Tantalum Mining Corporation of Canada Ltd.: Tailings Reprocessing Facility Project

Environment Act Proposal

PRESENTED TO

Tantalum Mining Corp. of Canada Ltd.

NOVEMBER 9, 2023
ISSUED FOR USE
FILE: 734-2301660100-REP-V0002-02

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EXECUTIVE SUMMARY

Since 2016, TANCO has been studying the feasibility of reprocessing existing mine tailings to recover residual economic minerals such as lithium. Several independent studies have been commissioned with positive results, with the most recent being a preliminary feasibility study for a new processing facility that would provide TANCO with the capacity to reprocess tailings from the West Tailings Management Area (WTMA) as well as the ability to process underground mined ore during the winter months.

TANCO now wishes to take advantage of current market conditions and proceed with the Tailings Reprocessing Facility Project (the Project) as outlined in this document. The primary objective of the Project is to construct a new 3,000 tpd processing plant (New Mill) that will reprocess approximately 3 million tonnes of existing tailings located within the WTMA over a five-year period to produce spodumene and amblygonite (lithium concentrates) with the option to extend the mill life should mill feed and favourable market conditions persist. The Project will also be designed to process underground ore to keep the New Mill running during winter months (when excavation of tailings from the WTMA is not possible).

The Project will require an increase in TANCO's licenced daily production rates from 1,000 tpd to 4,000 tpd overall, with the New Mill capable of processing 3,000 tpd and the existing mill (running concurrently) capable of processing 1,000 tpd. Key project components include the flotation mill, concentrate loadout building, surface runoff collection infrastructure, water and tailings pipelines, excavation of reclaimable tailings from the WTMA, and ore storage pad.

TANCO is proposing the following schedule for the Tailings Reprocessing Facility Project:

Project Phase	Start	End
Preliminary Design	Spring 2022	Spring 2023
Detailed Design	Spring 2023	Spring 2024
Site Preparation	Fall 2023	Spring 2024
Construction	Spring 2024	Fall 2024
Operation	Fall 2024	2029/30 or TBD end of mine life
Decommissioning and Reclamation	TBD	TBD

The New Mill will process reclaimable tailings for seven months per year (spring / summer / fall) and stockpiled underground ore for five months per year (fall / winter) for five years. Tailings extraction will use a combination of mechanical excavation and dredging, with dredging being employed where tailings are subaqueous (which represents about 70% of the reclaimable tailings within the WTMA). Underground ore will supply the New Mill with mill feed during winter months. The underground ore mill feed will be stacked on the Run of Mine (ROM) ore pad during late spring and early autumn.

The same reagents that are currently used for processing in the existing mill and stored on site will also be required for the New Mill; however, due to the increased production rate additional quantities will be needed. Most water supply needs for the New Mill will be met using recycled water from the WTMA Polishing Pond, supplemented with fresh water provided by extensions to the existing infrastructure and accommodated within the withdrawal limits in the existing *Water Rights Act* Licence No. 2015-010 (expires March 5, 2025).

Tailings from both the existing mill and the New Mill will be deposited in the WTMA from a series of spigots located along the tailings discharge pipe, replacing the current end of pipe discharge and providing better deposition control.

The New Mill will employ the same lithium flotation process as the existing mill. The tailings slurry is expected to be very similar in chemical composition to the slurry produced by the existing mill. Test work is underway to validate this assumption. The annual tailings volume deposited in the WTMA will increase 6-fold with the production rate enabled by the New Mill. TANCO is currently conducting test work and modelling to determine whether mine effluent quality may potentially change and what treatment measures may be required. Based on preliminary testwork, and with a conservative 80 percent water recovery (recycling) rate, the phosphorus impact to Bernic Lake associated with the Project is expected to be an order of magnitude lower than current loading. The results of these studies will be provided to Manitoba once available.

TANCO is committed to maintaining and improving its relationship and communications with surrounding communities and organizations. TANCO has made attempts to contact and/or have had discussions with Sagkeeng First Nation, Brokenhead Ojibway Nation, Roseau River First Nation, Hollow Water First Nation, Black River First Nation, and Manitoba Métis Federation to provide information about the proposed Project. TANCO has also met with various provincial government representatives, rural municipalities, townships, and interest groups within the region. TANCO looks forward to additional meetings and collaboration with all parties as the Project moves forward.

Detailed design of the Tailings Reprocessing Facility Project is underway. Project details developed to date are presented in this document and have been considered in the effects assessment. The effects assessment provided in this document considers the Tailings Reprocessing Facility Project by development phase: site preparation, construction, and operation.

Project development will leverage TANCO’s operational knowledge to create a more modern facility with improvements in operational efficiencies and recovery of economic minerals.

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ACRONYMS & ABBREVIATIONS

Acronyms/Abbreviations	Definition
AADT	Annual Average Daily Traffic
ASDT	Average Summer Daily Traffic
BLM	Bernic Lake Mine
CPF	Cesium Processing Facility
EAB	Environmental Approvals Branch
EAL	*Environment Act* Licence
EEM	Environmental Effects Monitoring
ETMA	East Tailings Management Area
masl	metres above sea level
MDMER	Metal and Diamond Mining Effluent Regulations
NOA	Notice of Alteration
NPRI	National Pollutant Release Inventory
SDS	Safety Data Sheets
tpa	tonnes per annum (year)
tpd	tonnes per day
tph	tonnes per hour
WTMA	West Tailings Management Area

GLOSSARY

Term	Definition
Reclaimable (or reclaimed) tailings	Tailings that are currently stored in the WTMA which will be excavated from the WTMA and reprocessed by the proposed New Mill.
Repulped tailings	Reclaimable tailings that have been screened, grinded, and pulped to the desired size and wet weight needed for reprocessing.
Reprocessed tailings	Tailings resulting from the reprocessing of reclaimable tailings, which will be deposited back into the WTMA. Reprocessed tailings will be produced during operation of the new plant, in seven months of the year for five years.
Mined ore tailings	Tailings that are produced from processing mined ore, either as part of approved and licenced operations in the existing TANCO Mill or in the New Mill. Mined ore tailings are deposited in the WTMA.
Spent final tailings	These are the tailings that will remain in the WTMA and represents the combination of mined ore tailings and reprocessed tailings.

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1.0 INTRODUCTION

Tantalum Mining Corporation of Canada (TANCO) is submitting this Notice of Alteration (NOA) to notify the Director of proposed alterations to Environment Act Licence No. 973 for the Bernic Lake Mine (BLM) as required under *The Environment Act* (S.14(1); Government of Manitoba 2012). This Notice of Alteration (NOA) describes the physical alteration of the proposed project and provides an assessment of potential environmental impacts and proposed mitigation measures to reduce or avoid any adverse effects.

Detailed design of the New Mill is underway. Known project details have been presented in this document and considered in the effects assessment for pre-submission review. Components or activities that require additional information to confirm the anticipated impacts have been noted (e.g., water treatment studies). The results of these studies, including the assessment of impacts and recommended mitigation measures, will be shared with the regulators as an addendum to this submission.

1.1 Overview

In 2016, TANCO conducted an internal resource estimate on the tailings stored in the existing West Tailings Management Area (WTMA) which found that on average, the WTMA tailings resource contained 2.86 million tonnes of tailings with approximately 1.06% Lithium Oxide, 0.54% Cesium Oxide, and 0.44% Rubidium Oxide (Hatch 2023). In 2021-22, TANCO commissioned three parallel studies. The first by Hatch Ltd. (Hatch) with the objective of developing a preliminary mine plan for extraction of the existing tailings in the WTMA and the management of tailings back into the WTMA. The second and third by Tetra Tech Canada Inc. (Tetra Tech) to complete a preliminary feasibility study related to a new processing facility capable of reprocessing the existing tailings material as well as the ability to process underground mined ore.

With positive results of the above-mentioned studies, TANCO now wishes to take advantage of current market conditions and proceed with the Project as outlined in this document. The overall objective of the Project is to construct a new 3,000 tpd processing plant (New Mill) that will reprocess approximately 3 million tonnes of existing tailings located within the WTMA over a five-year period to produce spodumene and amblygonite (lithium concentrates).

Due to seasonal constraints, the tailings extraction from the WTMA can only occur during non-frozen months; therefore, TANCO is proposing to also send underground ore to the New Mill during the winter months to avoid unnecessary idling of equipment. Underground ore from TANCO's mine will be stockpiled near the New Mill for processing during the winter. It is anticipated that approximately 2.1 million tonnes of underground ore will be processed through the five-year period. During the five-year tailings reprocessing period, TANCO will continue to assess ore supply and market conditions to determine if operation of the New Mill is feasible for a longer period.

This project only addresses the extraction of lithium bearing ores; however, the potential for extracting other minerals is being explored.

1.2 Project Ownership and Funding

TANCO is 100% owned by Sinomine Rare Metals Resources Co. Ltd (Sinomine) which is headquartered in Beijing, China. Established in 1999, Sinomine is a global geological exploration technology services company focusing on the exploration of mainly copper, lead, zinc, nickel, gold, silver, platinum and other non-ferrous metals. Sinomine has acquired extensive experiences in global geological exploration operating several open pit and underground mining projects. Sinomine is involved in rare metal raw material processing and development as well as providing

project management service for international engineering projects. The mine has been operated by TANCO since 1967.

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1.3 Need for the Project

Although the lithium concentrate production process is the same, the existing mill is not capable of supporting the desired production capacity associated with tailings reprocessing. In addition, the proximity of the New Mill to the WTMA allows TANCO operational efficiency. The implementation of the project will allow TANCO to leverage their existing operational knowledge to create a more modern facility with improvements in operational efficiencies and improve recovery.

1.4 Project Timeline

The following schedule is proposed to take advantage of market conditions for lithium (subject to receipt of applicable approvals and permits):

Project Phase	Activity	Start	End
Planning	Conducting Feasibility Studies, Detailed Investigations	2016	Spring 2023
Preliminary Design	Engineering design	Spring 2022	Spring 2023
Detailed Design	Engineering design	Spring 2023	Spring 2024
Site Preparation	Clearing of vegetation within project footprint (within TANCO surface lease), grading the site, constructing the surface water collection ditch and berm, developing staging/laydown areas, gravel road/trail construction, pouring foundation(s), and preparing/stacking WTMA tailings for extraction	Spring 2024	Spring 2024
Construction	Construction of New Mill building and ancillary infrastructure; upgrading existing infrastructure; tailings extraction (Phase 1)	Spring 2024	Fall 2024
Operation	Tailings extraction (Phases 2-3); reclaimable tailings preparation and reprocessing; hauling and sorting underground ore; processing underground ore; deposition of tailings to WTMA	Fall 2024	2030 or TBD end of mine life
Decommissioning and Reclamation	Removal of buildings, infrastructure, site clean up	TBD	TBD

1.5 Mineral and Surface Rights

The planned project components are located entirely within TANCO's current mineral and surface lease areas (Table 1-1).

Table 1-1: TANCO Current Land Leases at the Bernic Lake Mine

Type	Number	Annual Renewal Date
Surface Leases	M-126 to M-130	May 2
	M-145 to M-149	May 7
	SL-1	October 8
	SL-3	November 15
	SL-11*	August 22
Mineral Leases	ML-04 to ML-06	May 1
Quarry Lease	QL-2958	October 6
Mining Claims	MB1592 and MB1593	January 6
	MB1601	July 14
	MB2051 and MB2052	August 2
	MB3376	December 14
	MB3600	July 5
	MB3922	June 14
	MB5152 to MB5157	July 17
	MB605 to MB609; MB611 and MB634	March 12
	MB7334 to MB7338	June 11
	W46815 and W46816	June 14
	W50913	August 22
	W51488 and W51489	November 1
	W51528	January 11
	W51828 to W51830	December 20
	MB643	March 12
	W33024*	August 6
	W40003 to W40005	April 30
Crown Land General Permit (TANCO Mine road)	GP# 0000208	-

** This surface lease and mining leases are held by Coltan Mines Ltd, a subsidiary and fully administered by TANCO.*

The New Mill will be located on TANCO's existing surface lease No. 3 (SL-3) and mineral lease No. 4 (ML-4). TANCO's leases are renewed on an annual basis. Copies of the leases are available upon request.

1.6 Site Access

The site is accessible by a combination of paved and gravel all-season roads, namely PR 313, PR 315 and the TANCO Mine Road. The TANCO Mine Road is on Crown Land and extends outside the boundaries of the surface leases. Crown Land permit GP#0000208 allows TANCO to maintain and/or operate the all-weather road from PR315 to Bernic Lake (Bernic Lake Mine Road). No changes in main site access are proposed.

1.7 Environmental Licensing

The BLM operates under Environment Act Licence (EAL) No. 973. The mine has also been subject to the *Metal and Diamond Mining Effluent Regulations* (MDMER), where mine effluent discharge quality is regulated, and environmental effects monitoring is required to describe and respond to effluent-related effects to the aquatic environment.

The environmental compliance of the site is also driven by several other environmental related permits and approvals, such as those issued under:

- *The Environment Act*
- *Canadian Environmental Protection Act*
- *Mines and Minerals Act*
- *The Explosives Act*
- *The Water Rights Act*
- *The Dangerous Goods Handling and Transportation Act*
- *Workplace Safety and Health Act*
- *The Steam and Pressure Plants Act*
- *The Crown Lands Act*

Potential amendments to permits issued under the above-listed Acts or their subsequent regulations are referred to throughout this report where it is possible it may be required. These will be applied for through the appropriate agency prior to operation of the New Mill.

2.0 EXISTING OPERATIONS

The current configuration of the BLM includes an underground mine, a mill, the Cesium Processing Facility (CPF), warehouses and service buildings and two tailings management areas (East and West) with mineral and surface rights covering an area of 25.3 km^2. Underground mining is conducted primarily using the room and pillar mining method.

The facility footprint is approximately 85 hectares. An overall site plan is presented in Figure 2-1.

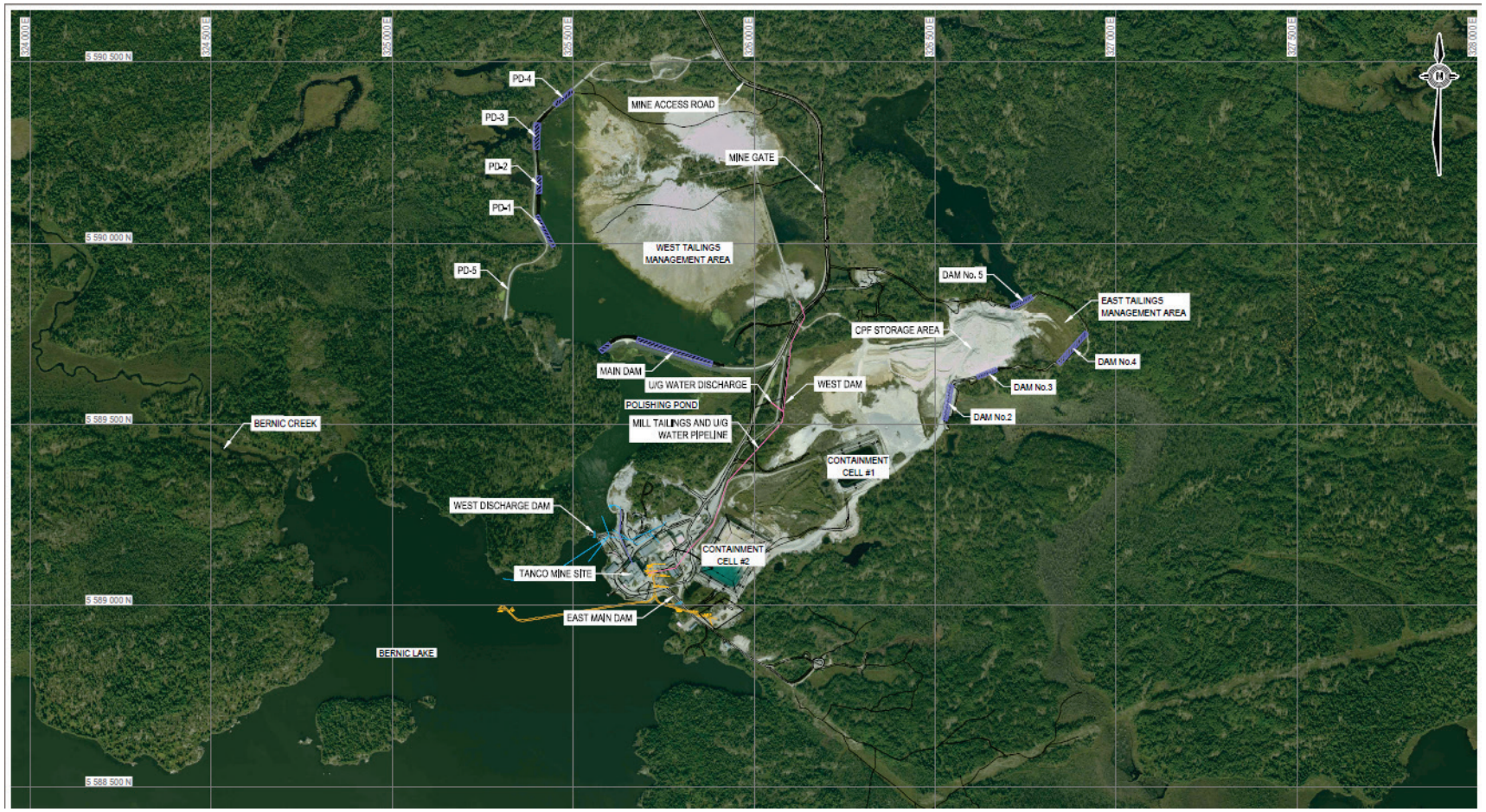


Figure 2-1: Current Configuration of the Bernic Lake Mine site

3.0 PROJECT DESCRIPTION

The Project will require an increase in TANCO's licenced daily production rates from 1,000 tpd to 4,000 tpd overall, with the New Mill capable of processing 3,000 tpd and the existing mill (running concurrently) capable of processing 1,000 tpd. The New Mill will process reclaimable tailings for seven months per year (spring/ summer/ fall) and stockpiled run of mine ore from the Bernic Lake mine for five months per year (fall/winter). No changes are proposed to the operation of the existing mill. This document only considers the incremental effects related to the construction and operation of the 3,000 tpd New Mill as an alteration to the existing facility.

