate native species.

10. MONITORING

Monitoring of soil salvage, stockpiling and material application on ALR designated lands, as described throughout this Plan, is summarized in this section. Regular monitoring will be conducted and at a minimum will include the following activities:

- **Salvage** – Daily visual inspections will be conducted by a QP during salvage operations to confirm that:
  - weather and soil moisture conditions are appropriate for salvage;
  - target reclamation material is being salvaged, as practical;
  - suitability criteria defined in **8.8.1** are being applied;
  - target salvage depths are being achieved (**8.1.2**);
  - surface soil material of different suitability classes are being appropriately segregated. If, during salvage operations, suitability and salvageability of surface soil varies substantially from that indicated by mapped units, the reclamation-materials balance will need to be reviewed to confirm that adequate volumes of each surface soil material type are still available to meet reclamation material needs and salvage criteria (e.g., area, depth, suitability) may need to be adjusted accordingly;
- **Sampling –** Sampling of salvaged reclamation materials will be conducted during salvage and/or application as per the RCP to confirm material properties and suitability for reclamation;
- **Stockpiling –** Weekly stockpile development inspections (including consideration of foundation, layout, slope, and lift height) and completion inspections of the final structure, as well as inspections required for erosion monitoring will be conducted. Stockpile volume and location tracking will be carried out during salvage and stockpile operations as described in **8.1.3**. Along with volume tracking, the reclamation-materials balance will need to be reviewed to confirm that material availability and suitability aligns with mapped polygons and verify the accuracy of the projected reclamation-materials balance;
- **Stockpile Inspections** – Bi-annual inspections of stockpiles in spring and fall will be conducted to assess revegetation status, presence of invasive or non-desirable species and evidence of erosion. Presence of identification signage will also be confirmed. As detailed in the **CEMP** and **SEPSCP**, during inclement weather conditions, erosion and sediment control structures and stockpile stability will be inspected at least daily where practical and required maintenance will be conducted immediately, provided it is safe to do so. Erosion and sediment control materials and pumps will be stored where they are readily accessible;
- **Material Application** – Completion inspections of final grading, application depth, decompaction, surface roughening, and long-term stabilization in **8.1.4** (erosion and sediment control measures, revegetation) will be conducted; and
- **Reclamation P**erformance – Research trials, progressive reclamation and operational reclamation areas will be monitored over time per the **RCP** to validate modeled soil properties, verify the suitability of the applied reclamation materials, and assess the recovery of planned ecosystems.

Monitoring of Parameters of Potential Concern/Contaminants of Potential Concern (POPC/COPC) and Parameters of Concern/Contaminants of Concern (POC/COC) identified for aquatic life, wildlife, terrestrial vegetation, human health, and land uses will be conducted for soils, vegetation, sediment, and surface and groundwater

10.1 Performance Objectives

Performance objectives to ensure the proper implementation of this RCPLALR are shown in **Table 10.1-1**, which highlights the performance objectives and targets required to ensure the proper implementation of this RCPLALR.

Table 10-1: Performance Objectives

Objectives	Target
Environmental conditions are monitored at meteorological station and weather forecasting followed	▪ Weather and soil moisture conditions were appropriate for soil salvage and placement. ▪ Inspections required for erosion monitoring on stockpiles were conducted.
Sampling programs for salvaged soil quality	▪ Sampling of salvaged reclamation materials was conducted during salvage and/or application to confirm material properties and suitability for reclamation. ▪ Suitability criteria were applied
Salvage activity conducted per plan requirements	▪ Qualified Professionals (QPs) clearly marked and/or communicated to operators salvageable areas and areas that should be avoided during salvage. ▪ Target reclamation material is salvaged, as practical. ▪ Stockpile volume and location tracking were performed.
Stockpile inspections during salvage operations	▪ Weekly stockpile development inspections were completed (including consideration of foundation, layout, slope, and lift height); ▪ Completion inspections of the final stockpile structure was done. ▪ Bi-annual inspections of stockpiles in spring and fall were conducted to assess revegetation status, presence of invasive or non-desirable species and evidence of erosion. ▪ Identification signage for stockpiles confirmed.
Material balance reviewed and verified	▪ Reclamation-materials balance was reviewed annually to confirm that material availability and suitability aligns with mapped polygons. ▪ Accuracy of the projected reclamation-materials balance was verified and is appropriate for needs.
Material placement completed	Final grading, application depth, decompaction, surface roughening, and long-term stabilization (erosion and sediment control measures, revegetation) were appropriate as per inspections.
Reclamation success monitoring	Research trials, progressive reclamation and operational reclamation areas are monitored over time to validate modeled soil properties, verify the suitability of the applied reclamation materials, and assess the recovery of planned ecosystems.
Management plans followed	Other relevant management plans to the Reclamation and Closure Plan for Lands within the Agricultural Land Reserve (RCPLALR) and their associated performance objectives will be followed during Project phases: **Environmental Management System (EMS) (S13.0-C1), Air Quality (AQMP) (S13.0-C2), Construction Environmental management (CEMP) (S13.0-C4), Metal Leaching/ARD (ML/ARD) (S13.0-C12), Reclamation and Closure Plan (RCP) (S13.0-C15), Socio-economic Plan (SEMP) (S13.0-C16, Surface Erosion Control (SEPSCP) (S13.0-C17), Vegetation Management (VMP) (C13.0-18), Visual Resources (S13.0-C19) (VRMP), and the Wildlife Management Plan (VMP) (S13.0-21).**

