



BC EAO EAC Application – Tenas Project

Section 13.0 Management Plans

Chapter 18 Vegetation Management Plan

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VERSION 1.0

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Submitted by:	Telkwa Coal Limited Suite 1410 – 409 Granville Street Vancouver, BC V6C 1T2

Tenas Project

Section 13.0 Management Plans Chapter 18 Vegetation Management Plan

TABLE OF CONTENTS

Table of Contents	i
List of Figures	iii
List of Tables	iii
List of Appendices.....	iii
Abbreviations and Acronyms	iv
Units of Measure	vi
Executive Summary.....	vii
1. Introduction	1
2. Purpose and Objectives	2
3. Scope and Scale.....	3
4. Compliance Obligations	5
4.1 Federal Regulatory Requirements	5
4.2 Provincial Regulatory Requirements	5
4.3 Guidelines and Best Management Practices (BMPs)	7
4.4 Indigenous and Stakeholder Consultation	9
5. Relationship to Other Management Plans.....	10
6. Details of the Vegetation Management Plan (VMP)	12
6.1 Project Phases	12
6.2 Existing Site Conditions	12
6.2.1 Ecological Overview	12
6.2.2 Vegetation of Concern	12
6.2.2.1 Old Growth Forest	12
6.2.2.2 Wetlands and Riparian Areas	13
6.2.2.3 Listed Ecological Communities	13
6.2.2.4 Culturally Important Species	15
6.2.2.5 Rare Plants and Lichens.....	15
6.2.3 Invasive Plants.....	15
6.3 Best Management Practices (BMPs).....	17
6.3.1 Vegetation	17
6.3.1.1 General Considerations	17

6.3.1.2	Vegetation of Concern	18
6.3.1.3	Vegetation Maintenance	19
6.3.1.4	Debris Management	19
6.3.2	Invasive Plants	20
6.3.3	Trace Metals Uptake	21
7.	Monitoring	23
7.1	Vegetation	23
7.2	Invasive Plants	23
7.2.1	Invasive Plant Management Plan	23
7.2.1.1	Education	24
7.2.1.2	Monitoring	24
7.2.1.3	Control	25
7.3	Trace Metals Uptake	26
7.3.1	Sample Collection	26
7.3.2	Sample Analyses	26
7.4	Quality Assurance/Quality Control (QA/QC)	27
7.5	Performance Objectives	27
8.	Reporting	29
8.1	General Reporting	29
8.2	Compliance Reporting	29
8.3	Internal Reporting	29
9.	Roles and Responsibilities	30
9.1	Mine Manager	30
9.2	Health, Safety, and Human Resources Superintendent	30
9.3	Environmental Coordinator	30
9.4	Environmental Technician	30
9.5	Independent Environmental Monitor	31
9.6	Employees and Contractors	31
10.	Communication	32
10.1	Training and Awareness	32
10.2	Employee and Contractor Training	32
10.3	Visitor Training	32
11.	Evaluation and Adaptive Management	33
11.1	Evaluation	33
11.2	Adaptive Management	33
11.3	Continual Improvement	33
12.	Change Management	34
13.	Conclusion	34
14.	References	35

LIST OF FIGURES

Figure 3-1: Study Area Boundaries	4
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LIST OF TABLES

Table 4.3-1: Strategies, Guidelines, Plans and Best Management Practices Applicable to the Vegetation Management Plan (VMP)	7
Table 5-1: Management Plans with Relationship to the Vegetation Management Plan (VMP).....	10
Table 6.2-1: Listed Ecological Communities.....	14
Table 10.5-1: Performance Objectives	27

LIST OF APPENDICES

Appendix 13.18-A	Invasive Plant Species with the Potential to Occur within the Project Area
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ABBREVIATIONS AND ACRONYMS

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
ARD	acid rock drainage
AQMP	Air Quality Management Plan (S13.0-C2)
BC	British Columbia
BC CDC	BC Conservation Data Centre
BC MAFF	British Columbia Ministry of Agriculture, Food, and Fisheries
BC MEMLI	British Columbia Ministry of Energy, Mines and Low Carbon Innovation
BC MECCS	British Columbia Ministry of Environment and Climate Change Strategy
BC MEMPR	British Columbia Ministry of Energy, Mines and Petroleum Resources
BC MFLNRORD	British Columbia Ministry of Forests, Lands, and Natural Resource Operations and Rural Development
BC MOE	British Columbia Ministry of Environment
BC MOF	British Columbia Ministry of Forests
BC MOFR	British Columbia Ministry of Forests and Range
BGC	Biogeoclimatic
BMPs	best management practices
C	Chapter
CEMP	Construction Environmental Management Plan (S13.0-C4)
CMSTHP	Chemicals and Materials, Storage, Transfer, and Handling Plan (S13.0-C3)
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPP	Coal Processing Plant
DMP	Discharge Management Plan
EAC	Environmental Assessment Certificate
ECCC	Environment and Climate Change Canada
EMP	Explosives Management Plan (S13.0-C6)
EMS	Environmental Management System (S13.0-C1)
ESSFmc	Engelmann spruce-Subalpine Fir moist, cold
FMSCP	Fuel Management and Spill Control Plan (S13.0-C7)
GPS	Global Positioning System
GovCan	Government of Canada
Gov BC	Government of British Columbia
IAPP	Invasive Alien Plant Program
ID	identification
IEM	Independent Environmental Monitor
IPM	Integrated Pest Management

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
ISCBC	Invasive Species Council of BC
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).
LSA	Local Study Area
MA/EMA	<i>Mines Act</i> , RSBC 1996, c 293, and <i>Environmental Management Act</i> , SBC 2003, c 53
ML	metal leaching
MTCP	Minesite Traffic Control Plan (S13.0-C10)
MOC	Management of Change
MWMP	Minesite Water Management Plan (S13.0-C11)
ML/ARDMP	Metal Leaching /Acid Rock Drainage Management Plan (S13.0-C12)
non-PAG	non-potentially acid generating
NWIPC	Northwest Invasive Plant Council
OW	Office of the Wet'suwet'en
PAG	potentially acid generating
POC/COC	Parameters of Concern/Contaminants of Concern
POPC/COPC	Parameters of Potential Concern/Contaminants of Potential Concern
Project	Tenas Project
QA/QC	Quality Assurance and Quality Control
QP	Qualified Professionals
RCP	Reclamation and Closure Plan (S13.0-C15)
RDBN	Regional District of Bulkley-Nechako
ROW	right-of-way
RSA	Regional Study Area
S	Section
SARA	<i>Species at Risk Act</i> , SC 2002, c 29 (GovCan 2002)
SBS	Sub-boreal Spruce
SBSdk	Sub-Boreal Spruce zone dry cool subzone
SBSmc2	Sub-Boreal Spruce zone moist cold subzone Babine variant
SEMP	Socio-Economic Management Plan (S13.0-C16)
SEPSCP	Surface Erosion Prevention and Sediment Control Plan (S13.0-C17)
SPPs	Standard Practices and Procedures
TAC	Tenas Access Corridor
TCL	Telkwa Coal Limited
VC	Valued Component

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
VMP	Vegetation Management Plan (S13.0-C18)
WMP	Wildlife Management Plan (S13.0-C21)
WMPRE	Waste Management Plan for Refuse and Emissions

UNITS OF MEASURE

Abbreviation or Acronym	Long Form of Abbreviation or Acronym
%	percent
cm	centimetre
ha	hectare
kg	kilogram
kg/m ²	kilograms per square meter
km	kilometre
m	metre

EXECUTIVE SUMMARY

The Vegetation Management Plan (VMP) has been developed by Telkwa Coal Limited (TCL) to provide realistic and practical guidance about how to avoid or minimize potential effects of the Tenas Project (Project) on vegetation, ecosystems, and wetlands resulting from all Project phases. These Project effects include alteration/loss of vegetation, ecosystems, and wetlands, and deposition of trace metals on plants and soil, which can result in uptake by plants.

The VMP provides a summary of vegetation of concern, as identified in the Environmental Assessment Certificate (EAC) Application as subcomponents of the Vegetation Valued Component (VC) (i.e., Old Growth Forest, Wetlands, Listed Ecological Communities, Culturally Important Species, Rare Plants and Lichens), identifies best management practices (BMPs). Although not a subcomponent, riparian areas are addressed alongside Wetlands. The VMP also presents mitigation measures developed in accordance with the Policy for Mitigating Impacts on Environmental Values (Environmental Mitigation Policy) (Government of British Columbia [GovBC] 2014b) to avoid or minimize potential effects on vegetation resulting from all phases of the Project. Furthermore, the VMP provides monitoring programs specific to vegetation, invasive plants and trace metals uptake to further quantify and qualify Project effects (if/where necessary), assess the effectiveness of mitigation measures, provide a mechanism for modification and/or adaptation, identify new problems (should they arise), and implement additional mitigation (if/where applicable).

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.

1. INTRODUCTION

The Vegetation Management Plan (VMP) describes mitigation measures developed in accordance with the Policy for Mitigating Impacts on Environmental Values (Environmental Mitigation Policy) (Government of British Columbia (GovBC) 2014b). In addition, the VMP describes monitoring programs for the Tenas Project (Project) to further quantify and qualify Project effects (if/where necessary), assess the effectiveness of mitigation measures, provide a mechanism for modification and/or adaptation if site conditions change or effects are not as predicted, identify new problems (should they arise), and implement additional mitigation (if/where applicable), including triggers, corrective actions, and regulatory implications.

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.

This CEMP is a draft document prepared as part of the submission of the Environmental Assessment Certificate (EAC) Application. This CEMP will be approved and/or amended in consultation with British Columbia Ministry of Energy, Mines and Low Carbon Innovation (BC MEMLI), British Columbia Ministry of Environment and Climate Change Strategy (BC MECCS), British Columbia Ministry of Forests, Lands, and Natural Resource Operations and Rural Development (BC MFLNRORD), and the Office of the Wet'suwet'en (OW) and submitted to the British Columbia Environmental Assessment Office (BC EAO) 45 days prior to start of the Construction Phase.