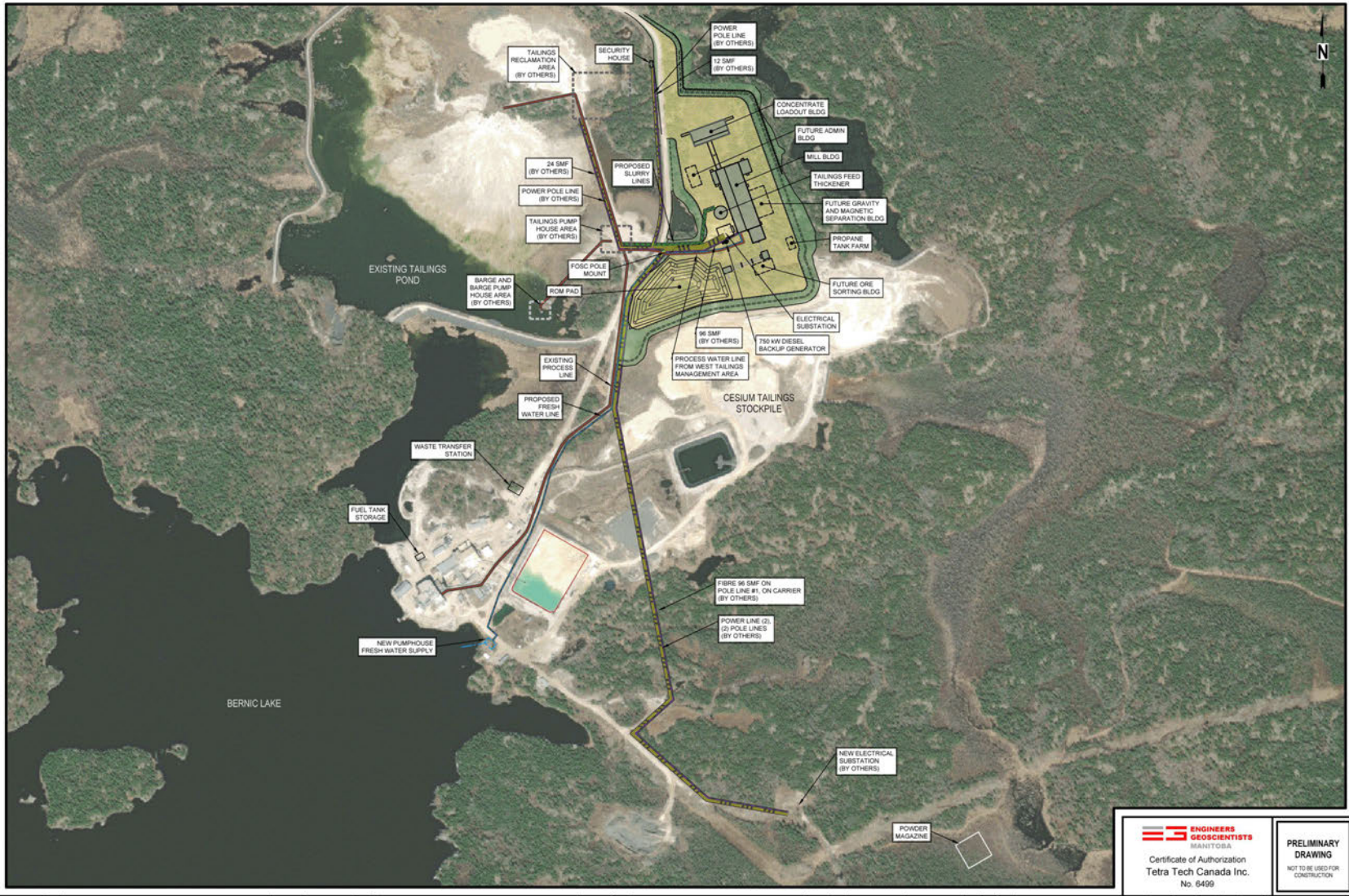
Key Design Criteria for the New Mill are listed below:

- Total Tonnage: 2.9 million tonnes Reclaimable Tailings / 2.1 million tonnes Underground Ore
- Processing Life: 5 years (with potential to extend)
- Annual Process Rate: 630,000 t (reclaimable tailings) / 420,000 t (underground ore)
- Nominal Process Rate: 3,000 t/d
- Mill Availability: 92%

A general overview of the project is illustrated on Figure 3-1 and a closer site plan view is shown on Figure 3-2.

3.1 New Mill and Ancillary Facilities

The New Mill Building and ancillary infrastructure described in this section will be wholly located on TANCO's surface leases. The total footprint of the project (not including the WTMA) is about 25 hectares. This includes area already cleared for current access roads, explosives magazine, and the Waste Transfer Station (approximately 4 hectares). The vegetation in the area is a mix of grasslands, shrubland and woodlands.



LEGEND

- PROPOSED POWER LINE
- PROPOSED FIBRE LINE
- PROPOSED FRESH WATER LINE
- PROPOSED SLURRY LINE
- EXISTING PROCESS LINE
- GRAVELED / FUNCTIONAL AREAS
- VEGETATED / SLOPED AREAS

100 0 100 200 300
METRES 1:4000

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
Tetra Tech Canada Inc.
No. 6499

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DOCUMENT CONTROL NUMBER
719-2301661810-SKT-C0003

INSTR. NO.	CODE	CONDITION	TRIP POINT

INSTR. NO.	CODE	CONDITION	TRIP POINT

	SHUTDOWN CODES
K	
J	TRIP TO SHUTDOWN
H	TRIP TO WARMUP
G	TRIP TO HEATLOAD
F	ALARM ONLY
E	MAIN BURNER PERMISSIVE
D	PRODUCTION LIMIT
C	MAIN BURNER LIMIT
B	PILOT/WARMUP LIMIT
A	IGNITION PERMISSIVE

MICRO FILMED	REV.	PROJECT ISSUE	TANCO PROJECT NO.	APP'D	DATE

REV.	DESIGN DESCRIPTION	DES	DWG	CHKD	APP'R	DATE
A	ISSUED FOR INFORMATION	SK	TRC	RH	BR	2023/08/17

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CAD FILE NAME: 719-2301661810-SKT-C0003 - Overall Site Plan (Permitting).dwg

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Canada

GENERAL ARRANGEMENT

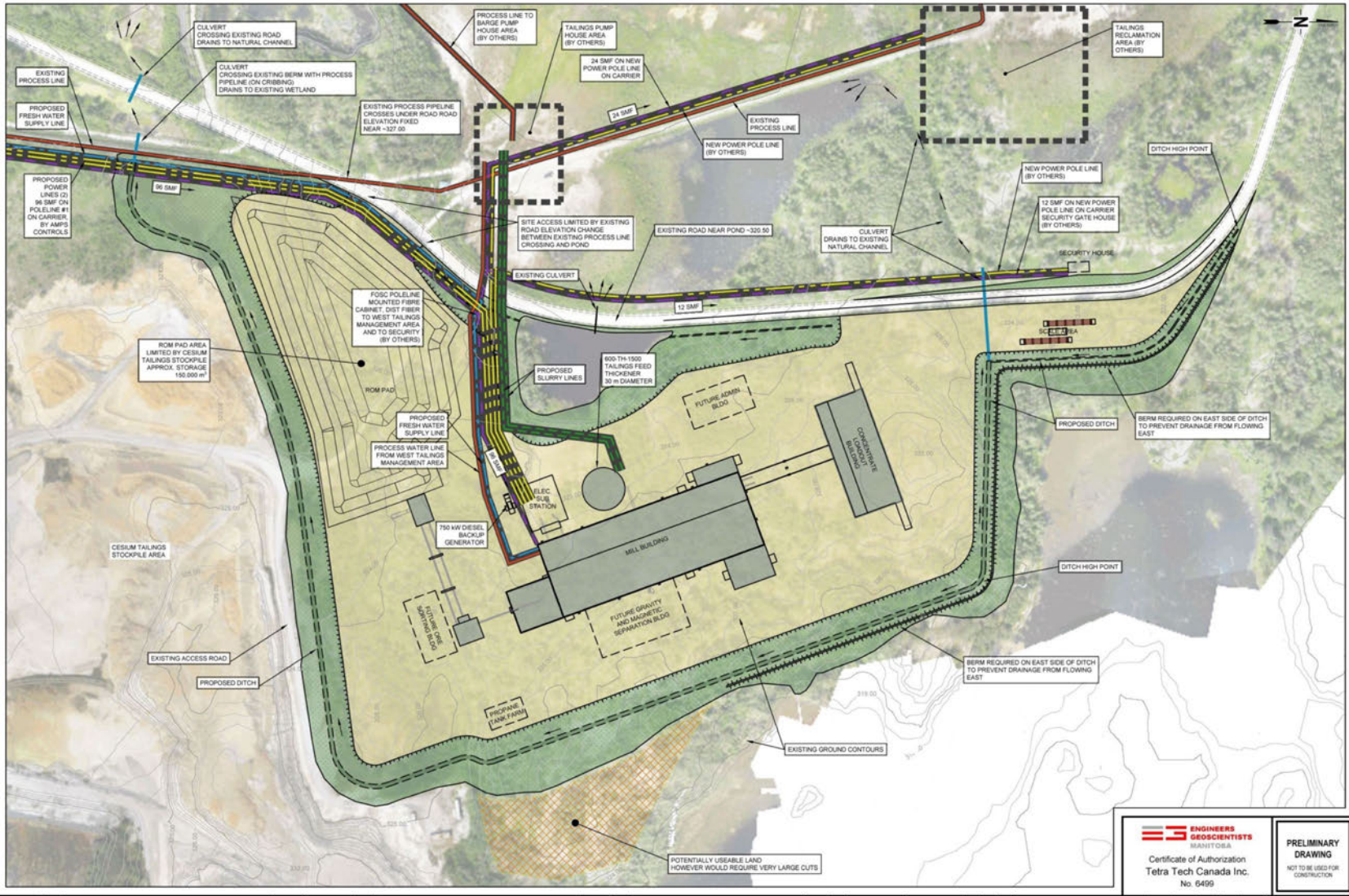
MILL FLOTATION PLANT GENERAL PERMITTING SITE PLAN SKETCH

MILL 600

SCALE 1:4000

Figure 3-1

REV. A



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DOCUMENT CONTROL NUMBER
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INSTR. NO.	CODE	CONDITION	TRIP POINT

INSTR. NO.	CODE	CONDITION	TRIP POINT

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J	TRIP TO SHUTDOWN		-	-	-	-		-	-							
H	TRIP TO WARMUP		-	-	-	-		-	-							
G	TRIP TO HEATLOAD		-	-	-	-		-	-							
F	ALARM ONLY		-	-	-	-		-	-							
E	MAIN BURNER PERMISSIVE		-	-	-	-		-	-							
D	PRODUCTION LIMIT		-	-	-	-		-	-							
C	MAIN BURNER LIMIT		-	-	-	-		-	-							
B	PILOT/WARMUP LIMIT		-	-	-	-		A	ISSUED FOR REVIEW	SK	TRC	RH	BR	2023/08/16
A	IGNITION PERMISSIVE		-	-	-	-								
	SHUTDOWN CODES	MICRO PLANES	REV.	PROJECT ISSUE	TANCO PROJECT NO.	APP'D	DATE	REV.	DESIGN DESCRIPTION	DES	DWG	CHKD	APPR	DATE
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CAD FILE NAME: 719-23016818100-SKT-C0002 - Civil Site Plan [Permitting].dwg

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Canada

GENERAL ARRANGMENT
MILL FLOTATION PLANT PERMITTING SITE PLAN SKETCH

MILL 600

SCALE 1:1250

Figure 3-2

REV. A

3.1.1 Flotation Plant (Mill Building)

The project involves the construction of a new 3,000 tpd mill and ancillary facilities. The New Mill will be located east of the WTMA, adjacent to the existing main access road (Figure 3-3). The flotation plant will be enclosed by an approximately 8,300 m^2 pre-engineered steel building on a concrete foundation.

The mill building will house most of the process equipment, including the secondary grinding equipment, flotation circuit, and concentrate dewatering equipment. The Mill building will also house a reagent preparation area, storage area, and office space.

Some of the mill processes will be in adjacent buildings, described in more detail in later sections:

- The comminution circuit (ore receiving pad, primary and secondary crushing and grinding).
- Thickener and reagent tanks.
- Concentrate loadout facility.

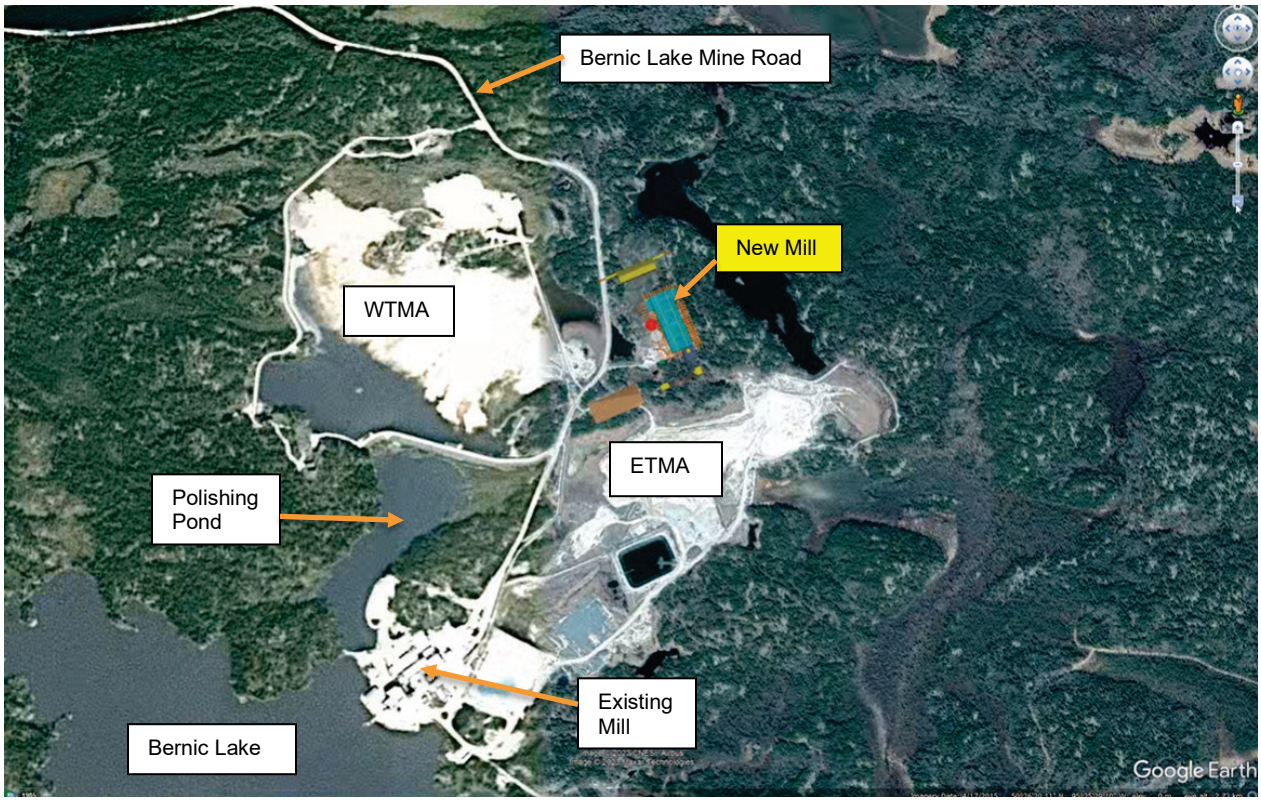


Figure 3-3: Proposed Location of New Mill

The roof of New Mill building will have an approximate elevation of 359 masl.

TANCO's explosives magazine and the waste transfer station for the BLM are currently located in the area of the New Mill. This infrastructure will require relocation to accommodate the new infrastructure for the proposed project. Ancillary facilities required to support the operation of the mill are described below.

3.1.2 Underground Ore Receiving Pad

In addition to supplying the existing mill with ore, underground ore will supply the New Mill with mill feed during winter months. Underground ore will be hauled by trucks to an approximately 150,000 m^3 capacity ore stockpile pad representing approximately 250,000 t of mill feed. The underground ore mill feed will be stacked on the pad year-round. During winter, materials will be reclaimed by loaders and hauled by trucks to the crushing circuit at a rate of approximately 164 tph. Surface runoff from the stockpile pad will report to the runoff collection ditch and to the WTMA. Previous acid-base accounting tests conducted of different rock fills and tailings indicate they are acid consuming, not acid producing.

3.1.3 Primary and Secondary Crushing and Grinding Buildings

The equipment used for primary and secondary crushing and grinding of underground ore will be housed in buildings to prevent potential interruptions by severe weather during winter. Conveyor galleries will be used to transport the crushed materials between these facilities. Ventilation stacks on these buildings will be fitted with dust collection equipment (make/model to be determined) control external air emissions.

Additional information about the comminution circuit (to prepare the underground ore for processing) is provided in Section 3.2.3 (Comminution Circuit).

3.1.4 Thickener / Reagent Storage

Reagents used in the New Mill flotation circuit will be the same as those used in the existing mill in quantities proportionate to the higher processing rate. Reagents will be stored either within the New Mill building (in designated areas) or in a tanks adjacent to the building. A 30 m diameter feed thickener tank will be located adjacent to the New Mill building. Appropriate ventilation, fire and safety protection, eye wash, and SDS stations will be provided at the reagent storage and preparation areas. Tanks will be inspected daily for structural integrity and leaks. The New Mill site will be graded to direct any accidental spills to the surface runoff collection ditch. There will also be secondary containment within the New Mill building and reagent areas.

3.1.5 Concentrate Loadout Area

The filter press will be used for the filtration of the amblygonite concentrate. The amblygonite concentrates will be loaded separately into the storage areas in bulk stacking. The concentrate will then be loaded onto bulk trucks for transport to Winnipeg (same as existing operation), where they will be loaded on rail cars to be sent to Vancouver for overseas shipping, same as the existing shipping operations. Between approximately 350 tonnes (spring/summer/fall) and up to 750 tonnes (winter) of concentrate per day will be shipped to Winnipeg. A dust collector near the concentrate dryer and loading area will be installed to control dust.

3.1.6 Surface Runoff Collection Ditch and Containment Pond

A key design element for the siting of project infrastructure is to contain all surface runoff and have it report back to the WTMA rather than to the unnamed pond located to the east of the site where runoff from this area presently reports. Surface infrastructure has been sited outside of the unnamed pond catchment area to the extent possible. Site grading and the inclusion of an existing containment pond and new perimeter drainage ditch and berm on the northeast corner of the site have also been incorporated in the design to manage surface runoff. The drainage plan also includes the collection of the runoff from the underground mined ore storage pad. The containment pond is currently connected to the WTMA via culverts installed under the road.

3.1.7 Site Access and Parking

An internal gravel road connecting to the main mine access road is planned to facilitate travel of vehicles within the New Mill site. The road will be designed to facilitate safe travel of bulk trucks which will transport concentrate to Winnipeg. A gravel parking lot will be made available for employees close to the mill entrance. Truck parking will also be developed to accommodate flat deck trucks or other large vehicles needed for the shipment of goods to/from the mill.

3.1.8 Open Storage Area

Open areas on the New Mill site may be used for staff parking, equipment laydown or other needs of the operation.

3.1.9 Electrical Supply

A transformer station, to be constructed as approved by the EAB on March 21, 2023, will step down the 66 kV transmission supply from Manitoba Hydro to 25 kV. Overhead power lines will distribute power to the required loads on site. The New Mill has a transformer station taking the 25 kV and stepping it down to 4,160 V. A 5 kV switchgear located in the New Mill electrical room will distribute power to the mill processes.