11. REPORTING

11.1 General Reporting

Reporting will be used to confirm consistent implementation of the **RCP**, including monitoring and adaptive management measures employed, and the results from mitigation and monitoring programs. Summary reports of monitoring activities and results will be compiled and reviewed annually.

11.2 Compliance Reporting

Compliance reporting will be subject to the Environmental Assessment Certificate (EAC), *MA/EMA* permit conditions. The information gathered during monitoring practices will be summarized, with appropriate information from other management plans, into an Annual Environmental Management Summary Report and upon permitting completion, the Annual Environmental Reports as required by *MA/EMA* permits. Community engagement activities will be an aspect of the **SEMP**. The **SEMP** will have requirements related to reporting on community engagement programs**.**

11.2.1 Agricultural Land Commission (ALC) Closure Report

A closure report will be submitted to the ALC upon completion of reclamation works. The closure report is intended to demonstrate that the final land use objective has been achieved and the agricultural capability and suitability of the site has been restored or improved, and that operations within the Footprint area occurring in the ALR have complied with conditions of the ALC authorization. As per ALC requirements, the closure report will include photographs and a written description of aspects of the reclamation and will be completed by a QP after the second full growing season of reclaimed areas has occurred. The specific requirements of the closure report will be outlined in the conditions of the ALC authorization.

11.2.2 Annual Reclamation Report

Annual reclamation reports will be submitted in compliance with *Mines Act*, RSBC 1996, c 293 (GovBC 1996) permit conditions and the Code. Annual Reclamation Reports will also be submitted to Indigenous groups and will summarize activities conducted on the mine property on an annual basis, including:

- mine development, including surface mining, vegetation clearing, soil salvage, stockpiling, disposal, and storage of materials;
- compliance with requirements of non-farm approval from the ALC; and
- activities, research, and monitoring results associated with the development and implementation of the environmental protection programs detailed in the overarching EMS and relevant environmental management plans.

The Annual Reclamation Report will also provide a projection of mining and reclamation activities planned for the next five (5) years.

11.2.3 Five (5) Year Mine Plan and Reclamation Program Updates

An updated Five (5) Year Mine Plan and Reclamation Program will be prepared every five (5) years (or more frequently, if required to reflect major permit amendments) as per Part 10, Section 10.4.1 of the Code, which states:

(1) After commencement of operations, mine plans, including programs for reclamation and closure, shall be updated, at a minimum, every 5 years.

(2) Reclamation plans shall outline progressive reclamation activities for the 5 years following the date on which the plans are updated in accordance with subsection (1).

Updates to the ALR reclamation plan will present ongoing refinement of reclamation and closure planning, such as updates of the cover designs and revegetation prescriptions, based on results from ongoing monitoring and research. Updates to the **RCP** will present detailed reclamation and mine plans for the next five years and updated closure cost estimates to reflect the existing and planned activities, and liabilities on the site.

11.3 Internal Reporting

The results from implementation of mitigation measures, monitoring programs, and adaptive management in this RCPLALR will be documented in a daily log. Daily logs will be stored in a digital data storage system that will be maintained by the Environmental Coordinator. Details of the monitoring will be reported internally on an annual basis according to the adaptive management framework of the **EMS**. The report will provide monitoring results, assessment of performance objectives in **10.1**, summarize and evaluate the success of soil salvage and control measures for the ALR lands, and identify management reviews and adaptive management strategies that were employed.

TCL staff or contractors will be strongly encouraged to report any inefficiencies to TCL management for evaluation and consideration.