2. PURPOSE AND OBJECTIVES

The VMP has been designed to provide realistic and practical guidance to avoid or minimize potential Project effects on vegetation, ecosystems, and wetlands resulting from all Project phases including:

- ▶ alteration/loss of vegetation, ecosystems, and wetlands; and
- ▶ deposition of trace metals on plants and soil, which can result in uptake by plants.

The alteration of vegetation is defined as reduced ecosystem function, plant vigour, and/or changes to population extent. The alteration of vegetation may occur because of introduction and/or proliferation of invasive plants, changes in water quality and quantity, edge effects, dust deposition, and soil erosion, deposition, and sedimentation. Alteration of vegetation can lead to the loss of vegetation, ecosystems and/or wetlands.

The loss of vegetation is defined as habitat alteration to the extent that it is rendered functionally unable to support vegetation populations or ecosystems. Land clearing and grubbing are anticipated to result in the greatest contribution to loss of vegetation; however, loss can also occur by severe alteration.

Trace metals deposition is defined as the deposition of elements on plants and soil at abundances higher than baseline conditions because of Project activities. These trace metals have the potential to be subsequently taken up by plants through roots and leaves and be accumulated within plant tissue. Trace metals uptake can affect plants by reducing plant health, changing plant abundance and community composition, and potentially changing their nutritional value and toxicity to wildlife (Shaw 1989).

This VMP is designed to fulfill provincial and federal regulatory requirements, and the Joint Application Information Requirements for *Mines Act* and *Environmental Management Act* Permits (British Columbia Ministry of Energy, Mines and Petroleum Resources [BC MEMPR] and BC MECCS 2019) (JAIR) which provides requirements for *Mines Act*, RSBC 1996, c 293, and *Environmental Management Act*, SBC 2003, c 53 (*MA/EMA*) permits also provides information for environmental management plans such as this VMP. The VMP guides mitigation and monitoring for vegetation of concern that are subcomponents of the Vegetation VC (i.e., Old Growth Forest, Wetlands, Listed Ecological Communities, Culturally Important Species, Rare Plants and Lichens), as well as riparian areas, invasive plants, and trace metals uptake. This VMP includes a detailed Invasive Plant Management Plan (see 7.2.1) per JAIR requirements for *MA/EMA* permits.

The objectives of the VMP include:

- ▶ avoid and minimize the alteration/loss of vegetation, ecosystems and wetlands resulting from clearing activities and the introduction and/or proliferation of invasive plants, edge effects, changes to water quantity and quality, and dust deposition;
- ▶ avoid and minimize effects on vegetation of concern that were identified as subcomponents of the Vegetation VC, including Old Growth Forest, Wetlands, Listed Ecological Communities, Culturally Important Species, Rare Plants and Lichens. Although not a subcomponent, riparian areas are addressed alongside Wetlands;
- ▶ avoid the introduction and spread of invasive plants during all Project phases through early detection and rapid response; and,
- ▶ control invasive plant populations in accordance with an Integrated Pest Management (IPM) approach.

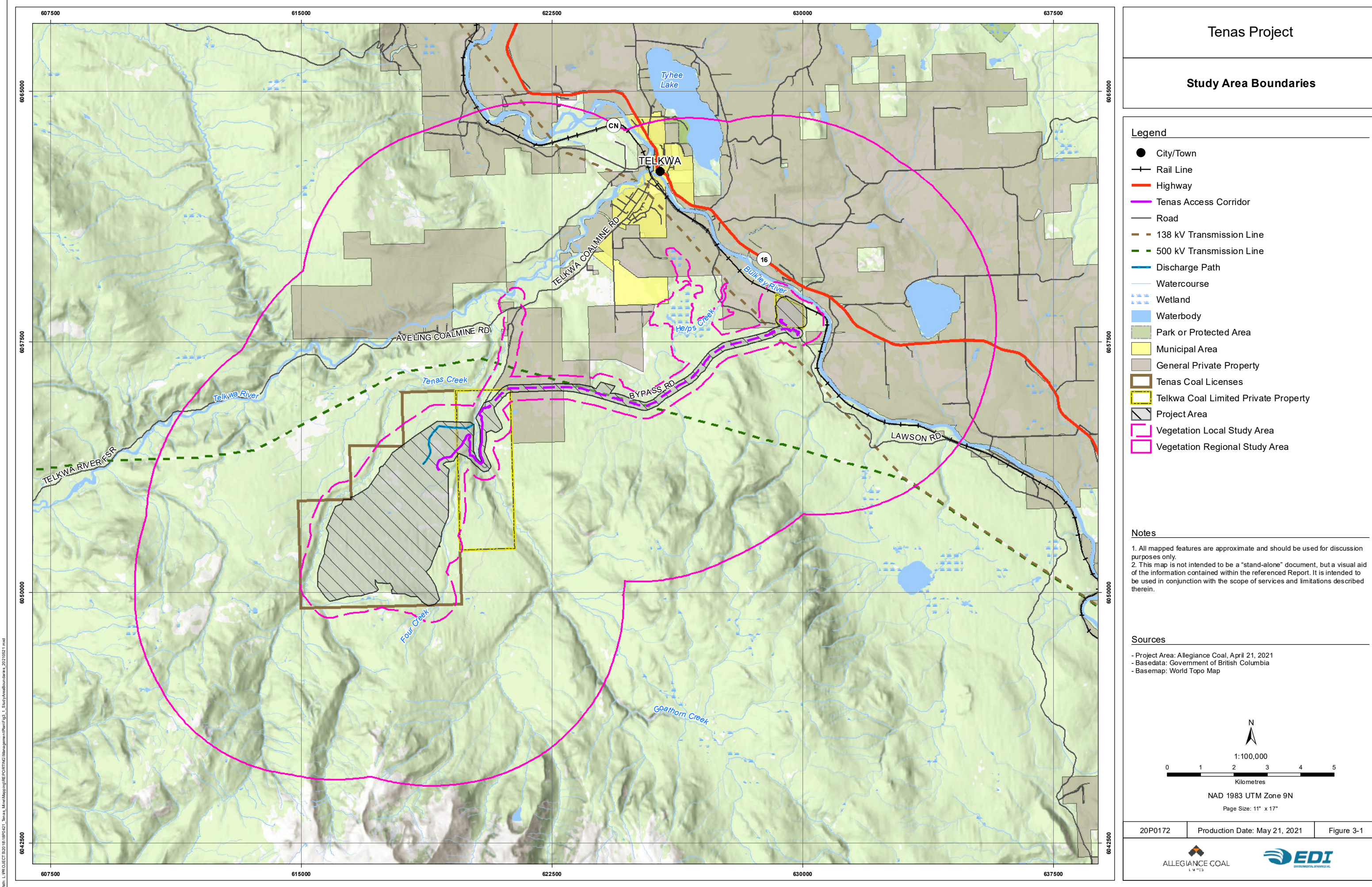
3. SCOPE AND SCALE

The scope of this VMP is defined within the Project Area, and includes all activities in all Project phases, as well as any operation and/or construction activities that are directly associated with the Project and exist outside of the Project Area. The Project Area encompasses the area of maximum footprint within which Project facilities and activities will be carried out and includes a buffer around the Project features (See **Figure 3-1**).

Mitigation measures outlined in the VMP have been designed to avoid or minimize potential direct and indirect effects on vegetation within the Project Area, as well as indirect effects on vegetation outside of the Project Area. The Vegetation Local Study Area (LSA) is 3,331 hectares (ha) and has been delineated to capture all direct effects and most indirect effects likely to occur on vegetation, ecosystems, and wetlands (See **Figure 3-1**).

The Vegetation Regional Study Area (RSA) is 35,726 ha and has been delineated to capture all indirect effects of the Project and provide context for the type, distribution, extent, and prevalence of plant species and ecosystems in the region, as it includes all the Biogeoclimatic (BGC) subzones and variants and related ecosystems that may be affected by the Project. The Vegetation RSA also represents the area where the direct and indirect effects of other land uses, and activities could interact with Project-specific residual effects with resulting cumulative effects on the Vegetation Valued Component (VC) (See **Figure 3-1**).

The VMP will be in effect during the Construction, Operation, Decommissioning and Reclamation, and Post-closure phases of the Project, and ceases to be in force at the final closure of the Project as approved by regulatory authorities.



4. COMPLIANCE OBLIGATIONS

The VMP considers applicable federal and provincial legislation, regulations, strategies, guidelines, plans, and best management practices (BMPs) relevant to the VMP. Summaries of these applicable documents are provided in **Sections 4.1** through **4.3**.

4.1 Federal Regulatory Requirements

Federal legislation associated with the management of vegetation is summarized in **Table 4.1-1** below.

Table 4.1-1: Summary of Federal Legislation Applicable to the Vegetation Management Plan (VMP)

Legislation and Regulations	Applicable Information
<i>Fisheries Act</i> , 1985, c F-14 (Government of Canada [GovCan] 1985a)	The Act prohibits harmful alteration, disruption, and destruction of fish habitat, supports restoration of fish habitat and riparian areas, and regulates commercial fisheries and other industry and development, promoting a biodiversity- and ecosystem-based approach.
<i>Seeds Act</i> , RSC 1985, c S-8 (GovCan 1985b)	The Act and regulations regulate the import, export, and sale of seeds in Canada, and their release into the environment. Seeds must meet established standards of registration, quality, testing, inspection, and labelling.
<i>Species at Risk Act</i> , SC 2002, c 29 (GovCan 2002) (SARA)	SARA protects species listed on Schedule 1 as Extirpated, Endangered and Threatened, and affords species listed as Special Concern the benefits of management planning. Species included in Schedule 1 are established by the federal Cabinet and are based on recommendations by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and consultation with government, Indigenous groups, and the public. SARA focuses on establishing and implementing plans to protect listed species and their critical habitat, reduce threats, and foster recovery.

4.2 Provincial Regulatory Requirements

Provincial legislation and regulations applicable to the Project and relevant to the VMP are described in **Table 4.2-1**.