The overhead electrical power distribution lines will be routed primarily along existing road and piping corridors within the surface lease to distribute power to the new mill, security house, and WTMA (for tailings extraction and preparation).

A diesel generator (750 kW) will be located outside in an enclosure adjacent to the New Mill substation at the southwest corner of the building. This generator will provide back-up power for critical systems in the event of a power failure. Only critical loads will be connected such as thickener rakes and agitators, and only as required to prevent solidification and/or freezing during power outages.

3.1.10 Water Supply Lines

Both fresh and process water will be required to support operation of the New Mill and therefore new water supply lines will be required.

Fresh water will be drawn from Bernic Lake. Design of the water supply system is not yet complete, however design is focusing on potentially repurposing existing water pumphouses and intakes to avoid in-water work to the extent possible. Upgrades to pumps and other equipment within the pumphouse may be required to meet predicted water demand. A new 250 mm HDPE fresh water supply line for the New Mill will be routed at grade along adjacent to existing roads of way to supply fresh water to the New Mill from the pumphouse at Bernic Lake.

Process water will be recirculated from the WTMA polishing pond as in the existing operation. New water lines and a new pumphouse will be required so as not to interfere with water recirculation to the existing mill. The new pumphouse will be located near the polishing pond and existing tailings pumphouse (Figure 3-5). New process water supply pipes will bring water from the polishing pond to a water tank adjacent to the new pumphouse. From there, process water supply pipes will go to (1) the New Mill and (2) the tailings preparation area within the WTMA, in existing disturbed areas and adjacent to existing roads. Pipes will be installed at grade.

All new water supply lines will be 6” HPDE pipes and will not require heat-tracing, consistent with other water supply lines in use for the existing operations. Constant flow rates in the pipes will be maintained to prevent freezing. All water supply lines will be located within TANCO’s existing surface lease.

Water supply requirements are provided in Section 3.2.5 (Water Requirements).

3.1.11 Explosives Magazine

To accommodate the New Mill building and ancillary infrastructure, the existing explosives magazine will be relocated southeast of the main mine site (Figure 3-2). The design, location and security will comply with applicable legislation and requirements. Clearing will be required for a new access road to connect the explosives magazine to the southern mine road and the explosives area itself.

3.1.12 Fuel and Propane Requirements and Storage

Existing fuel and propane storage areas will be used to the extent possible during all phases of the Project. During construction, the Contractor may develop and operate temporary fuel storage area(s), which will be located on TANCO's surface leases, and be designed and managed per applicable legislation and requirements. During tailings extraction, existing fuel storage areas will be used to the extent possible; temporary fuel storage may be sited within the WTMA. A new propane farm will be located within the new mill site and provide propane for use primarily in heating the New Mill building.

3.1.13 Tailings Conveyance

Additional tailings pipelines, and potentially additional pumping capacity, will be required to achieve the proposed deposition plan. Tailings pipes to/from the New Mill will primarily be installed at grade. Where crossing of the mine access road(s) is required, pipes will be run on trestles or through culverts installed under the road. Preliminary alignment for tailings conveyance lines are shown on Figure 3-2. It is possible that the alignment of the lines may change slightly during the course of design work, but will remain within the site footprint.

3.1.14 Waste

There are three main streams of waste associated with the project:

- **Sanitary Waste** – A new septic field will be required to treat sanitary waste generated in the New Mill building. While this is still being sited and designed, it is expected to be located within TANCO's surface leases. TANCO is currently undertaking the studies required to support siting, design, and permitting. TANCO will seek the necessary approvals under the *Onsite Wastewater Management Systems Regulation* and other applicable requirements.
- **Solid Waste** – A new waste transfer station will be required as the New Mill will be constructed at the site of the existing waste transfer station. The new waste transfer station will be constructed north of the main mine site. TANCO will seek the necessary approvals under the *Waste Management Facilities Regulation* and other applicable requirements.
- **Hazardous Waste** – Hazardous materials will be stored in existing storage facilities according to suppliers' directions with appropriate signage and containment. Hazardous waste materials will be sent offsite to a licenced facility for disposal.

3.1.15 Site Security

A new security office and gate will be established near to entrance to the New Mill. A small parking area may be constructed to accommodate security vehicle parking. TANCO will continue to post security staff at the gate 24/7 year-round.

3.2 Mill Feed and Processing

The New Mill will process reclaimable tailings for seven months per year (spring/ summer/ fall) and stockpiled underground ore for five months per year (fall/winter) for five years.

3.2.1 WTMA Tailings Extraction

The WTMA is one of two tailings management areas on the BLM site and is actively used to provide long-term storage of tantalum and spodumene tailings (Figure 2-1). The WTMA is a key component of the proposed alteration; from which reprocessed tailings will be excavated and into which spent tailings will be deposited. Operation of the WTMA is licenced under EAL No. 973.

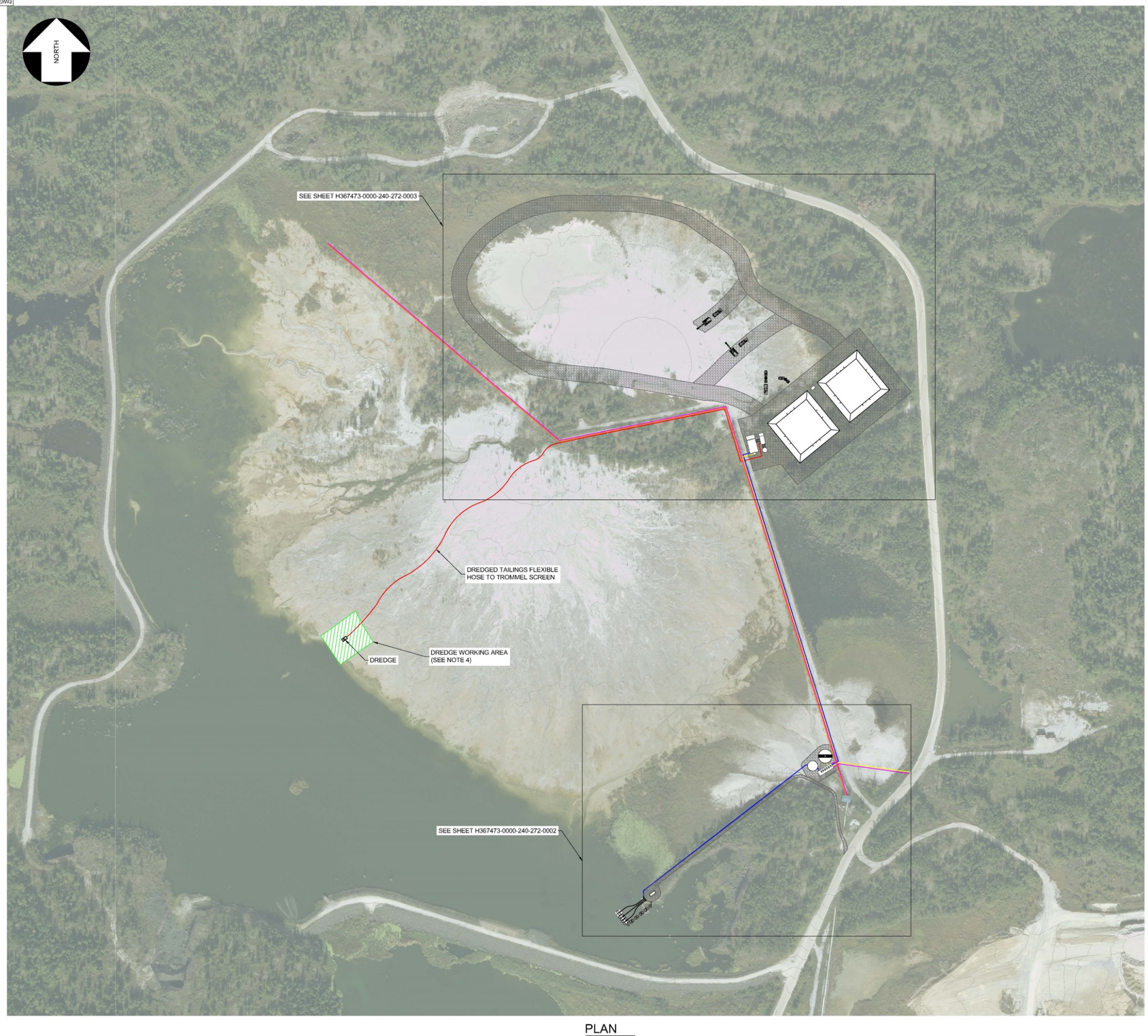
Extraction of the reclaimable tailings from the WTMA will require temporary internal containment dams, constructed with dry tailings material or other granular material, with the goal of developing segregated basins within the WTMA to separate reclaimable tailings and reprocessed/spent tailings.

It is expected that construction of temporary working platforms and/or access roads will be required in some areas of the WTMA to allow the mobile equipment to operate reliably. These would typically be constructed using a geotextile layer on top of the existing tailings, capped with layer of waste rock or other granular material. As tailings are excavated from segregated areas, the working platforms and access roads would be removed, the tailings below them would be excavated, and then new work platforms constructed.

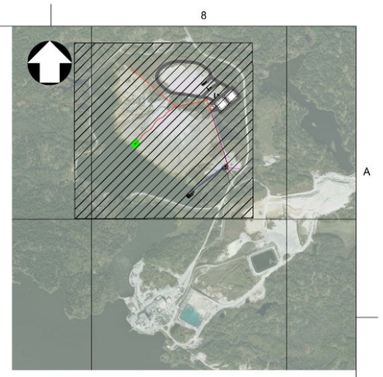
Tailings extraction will employ a combination of mechanical excavation and dredging. Dredging will be used for recovery of subaqueous tailings. The mechanical reclamation will be performed with mobile heavy machinery. An excavator will remove the tailings from the WTMA and load them into a haul truck for transport to the raw material stockpile within the WTMA. Approximately 70% of the reclaimable tailings within the WTMA basin will be reclaimed using dredge equipment due to the saturated nature of the tailings deposit. Dredging will employ a floating dredge with a cutter head which will produce a slurry that is then pumped to the “tailings reclamation area” in the WTMA (Figure 3-6). A monitoring plan and mitigation plan to control/settle suspended solids that may result from tailings extraction is currently being developed.

The temporary facilities required for tailings excavation and preparation are illustrated on Figure 3-4 (overall), Figure 3-5 (dredge area), and Figure 3-6 (preparation area). The location and configuration of these facilities may be adjusted as tailings excavation progresses.

DWG. No. H367473-0000-240-272-0001



PLAN
WEST TMA
SCALE: NTS



KEY PLAN

NOTES:
1. DRAWING FOR DISTRIBUTION AND DISCUSSION PURPOSES ONLY. THIS DRAWING IS NOT FOR CONSTRUCTION.
2. PORTABLE EQUIPMENT IS NOT SHOWN ON THIS DRAWING.
3. ELECTRICAL DISTRIBUTION INFRASTRUCTURE IS NOT SHOWN ON THIS DRAWING.
4. DREDGE WORKING AREA LOCATION AND SIZE WILL CHANGE THROUGHOUT THE RECLAMATION PROCESS.

LEGEND:
- EXISTING TAILINGS DISCHARGE
- NEW FLOTATION PLANT TAILINGS DISCHARGE
- FEED TAILINGS TO MILL
- WATER TO SUMP
- DREDGED TAILINGS TO TROMMEL SCREEN
- DREDGED TAILINGS AREA

PRELIMINARY
NOT FOR CONSTRUCTION

Figure 3-4: Overall Site Arrangement of WTMA Tailings Extraction and Preparation

DRAWING No.	DRAWING TITLE
REFERENCE DRAWINGS	
H367473-0000-240-272-0003	TAILINGS RECLAMATION AREA GENERAL ARRANGEMENT
H367473-0000-240-272-0002	TMA PUMP HOUSE & BARGE PUMP GENERAL ARRANGEMENT

HATCH

No.	DESCRIPTION	BY	CHK'D	DATE
A.	ISSUED FOR CLIENT REVIEW	J.E.	A.G.	2022-03-01

REG. PROFESSIONAL

REVISIONS

ROLE	NAME	SIGNATURE	DATE
DRAFTSPERSON	J. ENGBRECHT	NR	2023-02-27
DESIGNER	A. GERRRY	NR	2023-02-27
CHECKER			
DESIGN COORD.			
RESP. ENG.	A. GERRY	##	2023-03-01
LEAD DISC. ENG.	A. GERRY	##	2023-03-01
ENG. MANAGER	S. GRIEVE		2023-03-01
PROJ. MANAGER	J. SILCOX		2023-03-01

DRAWING APPROVAL STATUS:

TANTALUM MINING CORP. OF CANADA LTD.

LITHIUM TAILINGS REPROCESSING PFS
WEST TAILINGS MANAGEMENT AREA

SITE PLAN

SCALE: NTS OR AS NOTED | DWG. No. H367473-0000-240-272-0001 | REV A

SHEET SIZE: A0

DWG. No. H367473-0000-240-272-0002

KEY PLAN

NOTES:

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2. PORTABLE EQUIPMENT IS NOT SHOWN ON THIS DRAWING.
3. ELECTRICAL DISTRIBUTION INFRASTRUCTURE IS NOT SHOWN ON THIS DRAWING.
4. EQUIPMENT SIZING WILL BE CONFIRMED DURING SUBSEQUENT DESIGN PHASE.

LEGEND:

- NEW TAILINGS DISCHARGE
- FEED TAILINGS TO MILL
- WATER TO SUMP

PRELIMINARY
NOT FOR CONSTRUCTION

1 PLAN
BARGE & PUMPHOUSE
SCALE: NTS

Figure 3.5 West Tailings Management Preparation Dredge and Pumphouse Area

DRAWING No.	DRAWING TITLE
H367473-0000-240-272-0001	SITE PLAN

REFERENCE DRAWINGS

REG. PROFESSIONAL

No.	DESCRIPTION	BY	CHK'D	DATE
A	ISSUED FOR CLIENT REVIEW	J.E.	A.G.	2022-03-01

REVISIONS

HATCH

ROLE	NAME	SIGNATURE	DATE
DRAFTSPERSON	J. ENGBRECHT	NR	2023-02-27
DESIGNER	A. GERRRY	NR	2023-02-27
CHECKER			
DESIGN COORD.			
RESP. ENG.	A. GERRY		2023-03-01
LEAD DISC. ENG.	A. GERRY		2023-03-01
ENG. MANAGER	S. GRIEVE		2023-03-01
PROJ. MANAGER	J. SILCOX		2023-03-01

DRAWING APPROVAL STATUS:

TANTALUM MINING CORP. OF CANADA LTD.

LITHIUM TAILINGS REPROCESSING PFS
WEST TAILINGS MANAGEMENT AREA

TMA PUMP HOUSE & BARGE
PUMP GENERAL ARRANGEMENT

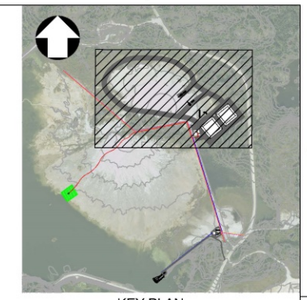
SCALE NTS OR AS NOTED | DWG. No. H367473-0000-240-272-0002 | REV A

SHEET SIZE: A0

DWG. No. H367473-0000-240-272-0003

PLANT NORTH

HAUL TRUCK
EXCAVATOR
TEMPORARY MINING ROAD (AS REQUIRED)
ONE WAY HAUL TRUCK ROADWAY
HAUL TRUCK
EXCAVATOR
GRAVEL WORK PLATFORM
LOADER
LOADER
STATIC GRIZZLY GZ-001
HAUL TRUCK
ONE WAY HAUL TRUCK ROADWAY
EXISTING TAILINGS DISCHARGE LINE
TAILINGS DISCHARGE FROM NEW FLOTATION PLANT
DREDGED TAILINGS TO TROMMEL SCREEN
DRY STOCKPILE "B"
DRY STOCKPILE "A"
TROMMEL SCREEN
WASTE PILE
TAILINGS RECLAMATION SUMP & PUMP
RECLAIMED TAILINGS TO SLURRY TAILINGS TANK
POND WATER TO SUMP



KEY PLAN

NOTES:

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2. PORTABLE EQUIPMENT IS NOT SHOWN ON THIS DRAWING.
3. ELECTRICAL DISTRIBUTION INFRASTRUCTURE IS NOT SHOWN ON THIS DRAWING.
4. THE TROMMEL SCREEN CAN BE FED EITHER FROM THE DRY STOCKPILE OR DIRECTLY FROM THE DREDGE, DEPENDING ON WHETHER TANCO IS STOCKPILING AND/OR PROCESSING TAILINGS AT THE TIME. DIRECT FEED FROM THE DREDGE TO THE TROMMEL SCREEN IS PREFERRED WHENEVER POSSIBLE, IN ORDER TO REDUCE DOUBLE-HANDLING OF TAILINGS.
5. WORKING STOCKPILES FOR TAILINGS REPROCESSING ARE SHOWN IN THIS DRAWING - ADDITIONAL STOCKPILING IS EXPECTED TO BE NECESSARY DURING THE INITIAL SITE PREPARATION PHASE OF THE PROJECT.

LEGEND:

- EXISTING TAILINGS DISCHARGE
- NEW FLOTATION PLANT TAILINGS DISCHARGE
- FEED TAILINGS TO MILL
- WATER TO SUMP
- DREDGED TAILINGS TO TROMMEL SCREEN
- UNDERGROUND

1 PLAN
STOCKPILES & TROMMMEL SCREEN
SCALE: NTS

PRELIMINARY
NOT FOR CONSTRUCTION

Figure 3-6: WTMA Tailings Preparation – Tailings Preparation Area

HATCH

TANTALUM MINING CORP. OF CANADA LTD.

LITHIUM TAINLINGS REPROCESSING PFS
WEST TAILINGS MANAGEMENT AREA

TAILINGS RECLAMATION AREA
GENERAL ARRANGEMENT

DRAFTSPERSON	J. ENGBRECHT		NR	2023-02-27		
DESIGNER	A. GERRRY		NR	2023-02-27		
CHECKER						
DESIGN COORD.						
RESP. ENG.	A.GERRY	pp		2023-03-01		
LEAD DISC. ENG.	A. GERRY	pp		2023-03-01		
ENG. MANAGER	S. GRIEVE			2023-03-01		
PROJ. MANAGER	J. SILCOX			2023-03-01		

No.	DESCRIPTION	BY	CHK'D	DATE
A	ISSUED FOR CLIENT REVIEW	J.E.	A.G.	2023-03-01

REVISIONS

DRAWING APPROVAL STATUS:

ROLE	NAME	SIGNATURE	DATE

REG. PROFESSIONAL

H367473-0000-240-272-0001	SITE PLAN
DRAWING No.	DRAWING TITLE
REFERENCE DRAWINGS	

SCALE: AS NOTED OR AS NOTED

DWG. No. H367473-0000-240-272-0003

REV A

SHEET SIZE: A0

3.2.2 Reclaimable Tailings Preparation

The reclaimed tailings extracted from the WTMA will be screened, repulped, and transported to the reprocessing plant, as described below.