12. ROLES AND RESPONSIBILITIES

Primary responsibilities for this RCPLALR are like those in the RCP and have been assigned to the following roles or groups:

12.1 Mine Manager

The Mine Manager bears overall responsibility for phases of the Project, and responsibility for onsite mine reclamation and closure. The Mine Manager is responsible for implementing the regulatory requirements of permits and authorizations and will ensure progressive and closure reclamation prescriptions and reclamation monitoring measures, as outlined are followed.

The Mine Manager reports to the executive steering committee for TCL and will coordinate with this group to ensure that Project objectives are being met.

Specifically, the Mine Manager will:

- implement the RCPLALR and **RCP**;
- provide the necessary budget and resources to allocate sufficient resources to carry out the RCPLALR, including provision of the QP as required in this plan and
- facilitate the annual review of the RCPLALR, and the **RCP**.

12.2 Mine Superintendent

The Mine Superintendent reports to the Mine Manager and will:

- assist the Mine Manager to implement the Plans
- coordinate personnel, equipment, and resources to undertake reclamation and monitoring programs;
- coordinate the integrated reclamation and mine planning process and make sure reclamation procedures such as the fact sheets described in the **RCP** and BMPs in the RCPLALR and **RCP** have been developed and communicated to site staff and contractors, and
- assists the Mine Manager and Environmental Coordinator to complete an annual review of the Plans.

12.3 Environmental Coordinator

The Environmental Coordinator is responsible for the day-to-day management of Project environmental programs and permits. The Environmental Coordinator reports to the Mine Superintendent.

The Environmental Coordinator will:

- provide guidance relating to permit conditions, commitments, regulations, acts, interpretation of legislation, and company policies;
- ensure adherence to mitigation measures and BMPs for management plans related to reclamation such as this RCPLALR, the **CEMP, RCP, SMP, WMP, SEPSCP,** etc.;

- be responsible for implementation of the EMS and management plans;
- conduct soil salvage and reclamation with the assistance of QPs, as required;
- produce annual compliance summaries as per EAC and *MA/EMA* permit requirements;
- be the liaison for government agencies for permitting, inspections etc.;
- be the liaison for Indigenous groups, through their designated representatives, for reclamation planning involving indigenous traditional values;
- Research trials, progressive reclamation and operational reclamation areas will be monitored over time per the **RCP** to validate modeled soil properties, verify the suitability of the applied reclamation materials, and assess the recovery of planned ecosystems; and
- conduct the annual review of the RCPLALR and **RCP**.

12.4 Environmental Technician

The Environmental Technician reports to the Environmental Coordinator and will:

- assist the Environmental Coordinator as required in this RCPLALR and **RCP**;
- provide vacation cover for the Environmental Coordinator;
- daily visual inspections of soil salvage and placement with the assistance of a QP, if required
- Assist the QP with sampling of salvaged reclamation materials during salvage and/or application as per the **CEMP** and **RCP** to confirm material properties and suitability for reclamation;
- Weekly stockpile development inspections (including consideration of foundation, layout, slope, and lift height) and completion inspections of the final structure, as well as inspections required for erosion monitoring will be conducted;
- Bi-annual inspections of stockpiles in spring and fall will be conducted to assess revegetation status, presence of invasive or non-desirable species and evidence of erosion;
- Completion inspections of final grading, application depth, decompaction, surface roughening, and long-term stabilization in **8.1.4** (erosion and sediment control measures, revegetation);
- assist the Environmental Coordinator with the Annual Environmental Management Summary Report, and
- assist the Environmental Coordinator with the Annual review of this RCPLALR.

13. COMMUNICATION

Communication of this RCPLALR and the **RCP** will be based on internal requirements and will primarily take place through these plans and relevant SPPs. Any substantial change to the RCPLALR or management of the ALR lands will be communicated to the Project's employees and contractors through a site-wide email, announcements over radio channels by Minesite supervisors and bulletins posted around the Project's Minesite. When effective to do so, maps will be marked to show the changes. Change management is detailed in **15**.

ALR lands soil management and reclamation will be a component of mine planning, with regular communication between Mine Planning, Mine Operations, and the Environment Department, such that suitably trained personnel and QPs are on site, as required, and are done in accordance with this RCPLALR and the **RCP**.

14. EVALUATION AND ADAPTIVE MANAGEMENT

14.1 Evaluation

The RCPLALR will be reviewed by the Environmental Coordinator on an annual basis to comply with regulatory and permit requirements, assess the implementation of the RCPLALR and **RCP** for effectiveness and the appropriateness of mitigation measures, and update the RCPLALR and **RCP**, as appropriate.