Table 4.2-1: Summary of Provincial Legislation and Regulations Applicable to the Vegetation Management Plan (VMP)

Legislation and Regulations	Applicable Information
<i>Forest and Range Practices Act</i> , SBC 2002, c 69 (Government of British Columbia [GovBC] 2002)	The Act outlines standards and requirements for how forest and range practices and natural resource activities should be conducted on Crown land in British Columbia (BC) in a manner that safeguards protection of natural resources, including vegetation.

Legislation and Regulations	Applicable Information
	The Act regulates forest clearing and applies protection to old growth forests and riparian areas.
<i>Integrated Pest Management Act</i> , SBC 2003, c 58 (GovBC 2003)	The Act and associated regulations legislate the sale and use of pesticides in BC to reduce reliance on and use of pesticides. From a vegetation perspective, the Act regulates the use of herbicides to control weeds and invasive plants.
Invasive Plants Regulation, BC Reg 18/2004 (GovBC 2004b)	The Regulation is a provision to section 47 the <i>Forest and Range Practices Act</i> , SBC 2002, c 69 (GovBC 2002) preventing the introduction or spread of invasive plants. This regulation specifies vegetation species recognized as invasive plants in BC.
<i>Mines Act</i> , RSBC 1996, c 293 (GovBC 1996a)	The Act describes how mines in BC are to be operated, including administration, permitting, acquisition, delegation of power, inspection, health and safety, penalties, abandonment, and enforcement.
Health, Safety and Reclamation Code for Mines in British Columbia (British Columbia Ministry of Energy, Mines and Low Carbon Innovation [BC MEMLI] 2021) (Code)	BC MEMLI requires completion of a vegetation assessment and development of an environmental management and reclamation plan to support the mitigation, decommissioning and closure of a Project and where required, monitoring for metal uptake.
<i>Riparian Areas Protection Act</i> , SBC 1997, c 21 (formerly the <i>Fish Protection Act</i>) (GovBC 1997)	The Act regulates approval of work in and around watercourses including provision of directives relating to the protection and enhancement of riparian areas.
Riparian Areas Protection Regulation, BC Reg 178/2019 (GovBC 2019)	The Regulation aims to protect riparian areas from development, thus preserving riparian heath, features, and functions.
Water Sustainability Regulation, BC Reg. 11/2021 (GovBC 2014d)	The Regulation regulates changes made in and around watercourses, and provides directives to protect water quantity, water quality and aquatic ecosystems.
<i>Weed Control Act</i> , RSBC 1996, c 487 (GovBC 1996b)	The Act establishes the duty to control designated noxious weeds growing on any occupied land in BC.
Weed Control Regulation, BC Reg 66/85 (GovBC 1985)	The Regulation specifies provincial and regional noxious weeds and provides instruction on controlling their introduction and spread.
<i>Wildlife Act</i> , RSBC 1996, c 488 (GovBC 1996c)	The Act provides for conservation of specific ecosystems and ecosystem components that provide habitat for wildlife species.
<i>Wildfire Act</i> , SBC 2004, c 31 (GovBC 1996c)	The Act specifies vegetation to limit fire danger and activity restrictions and practices for woody debris and slash in accordance with wildlife hazards.

The JAIR for MA/EMA permits provides direction for the development of VMP mitigation as follows:

- ▶ Limit disturbance to permitted boundaries and mitigate effects of disturbance in a timely manner;

- ▶ Provide details on proposed activities for achieving the objectives, including: BMPs during construction and operation; training requirements; detailed monitoring and reporting plans; provisions for adaptive mitigation; ongoing consultation with stakeholders; and considerations for reclamation planning; and
- ▶ Include Standard Practices and Procedures (SPPs) for addressing, if applicable, riparian areas, old growth and mature forests, rare and at-risk species and ecosystems, metal uptake, large/coarse woody debris, and invasive plant species. If prudent, develop a separate Invasive Plant Management Strategy to highlight the considerations for early identification and effective management of invasive plants to facilitate successful site reclamation.

Direction for development of mitigation within the Invasive Plant Management Plan (see **7.2.1**) within the JAIR for MA/EMA permits is as follows:

- ▶ Implement measures to prevent ingress of invasive plants to mine sites and put early detection systems in place to facilitate timely completion of required management activities. Effective management of invasive plants is key for successful reclamation of mine footprint;
- ▶ Provide details on proposed activities for achieving the objectives, including: BMPs throughout life-of-mine; training requirements; site inventory/potential invasive plants; treatment options for different species; detailed monitoring and reporting plans; provisions for adaptive management; and ongoing consultation with stakeholders; and
- ▶ Include SPPs for addressing invasive plant species. When appropriate, cross-reference with other management plans.

4.3 Guidelines and Best Management Practices (BMPs)

Other strategies, guidelines, plans, and BMPs are also applicable to the VMP (**Table 4.3-1**). These documents were considered while developing appropriate mitigation measures for the Project.

Table 4.3-1: Strategies, Guidelines, Plans and Best Management Practices (BMPs) Applicable to the Vegetation Management Plan (VMP)

Name	Year	Description
Canadian Biodiversity Strategy (Government of Canada [GovCan] 1995)	1995	The three (3) objectives of the Strategy are the conservation of biodiversity, the sustainable use of biological resources, and the fair and equitable sharing of the benefits that result from the use of genetic resources.
Conservation Framework: Conservation Priorities for Species and Ecosystems (British Columbia Ministry of Environment [BC MOE] 2009).	2009	A science-based framework designed to prioritize species and ecosystems for conservation, select effective conservation actions, and coordinate management actions. Results can be used to advise conservation programs for a variety of stakeholders and organizations.
Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia: Section 4. (Government of British Columbia [GovBC] 2014a).	2014	The purpose of these guidelines is to provide province-wide direction for maintaining environmentally valuable resource during urban and rural land development in British Columbia (BC). Environmentally valuable resources include species, features, or environmentally valuable resource locations that enhance the biodiversity of an area;

Name	Year	Description
		these may include common or rare species or habitats.
Environmental Assessment Best Practice Guide for Wildlife at Risk in Canada (Environment Canada 2004)	2004	This best practice guide for considering plant and wildlife species at risk in environmental assessment provides best practice guidelines, key sources of information, policy commitments and laws and a discussion of the implications of the federal <i>Species at Risk Act</i> , SC 2002, c 29 (Government of Canada [GovCan] 2002(SARA).
Handbook for Mineral and Coal Exploration in British Columbia (Association for Mineral Exploration British Columbia et al. 2008)	2008	This handbook compiles existing knowledge and recommended management practices for coal exploration and mining, including practices for water management and reclamation.
Accounts and Measures for Managing Identified Wildlife: Northern Interior Forest Region (GovBC 2004a)	2006	This document summarizes the status, life history, distribution, and habitat requirements of identified species and plant communities; they also outline specific guidelines for habitat conservation and management.
Invasive Plant Pest Management Plan for Provincial Public (Crown) Lands in Central and Northern British Columbia (British Columbia Ministry of Forests, Lands, and Natural Resource Operations and Rural Development [BC MFLNRORD] 2020b)	2020	This plan is intended to describe and provide guidance for an integrated pest management approach for control of invasive plants on public land. It provides guidance for the effective management of invasive plants on Provincial public lands within central and northern BC while also protecting environmental and human health values.
Northwest Invasive Plant Council (NWIPC) (NWIPC 2020c)	n/a	The Tenas Project (Project) is located within the Bulkley Invasive Plant Management Area of the NWIPC. The NWIPC provides support and coordination for invasive plant management, including providing a shared invasive plant inventory and a list of target invasive plants, spreading awareness about invasive plants, and assessing and treating new and existing invasive plant infestations.
Policy for Mitigating Impacts on Environmental Values (Environmental Mitigation Policy) (GovBC 2014b)	2014	This Policy provides guidance to decisions concerning environmental mitigation measures. It provides a mitigation hierarchy and the corresponding types of mitigation measures to be applied and incorporates environmental, social, and economic values, encourages use of the best available data and data sharing, and provides a recommended mitigation hierarchy and mitigation process and plan.
Protecting Vulnerable Species: A Five-Year Plan for Species at Risk in British Columbia (GovBC 2014c).	2014	A five (5)-year plan to manage and protect species at risk in BC while balancing economic, environmental, and community values. This plan outlines five (5) main goals of the plan and recommends strategic action items to achieve these goals.
Wetland Ways: Interim Guidelines for Wetland Protection and Conservation in BC. Wetland Stewardship Partnership (GovBC 2009).	2009	A document providing recommended practices on wetland protection and conservation to land managers and land users, with the goal of maintained or increased wetland quality and quantity. The document includes specific guidelines for various sectors, including mining.

4.4 Indigenous and Stakeholder Consultation

Vegetation contributes to environmental, socio-economic, and cultural values of Indigenous groups, regulators, and the public. Telkwa Coal Limited (TCL) continues to meaningfully consult and engage with affected Indigenous groups, government agencies, and interested persons and/or other stakeholders who may be interested in the Project and its related activities. This consultation and engagement process has included technical working groups established with the OW, government departments, community meetings, one-on-one and small group meetings, and ongoing communications such as print communication, newsletter, and website updates, including specific presentations and discussions regarding key themes of interest and exploration of vegetation management to represent the values of concern.

TCL will have ongoing consultation with the OW and stakeholders during all Project phases with these groups being part of the VMP adaptive management processes.

4.5 Standard Practices and Procedures (SPPs)

TCL Standard Practices and Procedures (SPPs) will conform to the Health, Safety and Reclamation Code in British Columbia (British Columbia Ministry of Energy, Mines and Low Carbon Innovation [BC MEMLI] 2021) (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**, this VMP has a relationship with other management plans that also present mitigation measures. Those management plans and their relationship to this VMP are listed in **Table 5-1**.