- **Screening**: A front-end loader will be used to process raw material through a static trash screen to remove coarse debris from stockpiles of mechanically extracted reclaimable tailings. The cleaned material will then be transported to a second screen or stockpiled in the adjacent area before being repulped. The second screen will remove smaller debris and oversize material from the tailings (to be sent back to the WTMA) and will discharge undersize materials into the sump. The screen will be located within the WTMA.

- **Repulping**: The screened reclaimed tailings will be fed to a wet trommel screen where process water will be added to repulp the tailings. A new pipe will be laid, and adjusted/extended as needed, in the WTMA to feed the trommel screen with the dredge-extracted tailings. Process water, sourced from the WTMA polishing pond, will be piped to a water tank (located near the screen), and then pumped to the repulp sump to produce a pumpable tailings slurry. The trommel screen undersize will report to a slurry sump and then will be pumped to a plant feed surge tank prior to being pumped to the New Mill. The oversize materials of the static grizzly and the trommel screen will be backfilled into the WTMA. The wet trommel screen will be located within the WTMA.

- **Transport** The repulped tailings (approximately 45% w/w solids) from the tailings preparation area will be piped to the New Mill.

3.2.3 Comminution Circuit (Underground Ore Preparation for Processing)

The New Mill will process BLM underground mined ore at a rate of 3,000 tpd when the tailings reprocessing is not in operation (i.e., for five months of winter), for a total annual throughput of underground ore of about 420,000 tpa. Underground ore will be hauled by trucks to an ore stockpile pad (Figure 3-1). The underground ore mill feed will be stacked on the pad year-round. In winter, underground ore will be reclaimed by loaders and hauled by trucks to the crushing circuit at a rate approximately 164 tph. The comminution circuit is described below.

- **Primary crushing**: The run-of-mine (ROM) or stockpiled ore will be dumped into a receiving pocket equipped with grizzly bars, rock breaker, and output feeder. The materials will then be fed to a jaw crusher feed conveyor. The jaw crusher will reduce the particle size of the mill feeds from finer than 400 mm to 80% passing approximately 80 mm. Ventilation stacks on these buildings will be fitted with dust collection equipment to control external air emissions (make/model currently being considered in design).

- **Secondary crushing**: Two cone crushers will further reduce the material size to <12 mm. The jaw crusher discharge (from primary crushing) will report to a screen feed conveyor. The screen feed conveyor will deliver the feed into a vibrating screen, which will classify the crushed materials into three particle size fractions. The two oversize fractions (>12 mm) will report back separately by gravity into two cone crusher feed surge bins, to reduce the material particle sizes. The screen undersize (<12 mm) will be conveyed directly to the fine material surge bin.

- **Fine Material Surge Bin**: The material will then be reclaimed by two belt feeders feeding onto a ball mill feed conveyor. A belt scale will be installed to measure the feed rate. A dust control system will be installed to collect fugitive dust generated at the surge bin feed conveyor discharge area and the fine material reclamation area.

- **Primary Grinding**: The crushed mill feed from the surge bin will be transported to a 4.9 m diameter ball mill equipped. The primary grinding ball mill will be operated in closed circuit with hydrocyclones. The crushed fine mill feed will be fed directly into the ball mill feed inlet where the hydrocyclone underflow will also report to. The ball mill discharge will flow by gravity into a pumpbox where process water (sourced from the Polishing

Pond) will be added to maintain the required solid density of the slurry. The cut particle size of the hydrocyclone overflow is targeted at 80% passing 300 µm.

- **Secondary Grinding:** The hydrocyclone overflow from the primary grinding circuit will report to the secondary grinding circuit. The secondary grinding circuit consists of a ball mill and hydrocyclones in closed circuit. The slurry from the primary grinding hydrocyclone overflow will report to the secondary grinding hydrocyclone feed pumpbox. The targeted particle size of the hydrocyclone overflow is 80% passing 125 µm. The mill feed will report to the lithium floatation circuit in the New Mill.

3.2.4 Lithium Flotation Process

The New Mill will use the same lithium flotation process used to process mined ore in the existing mill. The proposed process flowsheet is illustrated in Figure 3-7 and includes:

- Screening and repulping reclaimable tailings excavated from the WTMA (which is done in the WTMA).
- Crushing and grinding mined ore.
- Polishing, grinding, and desliming as needed.
- Amblygonite flotation, including cleaner flotation.
- Spodumene flotation, including cleaner flotation and regrinding.
- Concentrate dewatering circuit for amblygonite and spodumene.

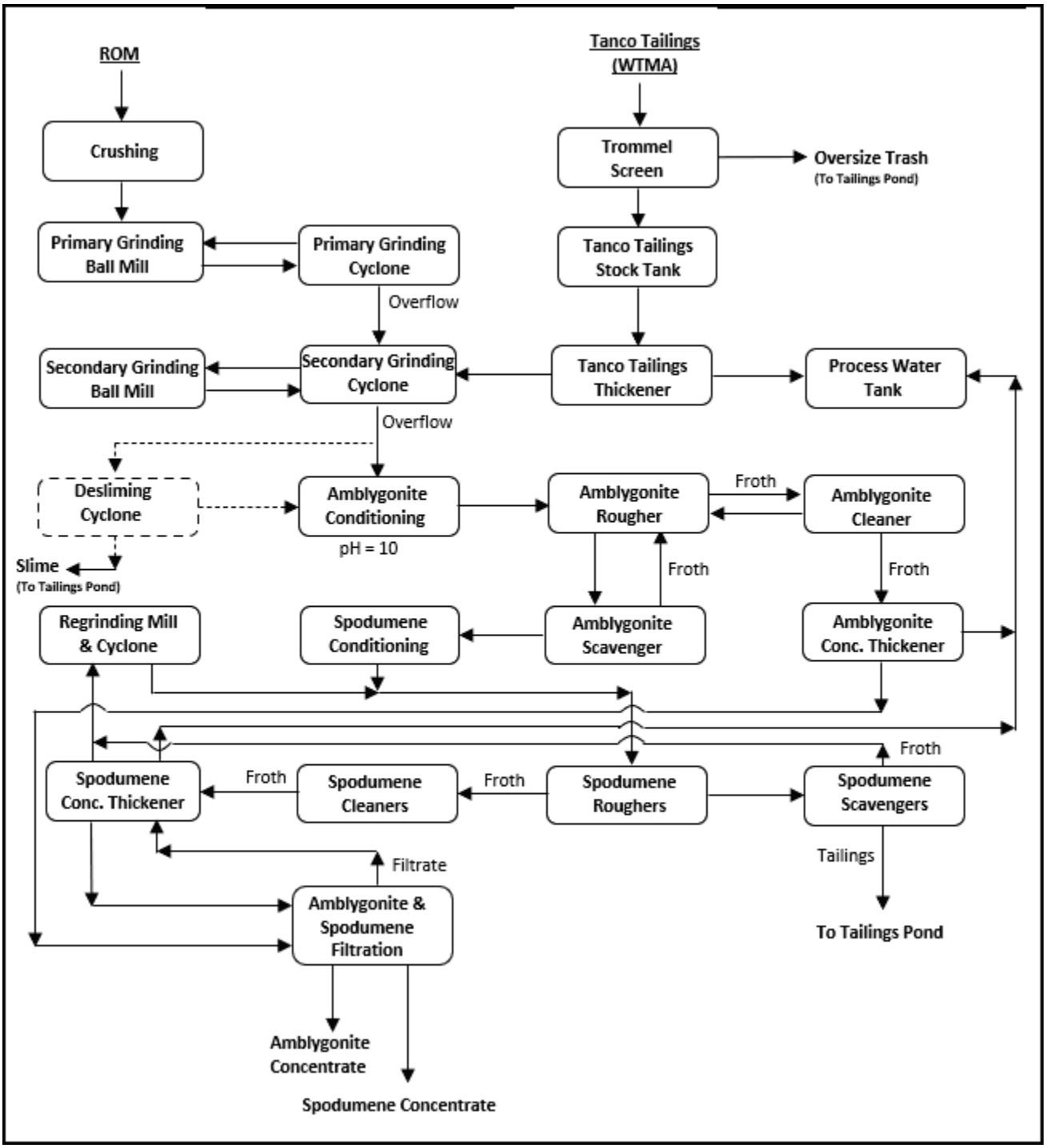

Figure 3-7: Lithium Flotation Circuit Process Flow Diagram

3.2.5 Water Requirements

An initial water balance diagram representing the water balance of the new mill during operation is provided in Figure 3-8 and Figure 3-9.

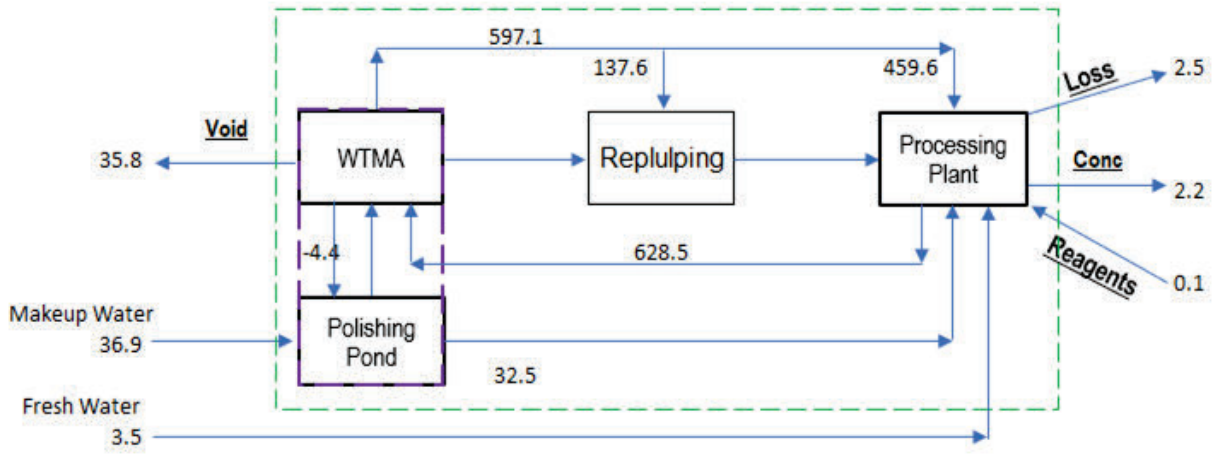

Figure 3-8: Water balance diagram during tailings reprocessing. Units are m^3/h.

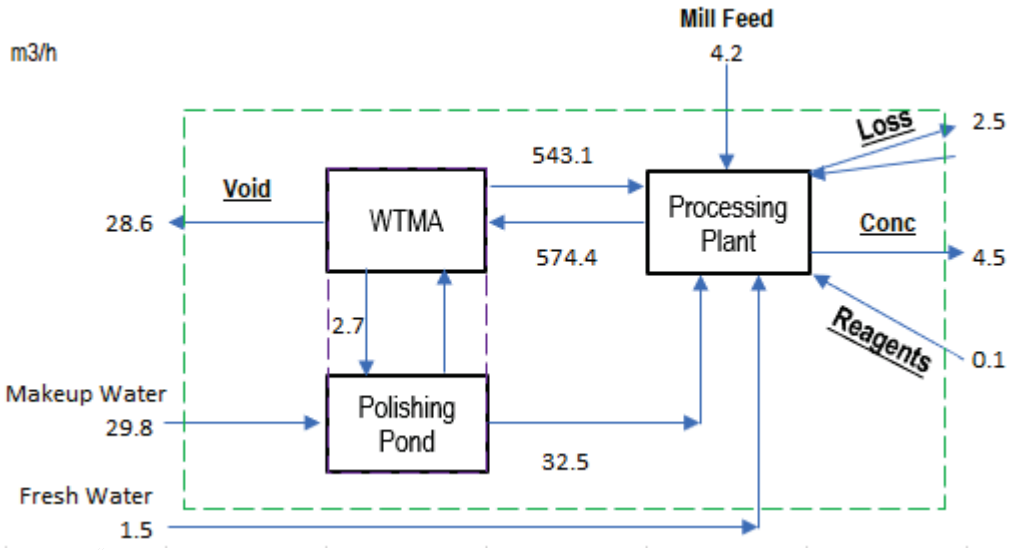

Figure 3-9: Water balance diagram during underground ore processing. Units are m^3/h.

For preparation of the reclaimable tailings, process water demands are estimated at about 137 m^3/hr and will be sourced from the WTMA. There are no freshwater requirements associated with the excavation and preparation of tailings.

During operation, >95% of the water needs (for process and pump gland seal purposes) for the New Mill will be recycled from the WTMA polishing pond. The system is designed to maximize the use of recycled water (Figure 3-8).

For operation of the New Mill, the estimated fresh water supply requirement will be approximately 3.5 m^3/hr (<0.001 m^3/sec) for tailings reprocessing or 1.5 m^3/h for the ore processing, representing less than 5% of total water needs of the New Mill. Fresh water will be used for reagent preparation. All freshwater withdrawals will be from Bernic Lake and are subject to the conditions of *Water Rights Act* Licence No. 2015-010 (expires March 5, 2025), which sets the maximum withdrawal rate at 0.362 m^3/sec and the maximum annual withdrawal at 3,700,460 m^3/year. In 2022, the BLM used about 2,249,584 m^3/year (0.071 m^3/sec) in the cesium processing facility, for domestic use and fire suppression, and in the mine and existing mill. It is not anticipated that any modifications to TANCO's *Water Rights Act* Licence will be required.

3.2.6 Potable Water

Potable water will be hauled in from off-site by a certified provider and stored in water tanks adjacent to the New Mill.

3.2.7 Reagent Requirements

The same reagents as are currently used for processing in the existing mill and stored on site will also be required for the new mill; however, due to the increased production rate additional quantities will be needed. Table 3-1 provides a list of the required reagents and anticipated quantity storage as well as other pertinent information.

Table 3-1: Summary of Reprocessing Plant Reagents

Reagent	Quantity Stored on Site (t)	Consumption Rate, kg per tonne of reprocessed tailings	Approx. Holding Tank Size (mm)	Purpose	Storage/Handling
Flocculant	2.2	0.08	3000 mm D x 3500 mm H	Used to settle out solids in slurries, tails, and concentrates.	Flocculant powder will be delivered to the site in tote bags on pallets and stored in the dedicated area. Flocculant solution will be locally prepared first to approximately 0.2% strength by using a wetting and mixing system and stored in a holding tank. The flocculant solution will be then further diluted to approximately 0.02% to 0.05% strength and fed to each thickener feed wells by metering pumps. The flocculant preparation system will be a modular unit.
Sodium Carbonate Na_2CO_3	30	1.05	2800 mm D x 2800 mm H	Used to regulate pH with the purpose of conditioning the tailings and concentrates for further processing	Sodium carbonate powder will be delivered to the site in tote bags and stored in the dedicated area. Sodium carbonate solution will be locally prepared in a mixing tank to approximately 15% strength, and then stored in a holding tank. Metering pumps will be used to deliver the sodium carbonate solution to each of the addition points.
Sodium Hydroxide NaOH	10	0.35	2000 mm D x 2000 mm H		Sodium hydroxide will be delivered to the site in solid form in tote bags and stored in the dedicated area. Sodium hydroxide solution will be locally prepared in a reagent mixing tank to approximately 15%, and then stored in a holding tank. Metering

Reagent	Quantity Stored on Site (t)	Consumption Rate, kg per tonne of reprocessed tailings	Approx. Holding Tank Size (mm)	Purpose	Storage/Handling
					pumps will be used to deliver the sodium hydroxide solution to each of the addition points.
Amblygonite and Spodumene Collector: Talon A150	17.9	0.625	1250 mm D x 1500 mm H	Collector agent used in amblygonite and spodumene conditioning step	Talon A150 will be delivered to the site in liquid form in drums and stored in a dedicated area. The liquid reagent will be pumped into a holding tank prior to being delivered to addition points by metering pumps.
Frother: W31	0.3	0.01	1000 mm D x 1000 mm H	Used to separate lighter particles during later stages of processing	Frother W31 will be delivered to the site in liquid form drums and stored in a dedicated area. The liquid reagent will be pumped into a holding tank prior to being delivered to addition points by metering pumps.
Test Reagents	Varies	Varies	2000 mm D x 2000 mm H	To be determined	A dedicated reagent system, including a bag breaker, a mixing tank, a holding tank, and related metering pumps, will be provided for new reagent testing.

Notes: The approximate estimates in this table are based on current use of these same reagents at the existing TANCO Mill.

3.2.8 Tailings and Wastewater

The WTMA is one of two tailings management areas on the BLM site and is actively used to provide long-term storage of tantalum and spodumene tailings. The WTMA currently receives the mined ore tailings from the existing mill, water from the underground mine workings and other groundwater collection areas, and from the collection ponds in the ETMA. It includes the Tailings Pond, Polishing Pond, and Water Management Control Structures (West Discharge and Main Dam). Excess water from the Tailings Pond is decanted into the Polishing Pond via a control structure in the Main Dam. Solids continue to settle out in the Polishing Pond before being discharged into Bernic Lake through a control structure known as the West Discharge (which is the BLM compliance point). There are planned upgrades to the Main Dam (and the water control structure in it) and the peripheral dams to raise the elevation and increase the storage capacity of the WTMA (NOA#34, as approved on July 13, 2023 by Manitoba Environmental Approvals Branch).

The tailings production schedule estimated for the WTMA in relation to the New Mill is summarized in Table 3-2.

Pipelines will carry the spent tailings slurry generated from the New Mill to the WTMA in 12” HDPE tailings pipes that will be run at-grade (or on existing trestles), following existing disturbed areas as much as possible. All spent tailings pipes will be laid within the catchment of the WTMA. Like existing tailings pipes on site, the new pipes will not be heat traced, as continuous flow rates prevent freezing. From the New Mill, the pipes will be sent to a new tailings pumphouse on the south-eastern edge of the WTMA, near to the existing tailings pumphouse. From there, spent tailings pipes will be laid on-grade within the WTMA and adjusted/relocated to optimize tailings deposition and to facilitate tailings extraction.

To optimize the use of available storage space in the WTMA, reprocessed and mined ore tailings (from the existing mill and New Mill) will be deposited using a series of spigots along the tailings discharge pipe (illustrated in

Figure 3-10). This will be a different tailings deposition approach than is currently used at the mine but will allow for better control and more even deposition.

Table 3-2: Tailings Production Schedule

Year	Reclaimable Tailings (t) to New Mill	Reprocessed Tailings (t) from New Mill	Mined Ore Tailings (t)		Total Spent Tailings to WTMA (Reprocessed + Mined Ore) (t)
			Existing Mill[1] to WTMA	New Mill to WTMA	
2023	-	-	120,000	-	120,000
2024	541,500[2]	341,145[3]	120,000	72,000[4]	533,145
2025	636,000[5]	400,680[3]	120,000	360,000[6]	880,680
2026	636,000[5]	400,680[3]	120,000	360,000[6]	880,680
2027	636,000[5]	400,680[3]	120,000	360,000[6]	880,680
2028	636,000[5]	400,680[3]	120,000	360,000[6]	880,680
2029	636,000[5]	400,680[3]	120,000	360,000[6]	880,680
2030	238,500[7]	150,255[3]	120,000	768,135[9]	1,038,390
Total	**3,960,000**	**2,494,800**	**960,000**	**2,640,135**	**6,094,935**

Notes:

1 Value calculated using a daily existing mill throughput of 500 tpd, with ~80% of that tonnage being tailings with an 80% mill availability for 12 months.