The Environmental Coordinator will compare data and trends from inspections and reclamation monitoring programs and surveys and evaluate the effectiveness of the mitigation measures implemented as directed in this RCPLALR and **RCP**, to determine if adjustments or corrections are required, through the adaptive management program. This process will include a review of the work plan deliverables and input received from Indigenous groups through the **SEMP**.

14.2 Adaptive Management

A philosophy of adaptive management will be adopted to verify that the **EMS** and associated mitigation measures are consistently meeting or exceeding performance targets. Adaptive management is a structured decision-making approach to reduce uncertainty over time via targeted system monitoring. This will be achieved through periodic reviews of the ALR Plan and the results of monitoring programs.

Adaptive management techniques will be employed where measures in the RCPLALR or **RCP** are found to be not performing as designed or expected, and TCL will work towards continual improvement for the Project. The RCPLALR and **RCP** are living documents that will be reviewed and improved as site conditions change and following the evaluation of monitoring and sampling data collected through the life of the Project. TCL will amend the RCPLALR and **RCP** as required based on input from consultations, monitoring results, regulatory or legislative changes, and any updated, improved, or revised BMPs and scientific methods will be considered.

14.3 Continual Improvement

TCL will amend the RCPLALR and **RCP** as required based on annual evaluations and feedback from stakeholders and Indigenous groups. Any proposed changes will be sent out for review by Indigenous groups and communities before being finalized and implemented into the plans.

If issues involving reclamation are noted during the life of the Project (e.g., vegetation or plant deficiencies), Project design, operational procedures, and/or mitigation measures will be reviewed and adapted, and if appropriate, to minimize effects. The Environmental Coordinator will investigate opportunities for adaptive management based on observing trends in the monitoring data and will report to the Mine Manager any adapted practices, that resulted in improved outcomes, that should be applied to other areas of the Project.

Incidents will be assessed for root causes and the Environmental Coordinator, or their delegate will design and implement a suitable corrective action. Examples of corrective actions could include:

- additional training of employees and contractors on soil salvage or reclamation procedures;
- enhancement of or alterations to mitigation measures or monitoring programs;
- development and implementation of additional mitigation measures or monitoring programs; and/or
- additional capacity to deliver mitigation or monitoring measures.

TCL will review the RCPLALR annually and amend it as required based on annual evaluations and feedback from relevant stakeholders and Indigenous groups. Any proposed changes regarding the RCPLALR based on concerns from the regulators, public or Indigenous groups will be sent out for review by these groups as needed before being finalized and implemented into the revised RCPLALR.

15. CHANGE MANAGEMENT

Changing any part of the RCPLALR or **RCP** requires a formalized process. If substantial changes are being planned to objectives, plan structure, key operational milestones, communication and/or information management, the Management of Change (MOC) procedure in the TCL **EMS** will be followed. Minor edits and/or updates to the Plan and RCP will be controlled through version control and content approval functions.

16. CONCLUSION

This RCPLALR is intended to support A Supplemental Information Request (SIR) from the Agricultural Land Commission North Division in response to Telkwa Coal Limited's Tenas Project Non-Farm Use Application to the ALC, submitted by TCL on December 29th, of 2020, and follows the criteria specified in Policy P-13 of the *Agricultural Land Commission Act,* SBC 2002, c 36 (ALC 2021). The original Non-Farm Use Application that was submitted on December 29, 2020, is provided in **Appendix 13.15-A-A** based on provincial data of agricultural capability for ALR lands overlapped by the Project while an updated version of the technical non-farm support report is included in **Appendix 13.15-A-B** based on actual field survey data of the agricultural capability for the ALR lands overlapped by the Project. Based on this review there were only minor differences in agricultural capability between the two investigations completed as such the Project is not expected to have a measurable effect after accounting for mitigation efforts including reclamation efforts during the Decommissioning and Reclamation Phase of the Project.

Mitigating potential effects on the end land use objective of average agricultural capability on ALR lands within the Project is important in maintaining regulatory compliance and to avoid and minimize effects on the environment. The RCPLALR and **RCP** has been developed following review of Project-specific baseline studies and the environmental assessment of the Terrain and Soils, Vegetation, and Wildlife Valued Components (VCs). Through implementation of the **RCP**, and adaptive management to address changing site conditions, TCL will use effective strategies and BMPs to avoid and minimize Project effects on the ALR land during Project phases.

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