Table 5-1: Management Plans with Relationship to the Vegetation Management Plan (VMP)

Management Plans	Nature of Relationship
Environmental Management System (S13.0-C1) (EMS)	All management plans are part of the EMS.
Air Quality Management Plan (S13.0-C2) (AQMP)	Dust suppression techniques in the AQMP will be used to control fugitive dust accumulation on vegetation.
Chemicals and Materials, Storage, Transfer, and Handling Plan (S13.0-C3) (CMSTHP)	Methods to minimize the potential for incidental release of hazardous materials into the environment (e.g., herbicides) will occur in accordance with the CMSTHP.
Construction Environmental Management Plan (S13.0-C4) (CEMP)	Vegetation management and invasive plant prevention specific to construction will occur in accordance with the CEMP.
Discharge Management Plan (S13.0-C5) (DMP)	Effluent discharge will be managed to minimize effects on vegetation and wetlands in accordance with the DMP.
Explosives Management Plan (S13.0-C6) (EMP)	When explosives are activated, dust suppression techniques will be used in accordance with the EMP to minimize the potential for accumulation of dust on vegetation.
Minesite Traffic Control Plan (S13.0-C10) (MTCP)	Traffic control measures outlined in the MTCP are expected to minimize the accumulation of fugitive dust and metals on vegetation.
Minesite Water Management Plan (S13.0-C11) (MWMP)	Water management onsite will occur in accordance with the MWMP, including interception, conveyance, diversion, storage, and discharge of contact and non-contact water. Effective water management will facilitate hydrologic connectivity across the Minesite and minimize the potential for surface water transport of metals to vegetation and ecosystems downgradient.
Metal Leaching (ML)/Acid Rock Drainage (ARD) Management Plan (S13.0-C12) (ML/ARDMP)	Handling and storage of materials in accordance with the ML/ARDMP is expected to minimize the potential for metals transport and subsequent deposition on vegetation.
Reclamation and Closure Plan (S13.0-C15) (RCP)	Revegetation and reclamation will occur in accordance with the RCP.
Socio-economic Management Plan (S13.0-C16) (SEMP)	The Annual Environmental Management Summary Report and upon permitting completion, the Annual Environmental Reports as required by Mines Act, RSBC 1996, c 293, and Environmental Management Act, SBC 2003, c 53 (MA/EMA)

Management Plans	Nature of Relationship
	permits will be distributed to Indigenous groups and made available to the public in accordance with the SEMP.
Surface Erosion Prevention and Sediment Control Plan (S13.0-C17) (SEPSCP)	Mitigation measures outlined in the SEPSCP will be used to minimize surface erosion and deposition of sediment on vegetation and within wetlands and waterbodies.
Waste Management Plan for Refuse and Emissions (S13.0-C20) (WMPRE)	Waste management strategies outlined in the WMPRE are anticipated to minimize the potential for incidental release of contaminants that may result in the alteration of vegetation or the deposition of trace metals on plants and soil.
Wildlife Management Plan (S13.0-C21) (WMP)	Vegetation management for wildlife habitat will be completed in accordance with the WMP.

6. DETAILS OF THE VEGETATION MANAGEMENT PLAN (VMP)

6.1 Project Phases

This VMP applies to all Project phases and will be adapted to changing site conditions through adaptive management (See 11. Evaluation and Adaptive Management).

6.2 Existing Site Conditions

6.2.1 Ecological Overview

The Project Area falls within the Sub-Boreal Spruce zone dry cool subzone (SBSdk) and the Sub-Boreal Spruce zone moist cold subzone Babine variant (SBSmc2) BGC units. The SBSdk covers low elevation areas with a transition to the SBSmc2 occurring at approximately 880 metres (m) elevation.

In the SBSdk, the main conifer tree species are hybrid white spruce (*Picea glauca* x *engelmannii*) and lodgepole pine (*Pinus contorta*), with lesser amounts of subalpine fir (*Abies lasiocarpa*), but there is a significant presence of deciduous tree species with deciduous and seral ecosystems containing trembling aspen (*Populus tremuloides*), black cottonwood (*Populus trichocarpa*), and paper birch (*Betula papyrifera*). Douglas maple (*Acer glabrum* var. *douglasii*) and Rocky Mountain juniper (*Juniperus scopulorum*) occur in moist and dry habitats respectively. The SBSdk is known for the diversity of its shrub and herb layers that are typically well developed (Banner et al. 1993). This diversity of plant species has led to a high diversity of ecosystems in this subzone's coniferous and deciduous forests, floodplains, wetlands and non-forested shrublands. Fires have been the greatest historic influence on the distribution of vegetation within the SBSdk, with agricultural development, forest harvesting and cattle grazing more recently affecting the distribution of forested ecosystem within this subzone.

In contrast to the SBSdk, deciduous forests are relatively uncommon in the SBSmc2, with hybrid white spruce, lodgepole pine and subalpine fir being the dominant tree species. These coniferous stands may have a component of trembling aspen, black cottonwood, or paper birch. The shrub and herb layers are not as well-developed or diverse as the SBSdk, and moss layer is better developed and may be dominant (Banner et al. 1993). Old forests are relatively common in areas that have escaped historic fires, although recent forest harvesting has been extensive in this subzone and in the Project Area.

6.2.2 Vegetation of Concern

6.2.2.1 Old Growth Forest

Old Growth Forest was identified within the Vegetation RSA with the use of ecosystem mapping developed for the Project. Forested ecosystems were defined to be old growth when their age was greater than 140 years in the Sub-boreal Spruce (SBS) and 250 years in Engelmann Spruce - Sub-alpine Fir (ESSF) BGC zones (British Columbia Ministry of Forests (BC MOF) 1995).

In total, 5,352.6 ha of Old Growth Forest was mapped within the Vegetation RSA, and 640.6 ha of Old Growth Forest was mapped within the Vegetation LSA. Most of the old growth forest is located at the southern extent of the Vegetation RSA. Old Growth Forest predominantly occurs to the southwest of the Vegetation LSA as patches of hybrid white spruce-dominated ecosystems in the SBSmc2 interspersed by existing cutblocks, as well as associated with the Tenas Creek Valley and its tributaries. Of the Old Growth Forest identified within the Vegetation LSA, 363.8 ha is located within the Project Area and is expected to be cleared during the Construction Phase.

6.2.2.2 Wetlands and Riparian Areas

Wetland ecosystems were identified within the ecosystem mapping in accordance with classifications outlined in Banner et al. (1993), Williams et al. (2001), and MacKenzie and Moran (2004). Wetland ecosystems were mapped within 2,011.1 ha (5.6 percent [%]) of the Vegetation RSA, and 405.6 ha (10.2%) of the Vegetation LSA. Within both the LSA and RSA, most of the wetland ecosystems were swamps, followed by bogs and fens.

Within the Vegetation LSA, the majority (56.4%) of the total wetland area is contained within the Helps Creek wetland complex outside of the Project Area to the north of the access corridor, which is comprised of a combination of bog, fen, and swamp wetland types. Outside of the Helps Creek wetland complex, wetlands in the remaining portions of the Vegetation LSA consist of a variety of wetland types, predominated by forested swamps and bogs. These remaining wetlands are generally small and isolated, ranging from 0.2 to 7.7 ha for all wetland types, and from 0.2 to 1.4 ha for non-forested wetland types such as marshes and open water.

Of the wetland area identified within the Vegetation LSA, 112.7 ha are located within the Project Area. Marsh ecosystems are expected to be the most directly affected by the Project, followed by swamps and bogs.

Riparian areas are anticipated to be associated with the wetland ecosystems above, as well as along the margins of watercourses, including Goathorn Creek, Tenas Creek, Four Creek, and Helps Creek (ERM 2020).

6.2.2.3 Listed Ecological Communities

Listed Ecological Communities are ecosystems listed by the BC Conservation Data Centre (BC CDC) based on the number and condition of occurrences, distribution, and potential threats from a variety of human activities or natural events. Ecological communities are defined as provincially rare when they are designated on the red list (Extirpated, Endangered, or Threatened status in BC) or the blue list (of Special Concern in BC). The conservation status information provided for listed ecological communities was obtained by using the BC Species and Ecosystems Explorer online search function of the BC CDC (BC CDC 2018).

A total of 1,817.3 ha of blue and red-listed ecological communities were mapped in the Vegetation RSA, and 256.1 ha were mapped within the Vegetation LSA. Of these communities, the blue-listed hybrid white spruce-horsetail ecosystem (SBSmc2/10 and 10b, SBSdk/07 and 07b) is dominant, with a total of 1,250.4 ha within the Vegetation RSA, and 133.8 ha within the Vegetation LSA. The next most extensive listed ecological community was the red-listed black cottonwood-spruce -red-osier dogwood floodplain ecosystem (SBSdk/08 and Fm02) of which 403.1 ha was mapped within the Vegetation RSA, and 38.8 ha was mapped within the Vegetation LSA. This community was found mostly along Goathorn Creek and the Bulkley River in the Rail Infrastructure area.

Within the Project Area, 110.9 ha of listed ecological communities were mapped including 107.1 ha of blue-listed ecological communities, and 3.8 ha of red-listed ecological communities. The only red-listed ecological community mapped within the Project Area is the black cottonwood-spruce -red-osier dogwood floodplain ecosystem (SBSdk/08 and Fm02). The most common, blue-listed ecological community within the Project Area is the hybrid white spruce-horsetail ecosystem (SBSmc2/10 and 10b, SBSdk/07 and 07b) at 101.2 ha, followed by the black spruce-creeping-snowberry-peatmoss (Wb01) community at 2.7 ha (**Table 6.2-1**).