2 Value calculated using a daily new mill throughput of 3,000 tpd for 7 months with a ramp up of ~65% production for initial 3 months. This assumes the new mill will be operational Q2 2024.

3 Value calculated assuming ~63% of the reclaimed tailings tonnage will be reprocessed tailings.

4 Value calculated using a daily new mill throughput of 1,500 tpd, with ~80% of that tonnage being tailings for 2 months (last two months of 2024, after reprocessing tailings)

5 Value calculated using a daily new mill throughput of 3,000 tpd for 7 months.

6 Value calculated using a daily new mill throughput of 3,000 tpd, with ~80% of that tonnage being tailings for 5 months.

7 Remaining quantity of economical tailings from West TMA.

8 Value calculated using a daily new mill throughput of 3,000 tpd, with ~80% of that tonnage being tailings for ~11 months.

9 Value calculated using a daily new mill throughput of 3,000 tpd, with ~80% of that tonnage being tailings for ~10.5 months. The WTMA basin will have no additional storage capacity at the current dam elevation (El. 321.6 m) beyond this timeframe.

10 This value is the expected total tailings within the WTMA that can be reclaimed for reprocessing. It includes existing tailings within the basin (3 million tonnes*) and the additional tailings deposited in 2023 and early 2024 (0.15* million tonnes*).*

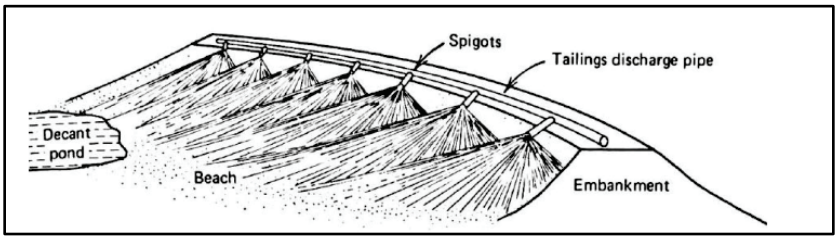

Figure 3-10: Tailings Spigot Diagram

The chemical composition of the spent tailings slurry is expected to be similar to that of tailings slurry from the existing mill since both mills will use the same lithium floatation process.

Due to the increased production capacity, the rate of tailings slurry deposited into the WTMA will increase approximately six-fold; however, the New Mill is being designed to maximize the use of water recycled from the

WTMA tailings pond and polishing pond. With an estimated 95% of the process water requirements coming from recycled water sources, the subsequent mine effluent discharge rate will not increase at the same escalation rate as tailings production.

The water management system will operate in a similar manner to the current operation with the potential, for improvements where possible. The supernatant from the WTMA Tailings Pond overflow to the Polishing Pond which is immediately downstream from the WTMA. Discharge from the Polishing Pond into Bernic Lake will be managed as it is currently, and effluent quality will be monitored to confirm it meets the MDMER effluent criteria.

Current treatment of effluent and water in the WTMA currently involves both active and passive methods. Effluent is treated passively by allowing sufficient time for suspended solids to settle out of the water column prior to discharge. Active treatment is provided through:

- Adding a coagulant to the TANCO Mill tailings to further promote the settling of solids when tantalum and spodumene ores are being processed. Flocculants will also be added to the spent tailings discharged from the New Mill.
- A filtration system, with the capability of filtering phosphorus and TSS from the influent stream using a chemical dosing system and continuous flow gravity sand filters, is operated adjacent to the West Discharge. The filtration system originally treated underground mine water but currently only treats water drawn from the WTMA Polishing Pond. The filtration plant treats between approximately 25% and 40% of the effluent discharged. Under both scenarios, effluent from the filtration system is directed to the decant structure at the West Discharge.
- A pH adjustment system is located at the West Discharge which monitors the pH in the Polishing Pond and adjusts the pH of the final effluent (to achieve a pH value between a range of 7.0 to 8.0) through the addition of 10% sulphuric acid. This system functions to mitigate the effect (elevated pH) of algal photosynthesis throughout the open-water season so is only operated seasonally (between April and September).

TANCO is currently conducting test work and modelling to confirm treatment measures required to maintain or (where possible) improve the quality of its mine effluent discharge into Bernic Lake. The preliminary results are summarized here:

- Fines and Slimes: The New Mill will regrind reclaimable tailings prior to the floatation circuit. This may result in increased volumes of fines and slimes (i.e., TSS) in the tailings discharge. Initial testwork with alum and flocculent dosing of tailings water has had positive results in reducing the TSS levels (from 32 NTU to 6 NTU), however, confirmatory work is ongoing to identify a polymer that encourages even faster settling rates.
- Phosphorus: TANCO proposes (through this project) to develop operational changes such that the concentration of phosphorus in future mine discharge is decreased. Phosphorus is known to be liberated during the milling process for lithium (in the current and New Mill). As such, TANCO is currently focusing its studies on possible design/treatment options associated with the New Mill to reduce phosphorus.

  The fines and slimes in the tailings water carry reactive phosphorus and phosphorus that is biologically active, so the treatment options tested have focused on TSS treatment. Based on preliminary testwork, a mass rate of 5 mg/L aluminum sulfate (48% as alum) inline injection in combination with the predicted settling time (5 days) reduced turbidity from 32 NTU to 6 NTU and phosphorus concentrations from 0.05 mg/L to 0.01 mg/L. Ongoing testwork will confirm these results, including testing alternate dosage or treatment to reduce the settling time required and thereby reduce the time the biologically available phosphorus is available for uptake by the algae and cyanobacteria in the tailings pond and/or polishing pond.
- Contaminant Upcycling: The New Mill relies on a high rate of internal process water recycle which may potentially “cycle up” (i.e., increase) contaminant concentrations in the WTMA tailings pond and polishing pond.

Soluble contaminants will cycle up in concentration in a manner governed by chemical activity and equilibrium constants, while fines and slimes can contribute to contamination beyond chemical activity if the particulate is not settled in the settling ponds. Further testwork, such as using alum and polymer (plus filtration), is necessary to confirm the treatment option best suited to manage potential contaminants of concern.

As stated, it is expected that approximately 95% of the water required during processing will be recycled from the WTMA tailings pond and polishing pond. Recycled water will be treated before and after (as needed) it is drawn into the New Mill to prevent dissolved solids from cycling up in concentration as the water is reused. Additional testwork is underway to confirm the recycled water quality, and to identify treatment options that prevent dissolved solids from being cycled up in concentration. Based on preliminary testwork, and with a conservative 80 percent water recovery (recycling) rate, the phosphorus impact to Bernic Lake associated with the Project is expected to be an order of magnitude lower than current loading.

3.3 Workforce

The TANCO Mine, at peak operating capacity, employs approximately 150 full-time and part-time positions in a variety of roles from administrative, general labour, miners, operations, security, and geologists. Most employees commute from Lac du Bonnet, Pinawa, and Winnipeg.

The operation of the New Mill will provide about 125 new positions, including maintenance crew, metallurgists, floatation circuit, mined ore handling and crushing, and management/administration.

Site preparation and construction of the New Mill and ancillary infrastructure will provide for many temporary employment opportunities. A worker camp may be established and managed by the selected Contractor, likely close to Lac du Bonnet. TANCO will provide shuttle transport this workforce to site, to reduce traffic volumes during the construction phase. The tailings excavation and preparation component of the project will employ less than 10 people.

As detailed design progresses, changes to these staffing numbers may occur.

3.4 Traffic

The TANCO Mine site, experiences regular heavy equipment and traffic movement as an active mine site.

Traffic increases will be associated with the following:

- **Reagent deliveries**: It is expected that reagent deliveries will be coming from Winnipeg (PTH#59 – PR#317 – PR#313– PR#315).
- **Material deliveries**. It is expected that deliveries of raw materials and other supplies will be coming from Winnipeg (PTH#59 – PR#317 – PR#313– PR#315).
- **Concentrate transport**: concentrate produced at the new Plant will be loaded onto trucks and transported to Winnipeg (PTH#59 – PR#317 – PR#313– PR#315).
- **Heavy equipment**: Equipment to assist in operations, such as cranes and excavators for ore handling.
- **Ore trucks**: Underground ore will be hauled by trucks to an ore stockpile pad. The underground ore mill feed will be stacked on the pad year-round. During winter, materials will be reclaimed by loaders and hauled by trucks to the crushing circuit. Ore truck movements during the summer will return to traffic rates seen in current operation.

- **Local traffic**: It is assumed that most staff will be coming from Lac du Bonnet or Winnipeg. During construction, a bus will shuttle workers from the temporary work camp, set up near Lac du Bonnet to reduce traffic volumes.

Table 3-3 shows the changes in traffic, by vehicle type and phase, estimated for the New Mill project.

Table 3-3: Current and Proposed Weekly Traffic Rates at the BLM Mine Site

Traffic Source	Route(s)	Current Operations	Increase in Traffic for New Mill	
			Site Preparation and Construction (Fall 2023 to Fall 2024)	**Operation** (Fall 2024 to 2030)
Reagent Deliveries	Winnipeg to Site	1	0	1
Material Deliveries	Winnipeg to Site	20	2	10
Concentrate Transport	Site to Winnipeg	38	0	125
Heavy Equipment	Winnipeg or Lac du Bonnet	3	0	4
Ore Trucks	Within Site	20	0	202
Local Vehicles	Winnipeg or Lac du Bonnet	280	14	140

During construction of the New Mill and ancillary infrastructure, traffic increase is expected to be temporary and minor relative to regular site activity. It is expected that delivery of clean fill material will be sourced locally and impacts to local traffic will be negligible. The selected Contractor may consider using a temporary concrete batch plant on site during construction.

3.4.1 On-Site Traffic Changes

During the operation phase, the increase in traffic is primarily related to on-site traffic (not public roads). The ore trucks, for the New Mill, will operate only from fall to spring and will mainly be concentrated between the mine portal and the ore stockpile. Concentrate transport and local vehicles will also contribute to traffic increases on the mine site.

A diagram showing a preliminary traffic management plan for on-site traffic is shown on Figure 3-11.

The traffic management plan will continue to be refined to properly manage vehicle and pedestrian safety. TANCO's initial plan includes the following elements:

- Create a low-speed area at the site entrance to split truck traffic (reagent/material deliveries and concentrate transport) from local vehicle traffic. A stop sign may be installed to direct local vehicles to turn south down the access road and inform local traffic to yield to trucks.
- Place signage and physical barriers or fencing throughout the site to guide traffic through the site and to discourage vehicles from taking paths designated for other vehicle types or pedestrian corridors.
- Install additional signage for higher traffic areas, such as in the underground ore storage area and along the ore truck route.

- Create defined pedestrian corridors to guide people to and from areas such as parking lots and mill building(s). These corridors would be protected by barriers or fencing and additional signage will be installed. Pedestrian traffic will be prohibited near to the ore truck route. Where pedestrian corridors cross traffic routes, they will be perpendicular crossings with additional signage for both pedestrians and vehicles.

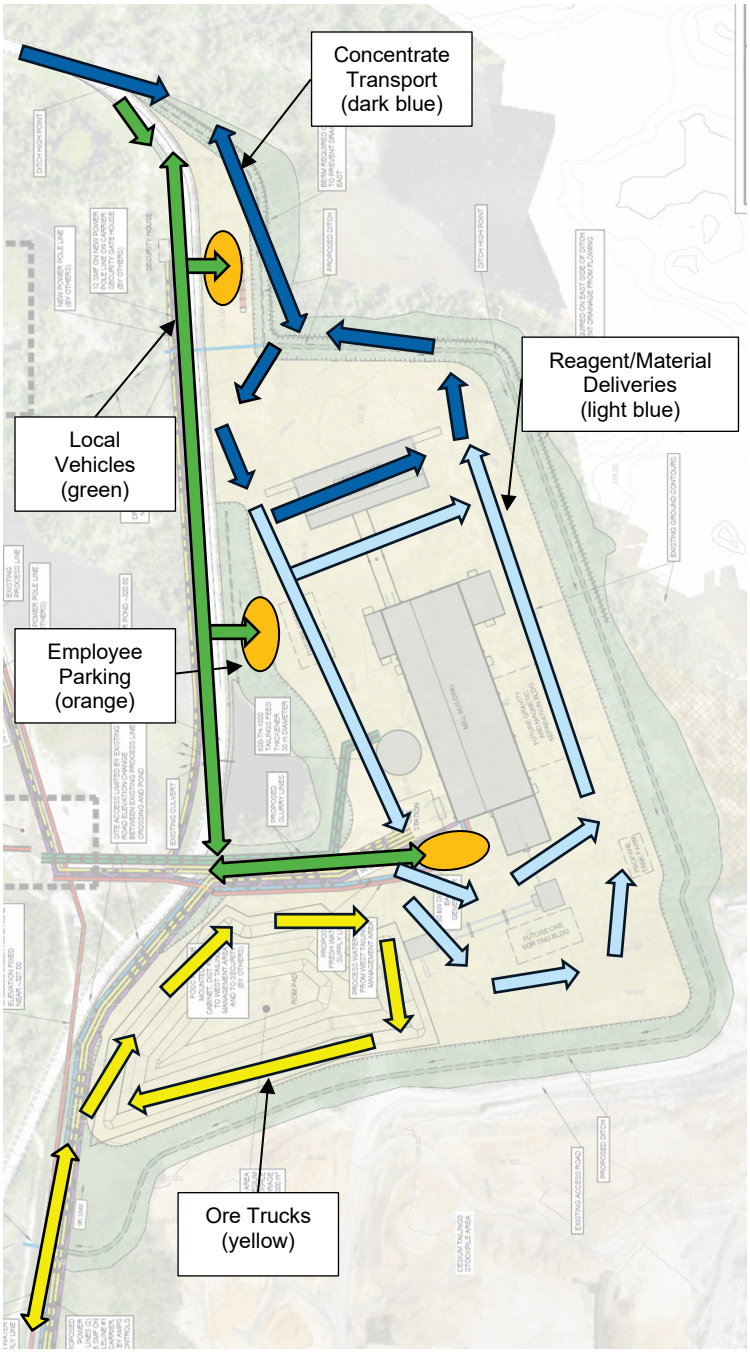

Figure 3-11: Preliminary Traffic Management Plan

3.4.2 Off-Site Traffic Changes

Table 3-4 presents the estimated daily traffic volume increases expected during the operation of the New Mill for traffic on nearby provincial roads and highways. It was assumed that half of the local vehicle traffic will travel to/from Winnipeg (i.e., on PR317 and PTH59).

Table 3-4: Percent Increase in Traffic on Provincial Roads and Highways During Operation

Highway	AADT[a]	ADST[b]	Traffic Source			
			Reagent + Material Deliveries	Concentrate Transport	Heavy Equipment	Local Vehicles
PR315[d]	1,610	2,399	0.7%	7.8%	0.2%	4.3%
PR313[e]	1,400	2,122	0.8%	9%	0.3%	5%
PR317[f]	1,870	2,412	0.6%	6.7%	0.1%	3.7%
PR317[g]	1,820	2,457	0.6%	6.9%	0.1%	3.8%
PTH59[h]	6,760	9,058	0.2%	1.8%	<0.1%	1.0%

Source: Manitoba Highway Traffic Information System (Government and Manitoba and University of Manitoba, 2019)

a The Annual Average Daily Traffic (AADT) is defined as the number of vehicles passing a point on an average day of the year. The reported combined AADT is based on the sum of traffic counts in the two opposite directions.

b The average summer daily traffic (ASDT) is the number of vehicles passing a point on an average day during the period May 1 through September 30.

c It was assumed that half of the local vehicles will travel past Lac du Bonnet, to Winnipeg (i.e., half the total traffic was used to estimate the increases on PR317 and PTH59).

d At station no. 2039; on PR315 south of the junction with PR313 and east of the Lee River.

e Calculated AADT/ADST based on data from PR315 (see note d above) minus the traffic on PR313 (at station no. 93; on PR313 just east of the junction with PR315).

f At station no. 898, on PR317 just west of Lac du Bonnet, north of PTH11.

g At station no. 75; on PR317 just east of PTH59.

h At station no. 2462; on PTH59 just south of PR317.

During operation, concentrate transport and local vehicles will result in minor (<10%) increases in traffic. Changes to traffic diminish with distance from site (lowest at PTH59). TANCO will work with Manitoba Transportation and Infrastructure to address concerns related to traffic increases, as necessary.

3.5 Noise

The nearest receptor (a cottage) to the TANCO Mine is located approximately 3.5 km NE of the New Mill. Sources of noise associated with the project include:

- Construction: Movement of traffic and equipment on site. Equipment noise (including blasting and site levelling) generated during Site Preparation and Construction phases.
- Tailings excavation: Equipment and traffic noise will be generated during tailings preparation and ongoing excavation.
- Ore processing: Transport, placement, and handling of ore at the ROM pad. Loading ore into the comminution circuit, crushing, and grinding of ore. The fine ore surge bin will be enclosed which will dampen the noise produced however there will also be noise produced when the ore falls from the feed conveyor into the fine ore surge bin.

- Mill process: Within the new Mill building during the Operation Phase. This building will be enclosed which will dampen the noise significantly from the outdoors. The compressor and blower will be housed in structures that will dampen the noise produced by this equipment.
- Concentrate loading: Noise will be produced with truck traffic, front end loader operation and the dumping of concentrate into bulk shipping trucks. This work will be conducted in an enclosed concentrate loadout building that will reduce the noise external to the building.

Noise levels are regularly monitored inside the operating facilities as required by the *Manitoba Workplace Safety and Health Act and Regulations*. The site experiences elevated sound through normal operations. While there may be temporary occurrences of elevated noise levels, best management practices, including providing employees with appropriate personal protective equipment and incorporating sound dampening measures in design, will limit the effects of noise on employees, nearby wildlife, and other users.

3.6 Air Emissions

Air emissions associated with the project include particulate matter (dust), and combustion emissions including greenhouse gases. All of which are typical of the BLM site.

Project activities and components will generate particulate matter emissions through:

- Increased movement of vehicles and equipment on unpaved site roads and the dry areas of the WTMA.
- Clearing and levelling the site for the new Plant building and parking area.
- Excavation, handling, storing, and processing reprocessed tailings in the WTMA.
- Transporting, handling, and storing underground ore.
- Within the New Mill (i.e., crushing/grinding, dewatering, concentrate handling).

There will be dust collectors operating in the New Mill building – near the concentrate dryer, concentrate storage area, and comminution circuit. Additional dust collectors may be included as detailed design progresses and evaluation of dust sources continues, to appropriately manage dust emissions.