Table 6.2-1: Listed Ecological Communities Mapped Within the Vegetation Study Areas

BGC Subzone	Site Series	Map Code	Ecological Community Name	BC List	Area (ha)		
					Project Area	Vegetation LSA	Vegetation RSA
ESSFmc	81	SW	saskatoon-slender wheatgrass	Red	-	-	1.2
	82	BW	bluegrass-slender wheatgrass	Red	-	-	2.0
SBSdk	02	LJ	lodgepole pine-juniper-ricegrass	Blue	0.1	0.9	99.9
	07/07b	SH	hybrid white spruce-horsetail	Blue	3.2	57.5	433.8
	08	CD	black cottonwood-dogwood-prickly rose	Red ¹	3.8	0.4	316.0
	-	Fm02	black cottonwood-hybrid white spruce/red-osier dogwood	Red ¹		38.4	87.1
	09	BS	black spruce-creeping-snowberry- <i>Sphagnum</i>	Blue	-	8.5	8.5
	81	SW	saskatoon-slender wheatgrass	Red	-	0.1	25.8
	82	BW	bluegrass-slender wheatgrass	Red	-	0.1	4.9
	-	Wm02	swamp horsetail-beaked sedge	Blue	2.3	3.9	3.9
	-	Wm05	cattail marsh	Blue	0.1	0.6	0.6
	-	Ws03	Bebb's willow/bluejoint reedgrass	Blue	0.4	0.9	1.0
	10/10b	SH	hybrid white spruce-horsetail	Blue	98.0	76.3	816.6
	81	SW	saskatoon-slender wheatgrass	Red	-	-	8.4
SBSmc2	82	BW	bluegrass-slender wheatgrass	Red	-	-	3.8
	-	Wb01	black spruce-creeping-snowberry-peatmoss	Blue	2.7	2.8	2.8
	-	Wm02	swamp horsetail-beaked sedge	Blue	-	0.4	0.4
	-	Ws03	Bebb's willow/bluejoint reedgrass	Blue	0.3	0.3	0.3
	-	-	-	-	-	-	-
Total Listed Communities Area					110.9	256.1	1,817.3

Notes: - =not applicable; BGC=Biogeoclimatic; ESSFmc=Engelmann spruce subalpine fir zone moist cold subzone; ha=hectare; LSA=Local Study Area; RSA=Regional Study Area; SBSdk=sub-boreal spruce zone dry cool subzone; SBSmc2=sub-boreal spruce zone moist cold subzone Babine variant

¹ This community is currently under review, but its last ranking by the BC CDC (2018) identified it as red-listed.

6.2.2.4 Culturally Important Species

Ecosystems within the Vegetation RSA with the potential to support a subset of 12 Culturally Important Species were identified with the use of available ecosystem mapping, with the assumption that these ecosystems and structural stages represent areas within the Vegetation LSA where Culturally Important Species might be abundant (Ardea Biological Consulting 2020).

Within the Vegetation RSA a total of 29,531.4 ha (83%) was identified to support at least one (1) Culturally Important Species, with the areas of individual plant species ranging from 354 ha for Indian hellebore to 11,474 ha for soopolallie. The Vegetation LSA had at total of 1,659 ha (42%) of ecosystems with the potential to support at least one (1) Culturally Important Species. The proportion of ecosystems supporting culturally important plant species followed similar patterns to what was observed within the Vegetation RSA, except a lack of higher elevation BGC subzones (e.g., ESSFmc) limited some species such as Indian hellebore and oval-leaved huckleberry. Within the Project Area, up to 1,378.5 ha of ecosystems with the potential to support at least one (1) Culturally Important Species were mapped.

6.2.2.5 Rare Plants and Lichens

Rare Plants and Lichens are defined as plant and lichen species that are listed by provincial and federal agencies based on their population size, distribution, and potential threats from a variety of human activities or natural events. Plant and lichen species are defined as provincially rare when they are designated on the red list (Extirpated, Endangered, or Threatened status in BC) or the blue list (of Special Concern in BC), and federally rare if they are listed as Endangered, Threatened, or Special Concern by Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or under Schedule 1 of the *Species at Risk Act*, SC 2002, c 29 (GovBC 2002) (SARA). Conservation status information provided for plant and lichen species was obtained by using the BC Species and Ecosystems Explorer online search function of the BC CDC (BC CDC 2018, 2020) and the SARA Public Registry online search function (ECCC 2018).

Two (2) rare plant species have been historically observed within the Vegetation RSA. **See Table 6.2-2.** No rare plant or lichen species have been observed within the Vegetation LSA or Project Area; however, while surveys for Rare Plants and Lichens can confirm the presence of rare species, they cannot verify the absence of rare species (Lancaster 2000). As such, there is potential for unobserved occurrences of Rare Plants or Lichens within the Project Area.

Table 6.2-2: Rare Plant and Lichen Species Historically Observed Within the Vegetation Regional Study Area (RSA)

Species Name		Conservation Status		
		Provincial	Federal	
Common	Scientific	BC CDC	COSEWIC	SARA Schedule 1
American sweet-flag	<i>Acorus americanus</i>	Blue	-	-
Whitebark pine	<i>Pinus albicaulis</i>	Blue	Endangered	Endangered

Note: BC CDC=BC Conservation Data Centre; COSEWIC=Committee on the Status of Endangered Wildlife in Canada; - =not assessed; SARA=Species at Risk Act, SC 2002, c 29 (GovCan 2002)

6.2.3 Invasive Plants

The effects of invasive plants on native vegetation diversity are well documented and recognized as the second greatest threat to listed species after habitat loss (Enserink 1999). Competition with native plants can lead to a reduction in the growth and vigour of native species, as well as changes in the diversity,

structure, and function of ecosystems. In this VMP, invasive plants are defined as meeting one (1) or more of the following criteria:

- ▶ listed as provincially noxious within Part I of Schedule A of the *Weed Control Act*, RSBC 1996, c 487 (GovBC 1996b);
- ▶ listed as regionally noxious in the Regional District of Bulkley-Nechako (RDBN) within Part II of Schedule A of the *Weed Control Act*, RSBC 1996, c 487 (GovBC 1996b);
- ▶ listed as an 'invasive plant' within the Invasive Plants Regulation, BC Reg 18/2004 (GovBC 2004b) of the *Forest and Range Practices Act*, SBC 2002, c 69 (GovBC 2002); or
- ▶ listed on the Northwest Invasive Plant Council Target Plant List or Bulkley Invasive Plant Management Area Plant List (Northwest Invasive Plant Council [NWIPC] 2020a, b).

Invasive plant species were identified within the Vegetation LSA using existing information sources as well as field surveys. Twenty-one (21) species were identified in the Vegetation LSA and within one (1) kilometre (km) of the Vegetation LSA in the Vegetation RSA using the invasive alien plant database. Field surveys observed 10 of those same species and an additional 4 species, for a total of 25 invasive plants occurring within 1 km of the Vegetation LSA. Invasive plants were observed throughout the Vegetation LSA, with species such as Canada thistle (*Cirsium arvense*) and oxeye daisy (*Leucanthemum vulgare*) identified within the Project Area.

Two (2) invasive plant species were of interest, St. John's-wort (*Hypericum perforatum*) and Tartarian honeysuckle (*Lonicera tartarica*), were both observed in the vicinity of Goathorn Creek. St. John's-wort is listed as an Early Detection Rapid Response (EDRR) species for the Bulkley Invasive Plant Management area (NWIPC 2020a, b), and Tartarian honeysuckle had not been detected within the region previously.

A full list of invasive plant species with the potential to occur within the Project Area is provided in **Appendix 13.18-A Invasive Plant Species with the Potential to Occur within the Project Area**.

6.3 Best Management Practices (BMPs)

6.3.1 Vegetation

Mitigation measures have been developed to avoid or minimize the potential Project effects on vegetation, ecosystems, and wetlands throughout the life of the Project. The overall objective of TCL is to limit disturbance to permitted boundaries and mitigate effects of disturbance in a timely manner. Applicable vegetation management and mitigation measures are described below, divided into four (4) subcategories:

1. general considerations;
2. vegetation of concern;
3. vegetation maintenance; and
4. debris management.

6.3.1.1 General Considerations

General vegetation mitigation measures have been developed to avoid or minimize potential Project effects on vegetation, ecosystems, and wetlands during all Project phases. They include the following measures:

- ▶ Place temporary and permanent infrastructure and Project features within existing disturbance and limit clearing of vegetation within Project Footprint, where possible. For example, the Minesite buildings will be built in areas previously cleared by forestry activity;
- ▶ Avoid disturbance to vegetation and soils by clearly delineating Project Area and 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;
- ▶ Site 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 **Minesite Water Management Plan (S13.0-C11) (MWMP)**;
- ▶ Implement the **Surface Erosion Prevention and Sediment Control Plan (S13.0-C17) (SEPSCP)**, including constructing sediment control facilities such as diversion and collection channels and sediment ponds;
- ▶ Implement the **Air Quality Management Plan (S13.0-C2) (AQMP)** that describes dust control measures, including watering and/or adding appropriate agents to haul roads, and/or access roads, and/or stockpiles, and install dust control systems for the crusher and temporary stockpiles when required;
- ▶ Use progressive reclamation including techniques to limit the amount of disturbance at a given time (e.g., 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, including topsoil for later use, in accordance with the **Reclamation and Closure Plan (S13.0-C15) (RCP)**;

- ▶ Vegetate all temporary growth media stockpiles with vegetation to minimize erosion and sediment release, to prevent subsequent effects to water quality, and to prevent losses of growth media;
- ▶ Implement progressive reclamation on embankments, buttresses, backfills, and other Minesite components where possible to minimize fugitive dust emissions;
- ▶ The reclaimed landscape will be shaped and contoured to achieve variations of slope steepness, slope length, aspect, and form to assist in creating landform diversity suitable for the establishment of varied plant communities;
- ▶ De-compact soil materials, as necessary, to establish suitable conditions for revegetation;
- ▶ Most terrain features (e.g., highwalls) will be covered/resurfaced/recontoured with non-potentially acid generating (non-PAG) rock and overburden; and
- ▶ Revegetate with native plant species appropriate for the target ecosystems.

6.3.1.2 Vegetation of Concern

Vegetation of concern includes rare plants and lichens, listed ecological communities, culturally important species, old growth forest, and wetlands and riparian areas as described in **6.2.2 Vegetation of Concern**. Mitigation measures have been developed to avoid or minimize potential Project effects vegetation of concern, as follows:

6.3.1.2.1 All Vegetation of Concern

- ▶ Avoid disturbance to vegetation and soils by clearly delineating Project Area and 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;
- ▶ Provide maps to all personnel and contractors to assist in identification and delineation of known Old Growth Forest, Wetlands, and riparian areas, Listed Ecological Communities and Rare Plant and/or Lichen occurrences; and
- ▶ Avoid herbicide use within 100 m of any known occurrences of Rare Plants, Rare Lichens, Listed Ecological Communities, or Wetlands and riparian areas. Where herbicide use is unavoidable in these areas, restrict use to direct application instead of broadcast spraying.

6.3.1.2.2 Wetlands and Riparian Areas

- ▶ Avoid known wetlands and sensitive ecosystems such as riparian areas;
- ▶ Establish appropriate no disturbance buffers around riparian and wetland ecosystems in accordance with recommendations under the *Forest and Range Practices Act*, SBC 2002, c 69 (GovBC 2002) and associated Regulations, where practicable;
- ▶ Clearly delineate the boundaries of no disturbance buffers in the proximity of planned disturbances to facilitate avoidance during all phases of the Project, where possible;
- ▶ Where saturated soils (i.e., soil adheres to vehicle tires) are encountered, the following applies:
 - ▶ Use low ground pressure equipment or tracked equipment where feasible;
 - ▶ Where practical, use matting or log corduroys to minimize disturbance to soils and vegetation and prevent rutting; and
- ▶ Maintain existing drainage to the extent possible when designing and installing culverts for cross-drainage. Do not create outlets that either increase wetland drainage or constrict the natural outlet.

6.3.1.2.3 Listed Ecological Communities

- ▶ Where practical, avoid vegetation clearing within Listed Ecological Communities;
- ▶ Minimize the extent of grubbing, stripping, and the removal of shrubs and herbaceous species within listed ecological communities. Where clearing is required, retain the vegetation root mat where possible; and
- ▶ Re-establish native vegetation in these areas as soon as practical following disturbance.

6.3.1.2.4 Rare Plants and Lichens

- ▶ Should occurrences of Rare Plants or Lichens be identified or suspected within the Project Area at any point during the lifetime of the Project, their locations will be recorded, a no-disturbance buffer will be implemented, and information will be provided to the Environmental Coordinator, as listed in **7. Roles and Responsibilities**;
- ▶ Any new or suspected Rare Plants or Lichens occurrences will be visited by a qualified vegetation ecologist during a biologically appropriate time of year to confirm identification and conservation status, delineate the extent of the occurrence, and develop site-specific mitigation measures to protect the occurrence during all Project phases; and
- ▶ Specific mitigation measures will depend on the species, its life history characteristics, time of year, and the location of the occurrence in relation to Project activities. Avoidance is the preferred mitigation for all Rare Plants or Lichens occurrences.

6.3.1.3 Vegetation Maintenance

Vegetation maintenance will be employed throughout the lifetime of the Project to provide safe working conditions. Examples include removal of danger trees/obstacles and providing clear line-of-sight. Maintenance activities include the following:

- ▶ Limit clearing of vegetation within the Project Area, where possible;
- ▶ Where feasible, complete construction activities under dry or frozen conditions to minimize effects to vegetation and soils;
- ▶ Maintain lines-of-sight by selective brushing (e.g., at blind corners) to encourage low growing shrub and herbs. Avoid grubbing where practical;
- ▶ Do not lay or store vegetation slash from general maintenance within wetlands, watercourses, or waterbodies. Minimize vegetation maintenance (e.g., clearing, slash placement) near wetlands, watercourses, and waterbodies to the extent feasible; and
- ▶ Avoid broadcast spraying of herbicides to the extent feasible, with preference for spot application to minimize potential effects on the surrounding vegetation.

6.3.1.4 Debris Management

Mitigation measures have been developed to avoid and minimize potential effects of felling and timber salvage on adjacent vegetation resources during all Project phases; they include:

- ▶ Complete timber salvage within forestry tenure boundaries approved by the BC MFLNRORD and in accordance with applicable permit conditions;

- ▶ Coordinate timber salvage with the objectives of the **Wildlife Management Plan (S13.0-C21) (WMP)**;
- ▶ Where practical, use equipment that will limit disturbance to adjacent habitats and avoid soil disturbance (e.g., feller bunchers);
- ▶ Minimize tree fall into existing forest/habitat, with a preference for falling into cleared forest or areas of existing activity;
- ▶ Salvage trees that inadvertently fall into existing forest/habitat to minimize forest fuel hazards;
- ▶ Avoid dragging salvaged logs through watercourses, wet areas, or thawed muddy ground. Use timber salvage methods to limit ground disturbance (e.g., rutting, soil compaction) in wet conditions;
- ▶ Where feasible, use coarse woody debris during reclamation of disturbed areas;
- ▶ If it cannot be used for reclamation, dispose of unmerchantable trees and other debris in accordance with the *Forest and Range Practices Act*, SBC 2002, c 69 (GovBC 2002) and the *Wildfire Act*, SBC 2004, c 31 (GovBC 2004c);
- ▶ Follow all BC FLNRORD guidelines and requirements for clearing, handling, and hauling beetle-infested wood (e.g., Guidance on Landscape and Stand-level Structural Retention in Large-scale Mountain Pine Beetle Salvage Operation [Snetsinger 2005]; Bark Beetle Management Guidebook [Province of British Columbia 1995]; and
- ▶ Remove all decked timber, and timber that cannot be marketed or used in reclamation from the Project Area before final closure.

6.3.2 Invasive Plants

The effects of invasive plants on native vegetation diversity are well documented and recognized as the second greatest threat to listed species after habitat loss (Enserink 1999). Competition with native species can lead to a reduction in the growth and vigour of native species, as well as changes in the diversity, structure, and function of ecosystems.

Vegetation clearing and soil disturbance 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 plants 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) during all Project phases include:

- ▶ 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 disturbance within the Project Area, where possible;
- ▶ Salvage growth media for later use, in accordance with the **RCP**;
- ▶ Vegetate all temporary growth media stockpiles with vegetation to minimize erosion and sediment release, to prevent subsequent 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 the plan outlined in **7.2.1 Invasive Plant Management Plan**;

- ▶ Invasive plants occurrences will be addressed as outlined in **7.2.1 Invasive Plant Management Plan**;
- ▶ Seed used during re-vegetation will be certified weed free, with a valid “Certificate of Seed Analysis”; and
- ▶ Use progressive reclamation techniques including to limit the amount of disturbance 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.

Monitoring and control of invasive plants is further described in **7.2.1 Invasive Plant Management Plan**.

6.3.3 Trace Metals Uptake

Trace metals have the potential to be transported and deposited onto vegetation and soil primarily by dust deposition and air emissions. All dust has the potential to contain trace metals, but road dust caused by movement of vehicles and equipment is expected to contain the highest concentrations of trace metals originating from oil, grease, hydraulic fluids, fuel additives, wear of vehicle and equipment parts (e.g., brake lining, tires), and road salts. Mobilization of this road dust has the potential to deposit trace metals on plants and soil (Trombulak and Frissell 2000). Similarly, air emissions from fossil fuel combustion from vehicles and equipment have the potential to disperse trace metals into the ambient air, which can subsequently be deposited onto plants and soil. Dust and air emissions are expected to be transported downwind and deposited in response to local atmospheric conditions and particle size.

Exposure of waste rock and overburden to weathering can also result in trace metals transport through surface water. Acid rock drainage (ARD) can result in increased solubility of trace metals, which can leach from material storage piles and be deposited on plants and soil. The mobilization distance of surface water-borne trace metals is variable and depends on local hydrology and topography, weather patterns, and preceding dry periods (Hwang et al. 2016).

Mitigation measures to avoid or minimize trace metals deposition on vegetation include:

- ▶ Vegetate all temporary growth media stockpiles with vegetation to minimize erosion and sediment release, to prevent subsequent effects to water quality, and to prevent losses of growth media;
- ▶ Implement progressive reclamation on embankments, buttresses, backfills, and other mine components where possible to minimize fugitive dust emissions;
- ▶ Most terrain features (e.g., highwalls) will be covered/resurfaced/recontoured with non-potentially acid generating (non-PAG) rock and overburden;
- ▶ Dust generation and subsequent deposition on plants will be limited through dust suppression techniques and implementation of the **AQMP** and the **Mine Site Traffic Control Plan (S13.0-C10) (MTCP)**;
- ▶ Build, maintain, and use the Tenas Access Corridor (TAC) for coal transport to access the Rail Infrastructure for the duration of all Project phases to minimize traffic on existing residential roads;
- ▶ Use buses for employees and contractors as much as practical to minimize the chance of traffic incidents, and to minimize noise and dust emissions from the Project. Provide bussing options to Wisset and/or Houston, if requested, and sufficient employees in these locations, to facilitate potential employees accessing opportunities for the Project;

- ▶ Use dust suppressing agents on the rail cars to minimize fugitive dust emissions;
- ▶ Cover super B-train trucks when transferring processed coal from the Coal Processing Plant (CPP) to Rail Loadout to reduce fugitive dust from trucks;
- ▶ Use water and chemical agents on the TAC to minimize fugitive dust emissions;
- ▶ Use water and chemical agents on the processed coal stockpiles to reduce fugitive dust emissions;
- ▶ Use best management stemming techniques (type of material, method, and thickness) that will minimize effects of noise and fugitive dust from blast patterns, as per the **Explosives Management Plan (S13.0-C6) EMP**;
- ▶ Correctly time blasts to minimize effects of noise, vibration, and fugitive dust from blast patterns;
- ▶ Keep blast patterns smaller to minimize effects of noise, vibration, and fugitive dust;
- ▶ Monitor actual blast results and implement improvements as required;
- ▶ Use electronic detonators to minimize effects of noise, vibration, and fugitive dust from blast patterns, and limit the number of misfires to minimize introduction of nitrogen species into the surrounding environment;
- ▶ Use centrifuges for processed coal dewatering versus coal and/or natural gas fuelled coal dryers to minimize greenhouse gas and dust emissions;
- ▶ Submerge potentially acid generating (PAG) material under at least 2 m of water to avoid potential ARD to minimize potential effects on surface water quality and fish habitat;
- ▶ Identify and segregate potentially PAG/metal leaching (ML) material while mining the pit and submerge the PAG/ML rock in the management ponds within an average time frame of six (6) months to prevent PAG material generating acidic drainage and potential effects on surface water quality and fish habitat;
- ▶ No PAG material will be used in construction of any external piles, pads, roads, embankments, buttresses, or for backfilling the open pit to avoid potential effects on surface water quality and fish habitat; and
- ▶ Maintain a database of geochemical testing results and material placement to avoid the incorrect placement of PAG material and potential effects on surface water quality.