Sources of combustion emissions associated with the project include:

- Vehicle and equipment exhaust during construction and operation of the project, excavation of the reclaimable tailings from the WTMA, handling of underground ore, and general movement on site (e.g., deliveries, employee traffic).
- Passive air emissions – Air emissions are expected from the ambient air flow into and out of the plant and tank vents. This may include fans and building ventilation.
- Stationary emission sources – Air emissions from generators, heaters or other equipment may also be used during construction and operation.
- Combustion ventilation – Ambient air heaters for the Mill Building will be required and will have combustion off-gases if gas heaters are used rather than electric heaters. This design element has not been confirmed.
- The backup power generator and other stationary or portable generators for construction will have combustion off-gas produced that will be vented to atmosphere. The backup power generator will be run intermittently and only in power outages.

TANCO will continue to inventory the sources and types of emissions to estimate changes because of this project; however, it is expected that detailed design will include measures to manage emissions, such that the site will continue to meet Manitoba Ambient Air Quality Criteria.

3.7 Health and Safety

TANCO is committed to being a leader in Safety, Health and Environmental (SH&E) performance and to integrating SH&E into their business activities to ensure the safety of their employees, contractors, visitors, the communities in which they operate, and the environment. SH&E excellence is a core value of both Sinomine and TANCO and will meet or exceed all appliable SH&E laws and regulations. TANCO is also committed to continuous improvement of their SH&E performance.

3.7.1 Malfunctions or Accidents

The BLM has developed an Emergency Response Plan that deals with the following types of accidents and malfunctions:

- Bulk spills of dangerous goods and/or petroleum products
- Specific procedures for handling:
- Sulphuric acid spill
- Formic acid spill
- Lime slurry spill
- Barium carbonate and barium hydroxide solid spill
- Cesium products spill
- Cesium hydroxide product spill
- Incidents involving nuclear devices
- Fires
- First Aid emergencies

TANCO's Emergency Response Plan will be updated to include the new Plant and ancillary components.

TANCO maintains a standard of emergency preparedness that will provide timely and coordinated response to an emergency to minimize the effects of the emergency on TANCO employees, the public, the minesite, and the environment.

An uncontrolled release of hazardous materials to the environment may have a lasting and residual effect. However, the probability of an uncontrolled release is low due to the secondary containment (of the reagent area and New Mill Building) and site contouring to direct spills to surface runoff collection ditch, as well as controls built into the operation and TANCO's active application of their emergency response plan and their overall commitment to minimize their impact on the environment.

3.7.2 Contingency and Emergency Response Plans

TANCO maintains a standard of emergency preparedness to provide timely and coordinated response to an emergency, to minimize the effects of the emergency or disaster on TANCO employees, the public, the minesite and the environment. TANCO updates and tests its Emergency Response Plan annually and recently prepared a new Environmental Emergency Plan. The Emergency Response Plans outline the actions to be taken by Response Groups and appropriate personnel.

The Emergency response plans developed for the BLM will be updated to include the new Plant and ancillary components.

In the case of an emergency underground, the TANCO Mine Department will follow response procedures in compliance with Standard Mine Rescue Practice.

TANCO has also established an agreement with the RM of Alexander to provide fire/rescue emergency services to the mine if required. The agreement includes provisions to ensure that alternative resources would be available for the RM should they be responding to a call at the mine during a subsequent emergency.

3.8 Decommissioning and Reclamation

TANCO intends to operate the new mill for five years with potential to continue operation for the life of mine pending market conditions. At closure, TANCO will remove all infrastructure, grade, and revegetate the site as needed, and implement / monitor all reclamation activities as outlined in the BLM Mine Closure Plan. The BLM Mine Closure Plan will be updated to include the new mill and ancillary facilities as outlined in this document and submitted to Manitoba Mines Branch for approval.

4.0 EXISTING ENVIRONMENT

This section summarizes the current environmental conditions of the region surrounding the project site, based largely on desktop information.

4.1 Climate

The Project is located in the Wrong Lake Ecodistrict. The climate of the Wrong Lake Ecodistrict is marked by short, warm summers and cold, long winters. (Smith et al. 1998)

The climate normal data (1981-2010) for the nearest Environment Climate weather station (Pinawa WRNE; Station ID 503162) was reviewed to describe local climate conditions. The station is located approximately 50 km southwest of the project site (at Latitude 50°10’50.000”N and Longitude 96°03’30.000”W).

Daily average air temperatures range from -16.6°C (January) to 19.3°C (July). The average annual rainfall amount is 464 mm, with the average monthly rainfall amount ranging from 0.3 mm (January) to 99 mm (June). The average annual snowfall amount is 114 cm, with the average monthly snowfall amount (between September and May) ranging from 0.5 cm (September) and 24 cm (December). More than half of the winter snow falls between November and February. (Environment Canada, 2023)

4.2 Air Quality and Noise

There are no provincial air quality monitoring stations near the project site; the closest is in Winnipeg. The general region surrounding the project site is largely undeveloped and sources of emission and noise would be limited to local vehicle traffic, recreational activity, and forest harvest activity. Forest fires may occasionally impact air quality in the region. The project site itself is on an active mine site, where dust, noise, and exhaust emissions occur and are regularly monitored. The nearest receptor (a cottage) to the TANCO Mine is located approximately 3.5 km NE of the New Mill (as the crow flies).

Air emissions from the BLM are annually estimated and reported to the National Pollutant Release Inventory (NPRI) for formic acid, sulphuric acid, greenhouses gases, particulate matter, and dust (road).

Releases reported to NRPI between 2011 and 2021 are presented in Table 4-1. Formic acid vapour is emitted during truck unloading into the formic acid bulk storage tank. Sulphuric acid mist and vapour are emitted from the digester in the CPF where the pollucite ore is dissolved.

Table 4-1: Substance Releases to Air from the TANCO Mine (2011-2021)

Substance	Formic Acid	Sulphuric Acid	Total PM	PM_{10}	$PM_{2.5}$
CAS Number	64-18-6	7664-93-9	NA-M08	NA-M09	NA-M10
2011	0.065	1.534	19.025	5.643	0.988
2012	0.032	1.436	38.031	11.228	1.971
2013	0.03	1.428	31.459	8.857	1.098
2014	0.027	1.301	34.458	9.76	1.1
2015	0.027	1.224	34.925	10.049	1.122
2016	0.022	0.828	33.792	9.66	1.011
2017	0.019	0.555	33.645	10.002	1.545
2018	0.019	0.677	25.229	7.089	0.8
2019	0.016	0.468	23.83	6.8	0.764
2020	0.0024	0.272	21.615	6.122	0.666
2021	0.006007	0.243	21.442	6.105	0.931

Notes: All units in tonnes. All sulphuric acid is released as stake or point released to air (from NPRI).

Most greenhouse gases originate from the combustion of propane for process steam production in the CPF, process and space heating for most on-site buildings, and heating the underground mine workings during the winter months (Table 4-2).

Table 4-2: Greenhouse Gas Emissions Reported for the TANCO Mine (2011-2021)

Year	Carbon Dioxide (CO_2)	Methane (CH_4)	Nitrous Oxide (N_2O)	Total (Propane)	Diesel	Gasoline	Barium Carbonate	Total
2011	4,556	1.53	101.7	4,659	273	42	294	5,269
2012	5,133	1.72	114.6	5,249	683	31	321	6,284
2013	5,133	1.72	114.6	5,249	683	31	321	6,284
2014	5,444	1.83	121.5	5,568	194	30	250	6,042
2015	5,270	1.77	117.6	5,390	127	20	246	5,783
2016	3,525	1.18	78.7	3,605	83	21	247	3,956
2017	4,416	1.48	98.6	4,516	97	23	113	4,749
2018	4,867	1.64	108.6	4,977	126	17	124	5,245
2019	4,263	1.43	95.2	4,360	197	14	73	4,645
2020	3,619	1.22	80.8	3,701	126	18	4	3,848
2021	4,844	2	108	4,954	286	13	23	5,277

Notes: All units in tonnes.

4.3 Topography and Geology

The topography of the Wrong Lake Ecodistrict ranges from 245 masl to the west and 305 masl to the east, draining westward towards Lake Winnipeg, with slopes generally less than 5% in upland areas and 10% to 15% in bedrock-dominated areas.

The Wrong Lake Ecodistrict is transitional between the peat-covered lowlands of the Berens River Ecodistrict to the west and the bedrock-dominated Nopiming Ecodistrict to the east. Mineral soils are well drained Dystric Burnisols that have developed on thin morainal veneers are dominant in the eastern portions of the ecodistrict. In the western portions, poorly drained loamy to clayey glaciolacustrine sediments occur in the peatlands that dominate there. (Smith et al. 1998).

The TANCO Mine is in the Precambrian Shield Physiographic Region. The region consists primarily of hummocky terrain of eroded crystalline bedrock and is partly covered with Quaternary deposits. The thickness of glacial and lacustrine sediment overlying the Precambrian shield is variable but generally thin with bedrock outcrop being common in many areas.

4.4 Groundwater

Groundwater is present in this depositional setting as perched water that receives direct recharge from rain or snow melt, or as part of a larger overburden aquifer that flows according to the direction of bedrock dip. Most of the groundwater is present in sandy gravel and/or sandy clay formations immediately above the bedrock. Due to the variable topography, this perched groundwater interacts with the various wetlands, streams and small lakes in the immediate vicinity.

Groundwater is also present in the fractures in the Precambrian bedrock, with the distribution of this water being dependent on the frequency, extent, and interconnectivity of the fractures. Recharge to these fractures may occur through infiltration from overlying water bearing overburden, or as direct infiltration of precipitation in areas of exposed bedrock. While the groundwater of the WTMA has not been as extensively studied as in the ETMA, it is expected to have similar characteristics as they relate to flow and level. Groundwater flow can be expected to be in the direction of topographic relief; in the WTMA, all flows are directed to the Main Dam, through the polishing pond and out the West Discharge.

4.5 Surface Water

The aquatic environment within the local study area is primarily represented by Bernic Lake and its inflowing and outflowing tributaries. Most surface water and fisheries studies have focused on Bernic Lake, as the receiving waterbody for the effluent from the TANCO Mine.

Bernic Lake has a drainage area of approximately 18 km^2 and is a second order lake receiving inflows from five headwater streams into the eastern and central parts of the lake and direct surface runoff from its immediate watershed. Two of the streams drain small headwater lakes, Warkentin Lake to the east and a small unnamed lake to the south. Inflow channels are small, approximately 2 m wide just prior to entering the lake and typically flow through low-lying bogs. There is a single outlet which drains the western basin through Bernic Creek to the Bird River which flows through Lac du Bonnet and into the Winnipeg River.

4.5.1 Surface Water Quality in Bernic Lake

Surface water quality is monitored quarterly in Tulabi Lake (as the reference area) and Bernic Lake (as the exposure area) as part of the water quality monitoring study conducted as part of the Environmental Effects Monitoring (EEM) studies conducted by TANCO. Surface water samples are collected from Bernic Lake (as the exposure area) and Osis Lake (as the reference area) as part of the EEM Biological Monitoring done every three years. Samples generally are analyzed for a full suite of metals, physical, ions, nutrients, and biological parameters in both monitoring programs. A historical data submission and six phases of monitoring have been completed thus far by TANCO as required for the EEM Biological Monitoring Studies. The Cycle 7 Interpretative Report was submitted on or before June 6, 2023.

Water quality data collected recently compared to prior to development shows that several limnological parameters such as hardness, alkalinity, and total dissolved solids have increased over time. Reduced water transparency is attributable to algal growth and corresponds with increased chlorophyll a concentrations. The increased algal standing crops in Bernic Lake are directly attributable to the increased total phosphorus concentrations in the lake.

Water quality measurements were recorded and samples collected quarterly between 2020 and 2022 from Bernic Lake and Tulabi Lake as part of the Cycle 7 EEM study. The analytical results were compared to Manitoba Water Quality Standards, Objectives and Guideline (MWQSOG) Tier II and Tier III guidelines for the protection of freshwater aquatic life (Williamson 2011) and the Canadian Council of Ministers of the Environment (CCME) guidelines for the protection of aquatic life (CCME 1999). Comparison of water quality samples events between lakes at the same depth identified several parameters that were greater in the Exposure Area by a factor of 2; however, dissolved fluoride was the only parameter two times greater in the Exposure Area that consistently exceeded applicable water quality guidelines. Single occurrences of metal concentrations exceeding water quality guidelines were observed across the samples: total iron (July 2020 in Bernic Lake); dissolved lead (July 2021 in Tulabi Lake); total cadmium (July and August 2022 in Tulabi Lake); dissolved zinc (Jun 2022 in Bernic Lake); and dissolved copper (October 2022 in Tulabi Lake). Average seasonal total phosphorus concentrations were between 1.5 and 3.9 times greater in Bernic Lake compared to Tulabi Lake. Similarly, chlorophyll a concentrations by sampling event were on average 1.2 to 10 times greater in Bernic Lake compared to Tulabi Lake.

4.5.2 Fish Community

There are small ponds adjacent to the Mill site that are not known to contain suitable fish habitat or fish species. These ponds are shallow and freeze to the bottom and are not expected to be impacted by project activities. TANCO has commissioned a site investigation to confirm these assumptions.

A waterfall on Bernic Creek presents a barrier to fish movements upstream from the Bird River. Wetlands are found in the floodplain of Bernic Creek and in depressional areas that are not directly connected to Bernic Creek. About 60 m downstream from the hydraulic control at the outlet of Bernic Lake, Bernic Creek enters Bernic Wetland. Outflow from Bernic Wetland (approximately 2.5 km downstream of Bernic Lake) appears to enter a cascading channel (approximately 8% gradient) that flows northward to the Bird River.

Six fish species have been reported in Bernic Lake: Cisco (*Corgeonus artedi*), Northern Pike (*Esox lucius*), White Sucker (*Catostomus commersoni*), Emerald Shiner (*Notropis atherinoides*), Spottail Shiner (*Notropis hudsonius*), and Yellow Perch (*Perca flavescens*). The downstream Bird River watershed has a higher fish species diversity, hosting 34 fish species.

The fish community structure in Bernic Lake has remained the same since the completion of the Cycle 6 Monitoring Study (2019) with only two large-body and three medium and small-body species captured in the Cycle 7 fish population survey (2022). White sucker remains the dominant species in the Bernic Lake fish population which is

consistent with the shift that was observed from northern pike to white sucker between the fifth and sixth phase of monitoring.

4.5.3 Macroinvertebrates

Algal Community: The total algal biomass in the Tulabi Lake and Osis Lake reference areas in October 2022 averaged approximately 1,260 mg/m^3 compared to 10,990 mg/m^3 in the Bernic Lake near-field exposure area. The total biomass of algae and cyanobacteria at the far-field site in Bernic Lake was more than 5 times greater than it was at the Bernic Lake near-field exposure area and 2 times greater than in the fish survey area of Bernic Lake.

Phytoplankton Community: The phytoplankton communities in Tulabi and Osis Lakes were much more diverse and more evenly distributed amongst the various algal groups than samples collected from the Bernic Lake sites in October 2022. Cyanophytes (cyanobacteria) comprised less than 20% of algal community (relative abundance) in the samples collected from Tulabi Lake and Osis Lake, while the relative abundance of Cyanophytes in Bernic Lake was greater than 97%.

Zooplankton Community: Zooplankton samples were collected in August 2020 from five locations in Bernic Lake. Zooplankton diversity and abundance/biomass in Bernic Lake were very low and were not typical of lakes in the area of Northwestern Ontario. The most abundant species were those known to occur in the upper layers of the water column; the absence of species preferring lower layers suggests unsuitable conditions may be present (e.g., low dissolved oxygen). The cladoceran and rotifer species that were most abundant in the Bernic Lake samples are common inhabitants of highly trophic lakes. The absence of *Daphnia* spp. in the samples also suggests a higher trophic state.

Benthic Invertebrate Community: Significant differences in the benthic communities were detected between the Osis Lake reference area and the Bernic Lake near-field and far-field exposure areas in the seventh phase of monitoring at the TANCO BLM (in 2022). Total invertebrate density was significantly greater in the reference area compared to the near-field and far-field exposure areas but density did not differ between the exposure areas. The Bray-Curtis Similarity Index was significantly greater in the far-field exposure area compared to the near-field exposure area and the reference area in Osis Lake. But no difference was detected between the near-field exposure and reference area. No significant differences were detected in family richness, Simpson's Evenness Index or Simpson's Diversity Index between any of the study areas. Differences in benthic community structure between the far-field exposure area and the reference and near-field exposure areas can generally be attributed to greater abundances of Chironomids in the far-field exposure area and greater abundances of Chaoboridae and Ceratopogonidae in the near-field exposure and reference areas. The differences detected during the seventh monitoring cycle were very different from those observed in previous six cycles. The differences detected in the first six cycles of monitoring are likely attributed to differences in limnology between the exposure and reference lake (which was previously Tulabi Lake).

4.6 Vegetation

In the general region, the dominant land cover is coniferous forest with some limited areas of mixed forest. At the project site, there are forest stands characteristic of the ecoregion, like white spruce (*Picea glauca*), balsam fir (*Abies balsamea*), and black spruce (*P. mariana*) with some trembling aspen (*Populus tremuloides*) and balsam poplar (*P. balsamifera*). Deciduous trees such as bur oak (*Quercus macrocarpa*) and ash (*Fraxinus* spp) are present on the site, but in fewer numbers compared to the ecodistrict to the south.

On well drained sites, white spruce, balsam fir, trembling aspen and balsam poplar form mixed stands. In bedrock outcrop areas, patchy tree stands are often dominated by jack pine (*Pinus banksiana*) with an understory of low

shrubs, mosses and lichens. Poorly drained areas, including bogs and transitional peatlands support black spruce with an understory of dwarf birch (*Betula papyrifera*), shrubs, and moss. Fens have a vegetative cover of sedges, shrubs and tamarack (*Larix laricina*). (Smith et al. 1998).

The project site is consistent with typical upland characteristics of the region with significant bedrock outcrops supporting lichen growth and open canopy, interspersed with tree cover consisting of black spruce, jack pine, trembling aspen, and white birch.

4.7 Wildlife

Characteristic regional wildlife includes mammals such as moose (*Alces alces*), black bear (*Ursus americanus*), lynx (*Lynx canadensis*), and snowshoe hare (*Lepus americanus*). Birds in the region include ruffed grouse (*Bonasa umbellus*), pileated woodpecker (*Dryocopus pileatus*), bald eagle (*Haliaeetus leucocephalus*), as well as many waterfowl and songbird species (Smith et al. 1998). Wildlife species observed within the project site include white-tailed deer (*Odocoileus virginianus*) and red fox (*Vulpes vulpes*).

4.8 Species of Management Concern

The Manitoba Conservation Data Centre tracks plant and animal species of conservation concern within the province and reports biodiversity in each ecoregion. Within the Lake of the Woods Ecoregion, there are 14 species listed as either Threatened or Endangered under the provincial *Endangered Species and Ecosystems Act*; ten of those are also listed under the federal *Species at Risk Act* as either Threatened or Endangered; five are not listed provincially but are listed federally (Table 4-3).