7. MONITORING

Monitoring programs will evaluate the VMP, verify that disturbance is limited to permit boundaries, and confirm mitigation measures have been employed and were successful to avoid or minimize potential Project effects on vegetation. Monitoring programs to address vegetation, invasive plants, and trace metals uptake are described below.

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.

7.1 Vegetation

Targeted monitoring and inspection will be undertaken to verify that mitigation measures to minimize effects on vegetation have been appropriately applied, maintained, and removed, where necessary. An Independent Environmental Monitor (onsite inspector) designated by the BC EAO will also be present during the Construction Phase activities to verify compliance and evaluate the success of mitigation measures within the VMP and applicable approval conditions.

To address potential concerns in a timely manner, vegetation monitoring will occur at least once annually during the growing season (i.e., June to September) throughout Construction, Operation, and Decommissioning and Reclamation. Monitoring will continue during Post-closure in accordance with the RCP.

Windthrow monitoring will be completed before clearing activities to identify whether mitigation measures are required, as well as annually after clearing for up to five (5) years. Each windthrow monitoring visit will include a visual assessment to identify areas with elevated potential for windthrow, or with evidence of historic or ongoing windthrow hazards in accordance with the Windthrow Handbook for British Columbia Forests (Sathers et al. 1994) and BCTS Windthrow Manual: A Compendium of Information and Tools for Understanding, Predicting and Managing Windthrow on the BC Coast (Zielke et al. 2010).

7.2 Invasive Plants

7.2.1 Invasive Plant Management Plan

This Invasive Plant Management Plan, as part of this VMP, is intended to avoid or minimize the establishment and spread of invasive plant species within the Project Area with the use of accepted IPM practices. IPM practices include prevention, control measures, and monitoring/evaluation (e.g., British Columbia Ministry of Agriculture, Food, and Fisheries [BC MAFF] 2002). This strategy aims to achieve long-term and effective invasive plant prevention and control using a combination of mechanical, chemical, and biological methods (British Columbia Ministry of Forests and Range [BC MOFR] 2015). Invasive plant management strategies have been developed in consideration of the following information sources:

- ▶ NWIPC (NWIPC 2020a, b, c);
- ▶ British Columbia Invasive Species Council (Invasive Species Council of British Columbia 2020);
- ▶ Pest Management Plan for Invasive Alien Plants on Provincial Crown Lands in Central and Northern British Columbia (BC MFLNRORD 2020a); and

- ▶ British Columbia Invasive Alien Plant Program Reference Guide: Part 1 (BC MFLNRORD 2010).

Mitigation measures to prevent the establishment and spread of invasive plants are provided in **6.2.3**. The objectives of the Invasive Plant Management Plan are to train staff to enable early detection of invasive plants; establish a monitoring process for early detection; and eradicate, control and/or manage existing invasive plant occurrences.

7.2.1.1 Education

Employees and contractors on the Project will require an employee orientation appropriate to the work they are undertaking, including instruction on the definition of invasive plants and their potential effects, mitigation measures to avoid the introduction and spread of invasive plants, and training on the presence and identification of common invasive plant species and those known to occur within the Project Area (**Appendix 13.18-A**).

Designated personnel involved in management of invasive plants will receive additional training including current requirements under provincial legislation, data collection techniques, reporting programs, control techniques, and advanced invasive plant identification (with emphasis on regional priority species as identified by NWIPC and provided in **Appendix 13.18-A**).

Resources such as The Field Guide to Noxious Weeds and Other Selected Invasive Plants of British Columbia (Invasive Species Council of British Columbia 2019b) will be made available to identify invasive plants. Handbooks including Best Practices for Managing Invasive Plants on Roadsides (Invasive Species Council of BC [ISCBC] 2019a) and Best Practices for Preventing the Spread of Invasive Plants during Forest Management Activities (ISCBC 2013) will be made available to provide guidance to personnel working on the Project.

7.2.1.2 Monitoring

Invasive plant monitoring will be conducted periodically by personnel skilled in invasive plant identification during Project phases to assess, evaluate, and document invasive plant occurrences within the Project Area. Proactive invasive plant management is preferred, as small occurrences are easier to manage than well-established populations.

Invasive plant surveys will be completed during a biologically appropriate time of year (e.g., when invasive plants can be identified) using methods like those prescribed within the province's Invasive Alien Plant Program (IAPP) (BC MFLNRORD 2020a). Surveys will be undertaken within areas identified as most susceptible to invasive plant introduction and spread, including roads, right-of-way (ROW), bridges, and other travel corridors; debris and vegetation management areas (e.g., stash piles, timber decks, exposed soil, or stockpiles); and other regularly disturbed habitats.

Recently reclaimed areas will be monitored following revegetation in accordance with the **RCP**. Should any invasive plants be identified within recently reclaimed areas, they will be managed in accordance with **7.2**.

Previously identified occurrences of invasive plants within the Project Area will also be monitored to verify efficacy of control measures and allow for early detection of recolonization if it has occurred.

Where invasive plant occurrences are observed, they will be documented using standard field forms such as the Site and Invasive Plant Inventory Record from the IAPP Database (BC MFLNRORD 2020b). Use of standard field forms will support consistent data collection in accordance with current provincial standards. Typically, occurrences separated by more than 100 m are considered separate.

Information collected for each occurrence will include at a minimum:

- ▶ date;
- ▶ plant species;
- ▶ geographic location (e.g., Global Positioning System [GPS] point);
- ▶ estimated size of the occurrence (e.g., by pacing the length and width, or delineating with a GPS track); and
- ▶ photo documentation.

7.2.1.3 Control

In accordance with accepted IPM approaches, three (3) general treatment options may be used alone or in combination to control of invasive plants in the Project Area:

- ▶ mechanical control: involves the physical removal of the plants;
- ▶ chemical control: involves application of synthetic and/or natural herbicides; and
- ▶ biological control measures: use living organisms (e.g., rusts, insects) to control selected invasive plant species.

The type of treatment option selected for an invasive plant occurrence will be based on a combination of specific information including the identity of the invasive plant species and its regional priority (as indicated in **Appendix 13.18-A**), the size and extent of the occurrence, time of year, the proximity of the occurrence to other susceptible areas (e.g., rare plant occurrences, wetlands, waterbodies), and the available control options. Where possible, control of invasive plants will be completed in consultation with a qualified professional or the NWIPC to minimize potential effects on native vegetation, ecosystems, and wetlands.

Control of invasive plant occurrences will be documented to current provincial standards using standard field forms such as the IAPP Invasive Plant Chemical and Mechanical Treatment Record (BC MFLNRORD 2020b).

7.2.1.3.1 Mechanical Control

Mechanical control is most effective within small occurrences, and may be completed by various means, including hand pulling, mowing, cultivation, or mulching. Typically, these methods must be completed more frequently than once to deplete the seed bank and/or diminish the plants' root reserves. Where completing mechanical control, soil disturbance should be minimized to the extent feasible and invasive plant seed heads and other plant material should be properly disposed of to minimize the risk of re-establishment.

7.2.1.3.2 Chemical Control

Should chemical control be selected to control an invasive plant occurrence, herbicides will be preferentially applied by a trained employee or contractor before the flowering stage when plants are most susceptible (BC MOE 2005). If treatments are applied after invasive plants have flowered or set seed, seed heads will be removed and disposed of at an appropriate waste disposal location. Herbicide application will be undertaken in compliance with the *Integrated Pest Management Act*, SBC 2003, c 58 (GovBC 2003) and the Handbook for Pesticide Applicators and Dispensers (BC MOE 2005). Direct application and spot treatment will be used instead of broadcast spraying, wherever feasible.

7.2.1.3.3 Biological Control

Biological control options are currently available for only a select number of invasive plant species in northern BC, and are typically useful on older, established occurrences of a species otherwise well established in areas beyond the Project (BC MOFR 2015). Should biological control be considered as a control option, it would be discussed with BC MFLNRORD prior to use.

7.3 Trace Metals Uptake

Metals monitoring in vegetation will identify if plants are being affected by the Project and accumulating metals in their tissue (BC MEMLI 2021). Monitoring will be used to guide Project dust management and reclamation and will include measuring trace metal concentrations in vegetation and soil over time. Trace metals uptake will be monitored periodically (e.g., one (1) to five (5) years) during the Construction, and Operation phases. Monitoring activities are carried out in two (2) steps: sample collection; and sample analyses.

7.3.1 Sample Collection

Trace metals uptake will be assessed at a combination of both background and Project monitoring locations. Background locations will be those located within areas outside of potential Project influence. Project monitoring locations will be located within areas of native vegetation potentially affected by the Project and paired with dust fall monitoring locations. Long term sampling plots will be selected considering baseline monitoring locations visited during the 2017, 2018 and 2019 field programs (Ardea Biological Consulting 2020).

Vegetation species selected for sampling will be common to the area, suitable to detect metals in tissues, be palatable for humans and/or wildlife, with a preference for those used during the baseline monitoring program (Ardea Biological Consulting 2020). Vegetation will be collected in sufficient quantities to be submitted for laboratory analysis. Samples will consist of a composite sample of the current year's growth, collected during the growing season (June to August) during a time of the day when plants have active photosynthesis and nutrient transport. Soil samples will be collected at the same monitoring locations as vegetation samples within the top 30 centimetres (cm) of the soil surface, using a stainless-steel hand-trowel.

Nitril gloves and sterilized implements (e.g., clippers, trowels) will be used to assist in collecting the samples and keeping them free of contaminants. Non-target plant materials and other debris will be removed prior to the sample being placed into a plastic sampling bag. Sample bags will be labelled with species name, tissue collected, sample site identification (ID) and date, and placed in a freezer or cooler within four (4) hours of collection.

7.3.2 Sample Analyses

Laboratory analytical testing of vegetation and soil samples will include:

- ▶ moisture content and trace metals concentrations of plant tissue samples; and
- ▶ pH, organic carbon content, and trace metals within soil samples.

Trace metals concentrations will be evaluated to assess the potential for Project-related change. Results will be compared to historical data from previous sampling years. A comparison between background and Project sampling locations will also be completed.

Should metal concentrations be identified to be increasing within the Project sampling locations in comparison to historic data and/or background sampling locations, the need for implementation of additional mitigation measures to minimize metals uptake (e.g., increased dust suppression) will be assessed. Laboratory analyses will be stored and maintained in a database for the lifetime of the Project.

7.4 Quality Assurance/Quality Control (QA/QC)

Quality Assurance and Quality Control (QA/QC) procedures will be followed during surveys and monitoring programs including:

- ▶ personnel conducting surveys will have appropriate training and experience;
- ▶ monitoring will be documented using standardized data sheets;
- ▶ data will be reviewed to standardize data accuracy prior to database transfer;
- ▶ data will be kept and maintained in a database throughout the lifetime of the Project; and
- ▶ monitoring plans will be updated throughout the lifetime of the Project to apply to current regulations, legislation, and BMPs.

For trace metals uptake monitoring, precision and accuracy will additionally be controlled with the use of sample duplicates. Laboratory sample holding times for samples will be reviewed and followed.

7.5 Performance Objectives

Table 7.1-1 summarizes the performance objectives that will be used to evaluate the implementation of this VMP.

Table 7.1-1: Performance Objectives

Objective	Target
Mitigation measures to avoid or minimize potential Project effects on vegetation of concern are in place.	Mitigation measures were developed and implemented to avoid or minimize potential effects on vegetation of concern, such as provision of no disturbance buffers around riparian and wetland ecosystems and any new or suspected rare plant or lichen occurrences will be visited by a qualified vegetation ecologist and mitigation employed.
Minimize the potential for windthrow along the edges of the Project area by retaining windfirm trees, feathering edges, and topping/pruning individual trees.	Complete plans before clearing activities, and work is conducted annually after clearing for up to five (5) years.
Windthrow monitoring visits includes visual assessment to identify areas with high potential for windthrow, or via evidence of historic or ongoing windthrow hazards in accordance with the Windthrow Handbook for BC (Stathers et al. 1994).	Areas with windthrow hazard were identified and mitigation applied to those areas, as necessary, resulting in reduced risk of windthrow or its associated hazards.
Invasive plants instruction on the definition of invasive plants and their potential effects, mitigation measures to avoid the introduction and spread of invasive plants, and training on the presence and identification of common invasive plant species	Employees and contractors onsite received training during induction and some employees received additional training specific to their roles.

Objective	Target
Invasive plants training received and in use	Employees and contractors report occurrences of invasive plants during their routine course of work
Invasive plants are monitored for early detection, prevention, and control	Targeted surveys occur in the growing season in areas most vulnerable to new spread or introduction of invasive plants (e.g., newly reclaimed areas or ground activities) and new occurrences were detected early and when they are relatively small infestations.
Invasive plants: Control and follow up monitoring of invasive plants occurrences as per Integrated Pest Management techniques	Invasive plants will not be introduced or spread due to Project activities compared to the species and size of infestations that occurred prior to the Project activities by: a) requiring that equipment and vehicles will arrive at the Project Area clean, and inspected for soil, plant material, wildlife, and seeds to limit the potential for the introduction of invasive plants; and b) by procuring seed mixes from vendors who have shown in the region that their mixes do not contain invasive plants.
Trace metals uptake sampling designed and implemented	Trace metal sampling programs were conducted to detect changes in soil and vegetation trace metals content using temporal and spatial replication (before-after, control-impact)
Trace metals uptake sample results are within range of variability pre-mining	Trace metals content of plants and soil will be within the range of variability that would occur had the Project not existed, as compared to trace metals of plants and soil in baseline data and reference sampling locations

8. REPORTING

8.1 General Reporting

Reporting completed by TCL will confirm consistent implementation of the VMP. Summary reports of monitoring activities and results will be compiled and reviewed annually.

8.2 Compliance Reporting

Compliance reporting will be subject to the EAC, and *MA/EMA* permit conditions. The information gathered during monitoring practices will be summarized with 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 **Socio-economic Management Plan (S13.0-C16) (SEMP)**. The SEMP will have requirements related to reporting on community engagement programs.

8.3 Internal Reporting

Vegetation management and monitoring activities will be recorded into a database 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, summarize and evaluate the success of vegetation management and invasive plant mitigation and control measures for the Project 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 consideration.

9. ROLES AND RESPONSIBILITIES

9.1 Mine Manager

The Mine Manager bears overall responsibility for all phases of the Project, and responsibility for onsite environmental monitoring and compliance. 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 VMP, and
- ▶ facilitate the annual review of the VMP.

9.2 Health, Safety, and Human Resources Superintendent

The Health, Safety, and Human Resources Superintendent will:

- ▶ provide resources to implement the VMP; and
- ▶ verify site personnel are competent through education and training.

9.3 Environmental Coordinator

The Environmental Coordinator will:

- ▶ verify the implementation of the VMP including Incident reporting;
- ▶ verify the annual review of the VMP;
- ▶ act as a resource to Minesite personnel by providing guidance relating to permit conditions, commitments, acts, regulations, and legislation;
- ▶ prepare a summary in the Annual Environmental Management Summary Report;
- ▶ verify the required environmental permits have been obtained throughout all Project phases;
- ▶ act as liaison with government agencies for permitting and non-compliance incidents;
- ▶ act as liaison with the IEM during construction and Indigenous groups and communities;
- ▶ implement adaptive management procedures, as necessary;
- ▶ coordinate invasive plant control measures with trained employees or contractors;
- ▶ maintain a database for the recording of vegetation management and monitoring activities; and
- ▶ coordinate Qualified Professionals (QP) to complete work related to the VMP.

9.4 Environmental Technician

The Environmental Technician reports to the Environmental Coordinator and will:

- ▶ assist the Environmental Coordinator with monitoring and reporting as required in the **VMP**;
- ▶ provide vacation coverage for the Environmental Coordinator;

- ▶ assist the Environmental Coordinator with the Annual Environmental Management Summary Report and annual compliance summary reports for EAC and *MA/EMA* permits; and
- ▶ assist the Environmental Coordinator with the annual review of the **VMP**.

9.5 Independent Environmental Monitor

The Independent Environmental Monitor (IEM), as required and approved by the BC EAO, will:

- ▶ monitor and report on Construction Phase activities per the scope of the position; and
- ▶ liaise with and act as a resource for the Environmental Coordinator and for the Contractor's Manager.

9.6 Employees and Contractors

Employees and contractors will:

- ▶ complete a site-specific environmental induction and invasive plant orientation training appropriate to their role; and
- ▶ understand and implement the VMP as appropriate to their role.

10. COMMUNICATION

Communication of the VMP at TCL will be based on internal requirements and will primarily take place through this VMP and relevant SPPs. Any significant change to the VMP will be communicated to the Project's employees and contractors through a site-wide email, announcements over all radio channels by Minesite supervision and bulletins posted around the Project's Minesite. When effective to do so, maps will be marked with changes.

10.1 Training and Awareness

All employees and contractors will have training and awareness of the Project responsibilities to meet the objectives of the VMP and Invasive Plant Management Strategy for all Project phases. General training will include an overview of the VMP objectives, mitigation measures, monitoring, and reporting requirements to meet VMP targets.

10.2 Employee and Contractor Training

The environmental training of all personnel involved in the Project is considered a critical factor in achieving the objectives outlined in this VMP. All employees and contractors will receive training on the VMP during a site induction and will be trained in to the degree that is appropriate for their role.

Additional training will be provided to employees and contractors delegated to specific work tasks (e.g., clearing, reclamation or herbicide application) and will occur through site-specific orientation and/or in-person communication with the Environmental Coordinator.

All those responsible for the management, implementation, and operation of any aspect of this VMP will be competent for their role.

10.3 Visitor Training

Visitors will not be required to be knowledgeable of this VMP as they will be under the direction of TCL employees and will not be allowed to be in a situation involving vegetation or invasive plant management.

11. EVALUATION AND ADAPTIVE MANAGEMENT

11.1 Evaluation

A review of the VMP will be completed by the Environmental Coordinator on an annual basis to compare data, trends, and implementation of the management plans of VMP objectives. This process will include a review of the performance objectives in **7. Monitoring** and input received from Indigenous groups through the **SEMP**.

11.2 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. This will be achieved through periodic reviews of the VMP and the results of monitoring programs.

The VMP is a living document that should 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 work towards continual improvement at the Project. The Mine Manager or their delegate will investigate improvements in any trend and assess whether the practices responsible for the improvements can be applied to other areas of the Project. Deteriorating trends will be studied to determine the root cause.

When the cause is identified, the Mine Manager or their delegate will implement a suitable corrective action through the EMS. Examples of corrective actions could include:

- ▶ additional training of employees and contractors on procedures;
- ▶ enhancement of maintenance and monitoring measures;
- ▶ development and implementation of additional maintenance and monitoring measures; and/or
- ▶ additional supervisory oversight.

TCL will amend the VMP as required based on annual evaluations and feedback from stakeholders and the Indigenous groups. Any proposed changes will be sent out for review by regulators, stakeholders, Indigenous groups and community before being finalized and implemented into the VMP.

11.3 Continual Improvement

TCL will amend the VMP as required based on evaluations and feedback from applicable stakeholders. Any proposed changes will be sent out for review by contractors and all relevant stakeholders before being finalized and implemented into the CEMP.

12. CHANGE MANAGEMENT

Changing any part of the VMP requires a formalized process to be used. If significant changes to objectives, management plan structure, operational milestones, communication and/or information management are being planned, it is required that the Management of Change (MOC) procedure in the **EMS** be followed. Minor edits and/or updates to this VMP will be controlled through version control and content approval functions.

13. CONCLUSION

The VMP has been developed following review of Project-specific baseline vegetation studies and the environmental assessment of the Vegetation VC. Through implementation of the VMP, and adaptive management to changing site conditions, TCL will use effective strategies and BMPs to minimize potential effects on vegetation, wetlands, and ecosystems during Project phases.

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