Table 4-3: Species of Conservation Concern in the Lake of the Woods Ecoregion

Scientific Name	Common Name	Subnational Rank[1]	National Rank[1]	ESEA	SARA	COSEWIC
Plants						
Symphyotrichum sericeum	Western Silvery Aster	S2S3	N2N3	T	T	T
Spiranthes magnicamporum	Great Plains Ladies'-tresses	S1S2	N3?	E	NL	NL
Birds						
Cygnus buccinator	Trumpeter Swan	S2B	N5B,N5N,N5M	E	NL	NL
Ixobrychus exilis	Least Bittern	S2S3B	N4B	E	T	T
Charadrius melodus	Piping Plover	S1B	N3B,N3M	E	E	E
Centronyx bairdii	Baird's Sparrow	S1B	N4B,N4M	E	SC	SC
Asio flammeus	Short-eared Owl	S2S3B	N4B,N3N,N4M	T	SC	SC
Chaetura pelagica	Chimney Swift	S2B	N4B,N3M	T	T	T
Antrostomus vociferus	Eastern Whip-poor-will	S2S3B	N4B,N3M	T	T	T
Chordeiles minor	Common Nighthawk	S2S3B	N4B,N3M	T	T	SC
Cardellina canadensis	Canada Warbler	S3B	N4B,N3M	T	T	SC

Scientific Name	Common Name	Subnational Rank[1]	National Rank[1]	ESEA	SARA	COSEWIC
Vermivora chrysoptera	Golden-winged Warbler	S2S3B	N4B,NUM	T	T	T
Melanerpes erythrocephalus	Red-headed Woodpecker	S3B	N4B,N3M	T	E	E
Contopus cooperi	Olive-sided Flycatcher	S2S3B	N4B,N3M	T	T	SC
Hirundo rustica	Barn Swallow	S4B	N3N4B,N3N4M	NL	T	T
Riparia riparia	Bank Swallow	S4B	N5B,N5M	NL	T	T
Dolichonyx oryzivorus	Bobolink	S3S4B	N5B,N4N5M	NL	T	T
Fish						
Notropis percobromus	Carmine Shiner	S2	N2	NL	E	E
Amphibian						
Ambystoma tigrinum	Eastern Tiger Salamander	S3?	N1	NL	E	E

Source: Manitoba Conservation Data Centre, 2023.
Notes: ESEA = Endangered Species and Ecosystem Act; SARA = Species at Risk Act; T = Threatened; E = Endangered; SC = Special Concern; NL = Not Listed.
[1]Conservation status ranking follows NatureServe (https://explorer.natureserve.org/AboutTheData/DataTypes/ConservationStatusCategories).

TANCO has commissioned bio-inventory studies on the site throughout their operations. These have included studies independent from their EEM monitoring including vegetation surveys, limnological studies, fish community and fish habitat investigations, and macroinvertebrate community studies. There are no records of the species listed in Table 4-3 being observed within the BLM.

The BLM is near the southern edge of the range of the Owl-Flintstone caribou herd which is made up of approximately 60 to 70 individuals. The range is considered of high conservation concern in Manitoba's draft Action Plans for Boreal Woodland Caribou Ranges in Manitoba (Manitoba Boreal Woodland Caribou Management Committee 2015). The woodland caribou is listed as Threatened under the Manitoba *Endangered Species and Ecosystems Act* and as Threatened under the *Species at Risk Act*. Caribou sightings have not been reported within the local study area but could potentially occur in the area. TANCO mine staff have not reported caribou on the site or along the mine road.

4.9 Socio-Economic Environment

4.9.1 Public Safety and Human Health

Access to the mine site is restricted to authorized personnel; all visitors are required to report to security.

Traffic and human presence in the vicinity of the mine experiences significant seasonal fluctuations (e.g., between 30% and 50% increase in traffic during summer months; Table 3-4). Residents are accustomed to mining traffic and activity. TANCO will work with MTI to develop and implement appropriate traffic management plans, as required.

4.9.2 Land and Resource Use

Cottaging and recreation in the area represents a significant portion of the regional land use. Water-oriented recreation is also popular along the Winnipeg River and Bird River systems.

Resource use in the regional study area includes forestry, mining, wild rice harvesting, hunting, fishing and trapping. Wild rice planting and harvesting occur in lakes and rivers in and around the regional study area. Recreational hunting and fishing are common in the regional study area. Hunting opportunities include waterfowl, geese, grouse, and white-tailed deer; black bear and moose are hunted in specific parts of the region. The mine site is located within the Eastern Registered Trap Line District (Trapping in the regional study area is largely confined to registered trap lines in the Hole River and Lac du Bonnet Registered Trap Line Zones (Manitoba Conservation 2021b).

4.9.3 Protected Areas

The TANCO BLM is located approximately 1 km south of the southern boundary of Nopiming Provincial Park and approximately 10 km north of Whiteshell Provincial Park.

4.9.4 Heritage Resources

A heritage resources impact assessment (HRIA) for the Tailings Reprocessing Facility Project was conducted by InterGroup Consultants Ltd. On September 28, 2023, under heritage permit A121-23. The project was screened by Manitoba's Historic Resources Branch as having the potential to impact heritage resources within NE-15-17-15W (AAS-23-20250). The HRIA consisted of a pedestrian survey and shovel testing within the project footprint. The southern half of the project footprint was noted to be disturbed by previous mine development and consisting of wet lowlands during the pedestrian survey with roads, man-made lakes, and partial buried conduit was observed. The northern half of the study area was less disturbed in relation to the southern half and consisted predominantly of exposed bedrock or bedrock with a thin layer of moss and lichen. Due to the presence of bedrock, subsurface shovel testing was restricted within the northern part of the project site.

A total of six (n=6) shovel tests were excavated within the project footprint. Shovel tests were spread out equidistantly in suitable locations to acquire stratigraphic data from the entirety of the project footprint. The test pits were hand shovelled in an approximate 50 cm-by-50 cm square hole and dug to a maximum depth of 34 cm due to bedrock being encountered. All extracted soils were screened through a 6 mm mesh. No heritage resources or features were observed during the pedestrian survey nor the subsurface shovel testing.

In summary, the project footprint for the development of the New Mill has been assessed for an impact to heritage resources and there does not appear to be any heritage concerns. TANCO is preparing a Heritage Resources Protection Plan as a mitigation measure to accompany all projects completed outside the area currently developed.

4.9.5 Indigenous Communities

There are four First Nations communities in the general vicinity of the mine:

- Sagkeeng First Nation
- Black River First Nation
- Brokenhead Ojibway Nation
- Hollow Water First Nation

The project site is also known to be part of the Homeland of the Red River Métis.

Hunting, fishing, and gathering by local Indigenous people is common across the regional study area. To our knowledge, the local study area, including Bernic Lake, has not been known to be a site of traditional resource harvest during the period of mine operation.

5.0 ENVIRONMENTAL EFFECTS ASSESSMENT

The potential environmental effects associated with the proposed alteration were and are evaluated at various spatial and temporal scales, defined specific to the project components and activities, sensitivities of the surrounding environment and valued components.

5.1 Valued Components

The valued components selected for this assessment have the potential to experience effects because of the project:

- Climate
- Air Quality and Noise
- Topography and Geology
- Groundwater
- Surface Water
- Aquatic Resources
- Vegetation
- Wildlife
- Species of Management Concern
- Land and Resource Use
- Public Safety and Human Health
- Protected Areas
- Heritage Resources
- Direct Impacts
- Resource Use
- Cultural and Traditional Activities

The existing environmental conditions are described in Section 4.0 (Existing Environment) of this report.

5.2 Effects Assessment Methods

Environmental effects because of this alteration will be considered in the context of its magnitude, geographic extent, duration, frequency, and degree of reversibility.

Those effects that remain, if any, following the implementation of mitigation measures are considered residual effects. The significance of the residual effects is assigned to one of three significance level ranging from ‘not significant’ (Level I) to ‘potentially significant’ (Level II) to ‘very significant’ (Level III) (Table 5-1). Where a residual effect has indicator criteria that span one or more significance levels, the assigned level will be determined based on professional judgement.

Table 5-12: Determination of Significance of Residual Effects

Significance Level	Context		Magnitude / Geographic Extent	Duration / Frequency	Likelihood of Occurrence	Reversibility
	Biophysical	Socio-Economic				
I	No meaningful adverse biophysical effects	No meaningful adverse effects to socio-economic interests	Minor, or restricted to the Project Site	Short-term, or rare	Unlikely	Readily reversible
II	Adverse effects to common species or ecological features	Adverse effects that are meaningfully inconvenient to local stakeholders	Moderate, or effects would be anticipated beyond the Project Site	Moderate term or life of mine, or intermittent	Reasonably expected to occur	Reversed with difficulty
III	Adverse effects to rare, or locally or regionally important species or ecological features	Adverse effects to livelihood or property values	Major, or effects extend beyond the life of the mine	Long-term, or continuous	Will occur	Not reversible

5.3 Results of Effects Assessment

A brief description of existing environmental components, project-environment interactions, mitigation measures to be implemented in ongoing operation of the New Mill, and resulting residual effects are separated by project phase in Table 5-2 (site preparation), Table 5-3 (construction) and Table 5-4 (operation).

Table 5-23: Summary of Environmental Effects During the Site Preparation Phase

Valued Component & Baseline Conditions	Type of Interaction	Recommended Mitigations	Significance Level of Residual Effects
Climate and Air Quality			
▪ Emissions & Greenhouse Gases: Air quality at the Project Site is influenced by ongoing mining and milling activities. Greenhouse gas emissions at the site are currently mainly influenced at the CPF, building heating and underground mine heating in winter.	Emissions from heavy equipment & traffic	▪ Ensure all equipment is in good working order and is maintained according to manufacturer specifications. ▪ Stationary emission sources, equipment, and vehicles will be turned off when not in use. ▪ Avoid unnecessary idling of vehicles and/or heavy machinery. ▪ No burning of oils, rubber, tires, or other materials will take place.	I
▪ Dust: Dust levels at the Project Site are locally affected by ongoing mining and milling activities; any increases occur only within the boundaries of the site itself.	Dust generated from movement of heavy equipment on gravel roads and site preparation activities (i.e., clearing vegetation and grading the site of the New Mill, developing staging/laydown areas, gravel access road construction, and preparing/stacking WTMA tailings for extraction).	▪ Dust generating activities will be minimized, if possible, during windy periods. ▪ Minimize the extent of soil disturbance and vegetation clearing. ▪ Limit the size of stockpiles to the extent practicable. ▪ Dust suppressions measures, if necessary, will include non-toxic dust controls (e.g., water).	I
	Dust generated from traffic, tailings extraction and site preparation activities.	▪ Continue with NPRI monitoring and reporting during operation. ▪ Dust generating activities will be minimized, if possible, during windy periods. ▪ Minimize the extent of soil disturbance and vegetation clearing. ▪ Material stockpile heights will be limited, where practical. ▪ Dust suppressions measures, if necessary, will include non-toxic dust controls (e.g., water). ▪ Re-vegetate areas that were temporarily disturbed during construction.	I
▪ Noise: Noise levels are elevated as the site is currently an active mine site. Noise levels are monitored and where they are elevated, signage and PPE is provided.	Noise generated by heavy machinery.	▪ Contractors will have appropriate noise protection PPE. ▪ Equipment will be regularly inspected and maintained.	I
Topography and Geology			
▪ Topography: The site selected for the New Mill is generally flatter than other areas and is close to existing roads. The layout is configured to make the most of the space and avoid unused areas and is located entirely on TANCO's surface leases.	Change in topography from levelling site for New Mill building and ancillary infrastructure. The area to be cleared is approximately 25 ha which is about an 20% increase in disturbed area compared to the rest of the BLM site (about 85 ha) and approximately 0.8% of the area covered by TANCO's mineral and surface rights (about 2,500 ha).	▪ Limit the size of the disturbed area to the extent practicable. ▪ New pipelines and electrical pole will follow existing disturbances and road right of ways as much as possible.	I
▪ Soils: There will be a concrete foundation under the New Mill and other buildings; the rest of the parking lot and access roads will be unpaved. The site is undisturbed but will be located entirely on TANCO's surface leases.	Compaction and mixing of soils and increased erosion potential with clearing and grading site, developing laydown areas, constructing access roads, and pouring foundation(s).	▪ Limit the size of the disturbed area to the extent practicable. ▪ Limit equipment movement to existing access roads. ▪ Develop a site-specific erosion and sediment control plan which may include avoiding work during heavy precipitation, using appropriate ESC measures like silt fencing or matting.	I
	Potential contamination of soils because of spills or accidents.	▪ Follow measures listed in "Spills and Accidents" below to avoid soil contamination.	I
Groundwater			
▪ Quality: In groundwater near to the ETMA, there are detectable concentrations of some metals; with groundwater movement in the direction of the WTMA.	Potential contamination of groundwater because of spills or accidents.	▪ Follow measures listed in "Spills and Accidents" below to avoid groundwater contamination.	I
▪ Quantity: Groundwater on site exists as an enclosed perched water table that receives direct recharge from rain or snow melt, or is part of a larger overburden aquifer.	Changes in groundwater quantity or quality because of changes in site drainage and/or soil compaction.	▪ Limit the size of the disturbed area to the extent practicable. ▪ Concrete pads will be constructed only for building foundations, the remainder of the site will be unpaved to limit disruptions to water infiltration to soils and groundwater.	I
Surface Water			
▪ Quality: Bernic Lake is the receiving waterbody; surface water quality is regulated under TANCO's EAL and MDMER.	Potential contamination of surface water because of spills or accidents.	▪ Follow measures listed in "Spills and Accidents" below to avoid surface water contamination. ▪ Surface runoff will report to a new perimeter ditch which will be constructed around the site to allow surface runoff to continue to report to the WTMA.	I

Valued Component & Baseline Conditions	Type of Interaction	Recommended Mitigations	Significance Level of Residual Effects
▪ Quantity: Bernic Lake is a second order lake receiving inflows from several small headwater streams, surface runoff and effluent from the mine.	Changes in surface water drainage patterns because of site preparation activities (see **Table 4-1** for list of components).	▪ Surface runoff will report to a new perimeter ditch which will be constructed around the site to allow surface runoff to continue to report to the WTMA. ▪ Concrete pads will be constructed only for building foundations, the remainder of the site will be unpaved to limit disruptions to water infiltration to soils and groundwater.	I
▪ Fish and Aquatic Organism Health: The small ponds adjacent to site are not known to contain fish. There are no inwater works during this phase that may affect health of aquatic life in these ponds or Bernic Lake.	Release of deleterious to downstream fish-bearing waters to reduce habitat quality or affect fish behavior or survival.	▪ Follow measures listed in “Spills and Accidents” below to avoid surface water contamination.	I
▪ Fish and Aquatic Habitat: There are no inwater works during this phase that may affect health of aquatic habitat in these ponds or Bernic Lake.	There are no inwater works during this phase that may affect health of aquatic habitat in these ponds or Bernic Lake.	▪ Not applicable.	Not Applicable
Vegetation			
▪ Vegetation: Much of the mine site is already cleared; the vegetative community in the area to be disturbed by the New Mill is typical of the area.	Vegetation clearing in area of New Mill building, ore stockpile, and ancillary infrastructure	▪ Limit the size of the disturbed area to the extent practicable. ▪ Limit equipment movement to existing roads or disturbed areas.	I
	Introduction or spread of non-native, noxious or invasive plant species.	▪ The Contractor will develop an Invasive Species and Weed Management Plan as part of the Environmental Protection Plan. ▪ Vehicles and equipment arriving on site should be inspected and cleaned in accordance with applicable best management practices.	I
Wildlife			
▪ Wildlife Habitat: The BLM site is disturbed and the area to be disturbed by the New Mill is not unique.	Habitat loss through vegetation clearing	▪ Follow measures listed in “Vegetation” below to avoid impacts to wildlife habitat. ▪ Clearing required for this alteration should be scheduled outside of the General Nesting Period for breeding birds, which in this area occurs from April 14 to August 28. ▪ If vegetation removal cannot be avoided during the general nesting period, pre-clearing nest surveys will be conducted by a qualified environmental professional in advance of clearing to identify any breeding, nesting, roosting or rearing birds and determine the appropriate Best Management Practices, such as establishing work exclusion buffers around detected nests.	I
▪ Wildlife: The BLM site is disturbed and is an active mine site. Several wildlife species are frequently observed within the minesite itself including white tailed deer and red fox.	Wildlife mortality or changes in behavior through noise, light, and traffic changes.	▪ Speed limits on the BLM site will be posted and adhered to. ▪ Follow measures listed in “Noise” above to avoid changes in noise, to limit disturbance to wildlife. ▪ Limit light pollution with directional lighting, limit work to daylight hours, and turn off lights in areas not in use or otherwise requiring lighting. ▪ Employees and Contractors to notify TANCO Site Manager of wildlife sightings and interactions.	I
	Garbage or waste generated by the project may attract wildlife and lead to wildlife-human interactions.	▪ Feeding, harassment or destruction of any wildlife will be prohibited. Wildlife encountered at or near the project will be allowed to passively disperse without undue harassment. ▪ Waste will be disposed of in appropriate containers and disposed at a licenced facility.	I
Species of Management Concern			
▪ Species at Risk and Critical Habitat: There are no known species at risk or critical habitat at the project site. Caribou sightings have not been reported within the local study area but could potentially occur in the area. TANCO mine staff have not reported caribou on the site or along the mine road.	Habitat loss or changes in survival or behavior (see Wildlife)	▪ Follow measures listed in “Wildlife” and “Vegetation” above to avoid impacts to species at risk.	I
Socio-Economic Environment			
▪ Public Safety and Human Health: Trucks travelling to and from Winnipeg to deliver reagents or transport concentrate will increase traffic volumes on roads that currently experience some heavy vehicles.	Increased traffic volumes associated with delivery of equipment and materials are anticipated to be negligible during this phase.	▪ The mine site has been an active mine site for over 90 years and experiences elevated noise and traffic levels. ▪ The increase in traffic during site preparation will be temporary (with the mobilization of heavy equipment to site), negligible on local roads and will be generally restricted to local mine roads during site preparation. ▪ Most equipment needed for site preparation activities are currently being used at the BLM site.	I
▪ Land and Resource Use: The area hosts a diverse economy, including agriculture, mining, forestry, technology, tourism, and hydro-electric production.	Construction will not affect surrounding land and resource use.	▪ Not applicable.	Not Applicable
▪ Protected Areas: The project site is 1 km south of the southern border of the Nopiming Provincial Park.	Changes in noise and traffic could negatively affect nearby residents and protected spaces (e.g., reduced ‘sense of nature’)	▪ Follow measures listed in “Noise” and “Public Safety” for mitigation measures to limit impacts associated with noise and traffic.	I

Valued Component & Baseline Conditions	Type of Interaction	Recommended Mitigations	Significance Level of Residual Effects
▪ Heritage Resources: There are five archaeological sites within the local study area.	There are no direct impacts to known archaeological features.	▪ A Heritage Resources Protection Plan is being prepared by TANCO, to support TANCO's Work Permit Application and will be used during the site preparation and construction phases of the project.	I
• Indigenous Communities: There are four nearby First Nation communities, with Sagkeeng First Nation being the most actively engaged in the project.	The local study area, including Bernic Lake, has not been a site of traditional resource harvest during the period of mine operation.	▪ TANCO has actively engaged with nearby Indigenous communities to communicate the project, and to solicit concerns or feedback to improve their design and mitigation measures. ▪ TANCO will continue to work with Nations to assist in identifying opportunities and removing barriers of employment.	I
Spills and Accidents			
	Spills or discharge of contaminants (such as reagents or fuels) or sediment-laden water may affect surface water, groundwater, or soil quality.	▪ The Contractor will have a Spill Response Plan. ▪ All equipment should be in good operating condition, washed, free of leaks and excess oil, prior to arriving on site. ▪ Appropriately stocked spill kits should be available and on all mobile equipment. Trained personnel should be available to deploy spill kits. ▪ Refueling should occur in designated areas with a spill containment kit available. ▪ Sump pumps will be constructed near each reagent storage tanks to contain spills. ▪ Hazardous materials should be labeled and disposed of according to applicable regulations. ▪ TANCO will update their Emergency Response Plan to include the New Mill and its associated activities. ▪ All spills will be reported to the Manitoba Conservation Emergency Response Team at (204) 944-4888.	I

Table 5-34: Summary of Environmental Effects During the Construction Phase

Valued Component & Baseline Conditions	Type of Interaction	Recommended Mitigations	Significance Level of Residual Effects
Climate and Air Quality			
▪ Emissions & Greenhouse Gases: Air quality at the Project Site is influenced by ongoing mining and milling activities. Greenhouse gas emissions at the site are currently mainly influenced at the CPF, building heating and underground mine heating in winter.	Emissions from heavy equipment & traffic are expected to be minor or negligible and temporary during construction.	▪ Ensure all equipment is in good working order and is maintained according to manufacturer specifications. ▪ Avoid unnecessary idling of vehicles and/or heavy machinery. ▪ No burning of oils, rubber, tires or other materials will take place. ▪ Stationary emission sources, equipment, and vehicles will be turned off when not in use. ▪ There will be a small and temporary increase in traffic associated with the contractors and workers during the construction phase. TANCO will use employee shuttles to reduce traffic volumes.	I
▪ Dust: Dust levels at the Project Site are locally affected by ongoing mining and milling activities; any increases occur only within the boundaries of the site itself.	Dust generated from movement of heavy equipment on gravel roads and handling of construction materials; increases are expected to be minor and temporary.	▪ Dust generating activities will be minimized, if possible, during windy periods. ▪ Dust suppressions measures, if necessary, will include non-toxic dust controls (e.g., water). ▪ Re-vegetate areas that were temporarily disturbed during construction.	I
▪ Noise: Noise levels are elevated as the site is currently an active mine site. Noise levels are monitored and where they are elevated, signage and PPE is provided.	Noise generated by heavy machinery, handling of materials, and placement and construction of buildings and ancillary infrastructure; increases are expected to be minor and temporary.	▪ Contractors will have appropriate noise protection PPE. ▪ Equipment will be regularly inspected and maintained.	I
Topography and Geology			
▪ Topography: The site selected for the New Mill is generally flatter than other areas and is close to existing roads. The layout is configured to make the most of the space and avoid unused areas and is located entirely on TANCO's surface leases.	All levelling and site clearing will have been completed during site preparation phase. Tailings excavation will be limited to within the WTMA and in tailings deposited there by TANCO.	▪ Limit equipment movement to existing access roads and disturbed areas.	I
▪ Soils: There will be a concrete foundation under the New Mill and other buildings; the rest of the parking lot and access roads will be unpaved. The site is undisturbed but will be located entirely on TANCO's surface leases.	Compaction and mixing of soils and increased erosion potential with placement of New Mill building, ore stockpile, and ancillary infrastructure.	▪ Limit equipment movement to existing access roads. ▪ Develop a site-specific erosion and sediment control plan which may include avoiding work during heavy precipitation, using appropriate ESC measures like silt fencing or matting.	I
	Potential contamination of soils because of spills or accidents.	▪ Follow measures listed in "Spills and Accidents" below to avoid soil contamination.	I

Valued Component & Baseline Conditions	Type of Interaction	Recommended Mitigations	Significance Level of Residual Effects
Groundwater			
▪ Quality: In groundwater near to the ETMA, there are detectable concentrations of some metals; with groundwater movement in the direction of the WTMA.	Potential contamination of groundwater because of spills or accidents.	▪ Follow measures listed in "Spills and Accidents" below to avoid groundwater contamination.	I
▪ Quantity: Groundwater on site exists as an enclosed perched water table that receives direct recharge from rain or snow melt, or is part of a larger overburden aquifer.	Changes in groundwater quantity because of changes in site drainage and/or soil compaction.	▪ A perimeter ditch constructed during site preparation phase will collect runoff and report to WTMA.	I
	Changes in groundwater quantity because of withdrawals, surface water management or soil compaction.	▪ There are no withdrawals of groundwater required for this project. ▪ Limit equipment movement to existing access roads.	I
Surface Water			
▪ Quality: Bernic Lake is the receiving waterbody; surface water quality is regulated under TANCO's EAL and MDMER.	Potential contamination of surface water because of spills or accidents.	▪ Follow measures listed in "Spills and Accidents" below to avoid surface water contamination. ▪ All work planned will occur on ground where surface runoff will report to the WTMA. ▪ Tailings excavation and dredging of tailings within the WTMA will incorporate relevant environmental protection measures to avoid elevated turbidity or other contaminants from being discharged out of the tailings pond and polishing pond. This may include the use of silt curtains, floating baffles or additional treatment to encourage the settling of solids.	I
▪ Quantity: Bernic Lake is a second order lake receiving inflows from several small headwater streams, surface runoff and effluent from the mine. There is a single outlet channel, Bernic Creek, which flows to the Bird River.	Changes in surface water drainage patterns because of construction and placement of New Mill and ancillary infrastructure.	▪ Surface runoff will report to a new drainage ditch which will be constructed during the site preparation phase. ▪ During construction, site drainage will be managed to the extent practicable.	I
▪ Fish and Aquatic Organism Health: The small ponds adjacent to site are not known to contain fish. Bernic Lake is the receiving waterbody of site drainage.	Release of deleterious to downstream fish-bearing waters to reduce habitat quality or affect fish behavior or survival	▪ Follow measures listed in "Spills and Accidents" below to avoid surface water contamination.	I
▪ Fish and Aquatic Habitat: Bernic Lake offers fish habitat for several species.	Construction of a new fresh water intake in Bernic Lake may result in temporary disturbances and permanent habitat loss.	▪ Follow DFO's habitat protection measures, including applicable codes of practice during construction of new intake in Bernic Lake. ▪ Submit a Request for Review (and/or Notification under the DFO's Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater) for the new intake and other inwater components. Additional mitigation measures may be identified during DFO's review of the project. ▪ Schedule construction to avoid sensitive fish spawning windows.	
Vegetation			
▪ Vegetation: Much of the mine site is already cleared; the vegetative community in the area to be disturbed by the New Mill is typical of the area.	All site clearing will occur during the site preparation phase.	▪ Not applicable.	Not Applicable
	The project site will have already been cleared during the site preparation phase. Introduction or spread of non-native, noxious or invasive plant species.	▪ The Contractor will develop an Invasive Species and Weed Management Plan as part of the Environmental Protection Plan. ▪ Vehicles and equipment arriving on site should be inspected and cleaned in accordance with applicable best management practices.	I
Wildlife			
▪ Wildlife Habitat: The BLM site is disturbed and the project site will have already been cleared during the site preparation phase	All site clearing will occur during the site preparation phase.	▪ Not applicable.	Not Applicable
▪ Wildlife: The BLM site is disturbed and is an active mine site. Several wildlife species are frequently observed within the minesite itself including white tailed deer and red fox.	Wildlife mortality or changes in behavior through noise, light, and traffic changes.	▪ Speed limits on the BLM site will be posted and adhered to. ▪ Follow measures listed in "Noise" above to avoid changes in noise, to limit disturbance to wildlife. ▪ Limit light pollution with directional lighting, limit work to daylight hours, and turn off lights in areas not in use or otherwise requiring lighting. ▪ Employees and Contractors to notify TANCO Site Manager of wildlife sightings and interactions. ▪ Clearing required for this alteration will be scheduled outside of the General Nesting Period for breeding birds, which in this area occurs from April 14 to August 28.	I
	Garbage or waste generated by the project may attract wildlife and lead to wildlife-human interactions.	▪ Feeding, harassment or destruction of any wildlife will be prohibited. Wildlife encountered at or near the project will be allowed to passively disperse without undue harassment. ▪ Waste will be disposed of in appropriate containers and disposed at a licenced facility.	I
Species at Risk and Critical Habitat			
▪ Species at Risk and Critical Habitat: There are no known species at risk or critical habitat at the project site.	Changes in survival or behavior (see Wildlife)	▪ Follow measures listed in "Wildlife" and "Vegetation" above to avoid impacts to species at risk.	I

Valued Component & Baseline Conditions	Type of Interaction	Recommended Mitigations	Significance Level of Residual Effects
Caribou sightings have not been reported within the local study area but could potentially occur in the area. TANCO mine staff have not reported caribou on the site or along the mine road.			
Socio-Economics			
▪ Public Safety and Human Health: Trucks travelling to and from Winnipeg to deliver reagents or transport concentrate will increase traffic volumes on roads that currently experience some heavy vehicles.	Increased traffic volumes associated with delivery of equipment and materials are anticipated to be negligible during this phase.	▪ The mine site has been an active mine site for over 90 years and experiences elevated noise and traffic levels. ▪ The increase in traffic during construction will be temporary (with the mobilization of heavy equipment to site), negligible on local roads and will be generally restricted to local mine roads during site preparation. TANCO will use employee shuttles to reduce traffic volumes. ▪ Most equipment needed for site preparation activities are currently being used at the BLM site.	I
▪ Land and Resource Use: The area hosts a diverse economy, including agriculture, mining, forestry, technology, tourism, and hydro-electric production. The general area brings many vacationers and cottagers in summer months.	Construction will not affect surrounding land and resource use.	▪ Not applicable.	Not Applicable
▪ Protected Areas: The project site is 1 km south of the southern border of the Nopiming Provincial Park.	Changes in noise and traffic could negatively affect nearby residents and protected spaces (e.g., reduced 'sense of nature')	▪ The mine site has been an active mine site for over 90 years and experiences elevated noise and traffic levels. ▪ Follow measures listed in "Climate and Air Quality" above to avoid impacts to air and noise. ▪ Follow measures listed in "Noise" and "Public Safety" for mitigation measures to limit impacts associated with noise and traffic.	I
▪ Heritage Resources: There are five archaeological sites within the local study area.	There are no direct impacts to known archaeological features.	▪ A Heritage Resources Protection Plan is being prepared by TANCO, to support TANCO's Work Permit Application and will be used during the site preparation and construction phases of the project.	I
▪ Indigenous Communities: There are four nearby First Nation communities, with Sagkeeng First Nation being the most actively engaged in the project.	The local study area, including Bernic Lake, has not been a site of traditional resource harvest during the period of mine operation.	▪ TANCO has actively engaged with nearby Indigenous communities to communicate the project, and to solicit concerns or feedback to improve their design and mitigation measures. ▪ TANCO will continue to work with Nations to assist in identifying opportunities and removing barriers of employment.	I
• **Spills and Accidents**	Spills or discharge of contaminants (such as reagents or fuels) or sediment-laden water may affect surface water, groundwater, or soil quality.	▪ The Contractor will have a Spill Response Plan. ▪ All equipment should be in good operating condition, washed, free of leaks and excess oil, prior to arriving on site. ▪ Appropriately stocked spill kits should be available and on all mobile equipment. Trained personnel should be available to deploy spill kits. ▪ Refueling should occur in designated areas with a spill containment kit available. ▪ Hazardous materials should be labeled and disposed of according to applicable regulations. ▪ TANCO will update their Emergency Response Plan to include the New Mill and its associated activities. ▪ All spills will be reported to the Manitoba Conservation Emergency Response Team at (204) 944-4888.	I

Table 5-4: Summary of Environmental Effects During the Operation Phase

Valued Component & Baseline Conditions	Type of Interaction	Recommended Mitigations	Significance Level of Residual Effects
Climate and Air Quality			
▪ Emissions & Greenhouse Gases: Air quality at the Project Site is influenced by ongoing mining and milling activities. Greenhouse gas emissions at the site are currently mainly influenced at the CPF, building heating and underground mine heating in winter.	Emissions from heavy equipment & traffic (movement and stockpiling of ore, excavation of reclaimable tailings, operation of New Mill (grinding, crushing, drying and loading concentrate).	▪ Ensure all equipment is in good working order and is maintained according to manufacturer specifications. ▪ Avoid unnecessary idling of vehicles and/or heavy machinery. ▪ No burning of oils, rubber, tires or other materials will take place. ▪ Continue with NPRI monitoring and reporting during operation.	I
	Emissions associated with combustion of propane and other fuels.	▪ Stationary emission sources, equipment, and vehicles will be turned off when not in use. ▪ The New Mill will be outfitted with higher efficiency propane heating system, to reduce the net change in emissions associated with this source. ▪ Continue with NPRI monitoring and reporting during operation.	
▪ Dust: Dust levels at the Project Site are locally affected by ongoing mining and milling activities; any increases occur only within the boundaries of the site itself.	Dust generated from movement of heavy equipment on gravel roads, and handling of ore and reclaimable tailings.	▪ Dust generating activities will be minimized, if possible, during windy periods. ▪ Dust suppressions measures, if/when necessary, will include non-toxic dust controls (e.g., water). ▪ TANCO will continue with NPRI monitoring and reporting during operation.	I

Valued Component & Baseline Conditions	Type of Interaction	Recommended Mitigations	Significance Level of Residual Effects
	Dust generated during processing in New Mill (crushing, grinding, transporting ore, and drying and handling concentrates)	▪ TANCO will continue with NPRI monitoring and reporting during operation. ▪ Dust collectors will be installed in the buildings where there is the potential to generate dust (e.g., crushing, concentrate loading area). ▪ Trucks transporting ore from the mine to the New Mill will be covered, if practical.	
▪ Noise: Noise levels are elevated as the site is currently an active mine site. Noise levels are monitored and where they are elevated, signage and PPE is provided.	Noise generated by heavy machinery and handling/transporting mined ore and reclaimable tailings.	▪ Contractors will have appropriate noise protection PPE. ▪ Equipment will be regularly inspected and maintained. ▪ The site is an active mine site, with heavy machinery operating regularly.	I
	Noise generated by operation of New Mill (ore crushing and grinding; floatation circuit), tailings extraction	▪ Mill employees will have annual audiograms and be provided with appropriate noise protection PPE. ▪ TANCO will continue to monitor noise inside the operating facilities, including the New Mill once it is operational.	I
Topography and Geology			
▪ Topography: All levelling and site clearing will have been completed during site preparation phase.	Not Applicable	▪ All levelling and site clearing will have been completed during site preparation phase.	Not Applicable
▪ Soils: Movement of vehicles and placement of materials will be within areas disturbed or constructed in prior phases.	Potential contamination of soils because of spills or accidents.	▪ Follow measures listed in “Spills and Accidents” below to avoid soil contamination.	I
Groundwater			
▪ Quality: In groundwater near to the ETMA, there are detectable concentrations of some metals; with groundwater movement in the direction of the WTMA.	Potential contamination of groundwater because of spills or accidents.	▪ Follow measures listed in “Spills and Accidents” below to avoid groundwater contamination.	I
▪ Quantity: Groundwater on site exists as an enclosed perched water table that receives direct recharge from rain or snow melt, or is part of a larger overburden aquifer. There are no withdrawals from groundwater for the operation of the New Mill. All surface runoff will continue to report ultimately to the WTMA (where it currently does).	Changes in groundwater quantity because of withdrawals, surface water management or soil compaction.	▪ Not Applicable.	Note Applicable
Surface Water			
▪ Quality: Bernic Lake is the receiving waterbody; surface water quality is regulated under TANCO’s EAL and MDMER. The increased algal standing crops in Bernic Lake are attributed to the increased total phosphorus concentrations in the lake and the increase in phosphorus can be traced to the mine effluent discharge.	Potential contamination of surface water because of spills or accidents.	▪ Follow measures listed in “Spills and Accidents” below to avoid surface water contamination	I
	ROM ore storage pad runoff may be high in TSS or other contaminants	▪ Runoff from the ore storage pad will report to the constructed surface runoff collection ditch and ultimately to the WTMA. ▪ The mined ore is not expected to be acid-generating, based on results of previous testwork.	I
	Increased suspended solids during dredging or excavation of tailings within the WTMA.	▪ Tailings excavation and dredging of tailings within the WTMA will incorporate relevant environmental protection measures to avoid elevated turbidity or other contaminants from being discharged out of the tailings pond and polishing pond. This may include the use of silt curtains, floating baffles, or additional treatment to encourage the settling of solids. ▪ The effluent discharge to Bernic Lake will be managed and monitored to meet EAL and MDMER requirements.	I
	Changes in effluent quality discharged to Bernic Lake	▪ The effluent discharge to Bernic Lake will be managed and monitored to meet regulatory requirements. ▪ The current effluent treatment system will be adjusted to accommodate the additional water requirements and discharges of the New Mill. Testwork has shown positive results with addition of alum to control for TSS. ▪ Recycled water will be treated before and after (as needed) it is drawn into the New Mill to prevent dissolved solids from cycling up in concentration as the water is reused. Additional testwork is underway to confirm the recycled water quality, and to identify treatment options that prevent dissolved solids from being cycled up in concentration. Based on preliminary testwork, and with a conservative 80 percent water recovery (recycling) rate, the phosphorus impact to Bernic Lake associated with the Project is expected to be an order of magnitude lower than current loading.	II
▪ Quantity: Bernic Lake is a second order lake receiving inflows from several small headwater streams, surface runoff and effluent from the mine. There is a single outlet channel, Bernic Creek, which flows to the Bird River.	Changes in surface water drainage patterns.	▪ Surface runoff will report to a new drainage ditch which will be constructed during the site preparation phase.	I
	Due to the increased production capacity, the volume of tailings slurry and effluent discharge will increase accordingly.	▪ Although the tailings volumes will increase, the New Mill is designed to recycle much of the water back into the mill for processing, so the net increase in effluent discharged out of the Main Dam is not expected to be significant. ▪ Testwork and modelling continues to confirm potential changes to the quantity of the mine effluent.	I
	Surface water withdrawals during operation of the New Mill.	▪ TANCO is currently modelling to confirm the future water balance. ▪ Most of the process water needed in the New Mill will be sourced from the Polishing Pond. ▪ Fresh water withdrawals rates are expected to be within TANCO’s *Water Rights Act* License No. 2015-010.	I

Valued Component & Baseline Conditions	Type of Interaction	Recommended Mitigations	Significance Level of Residual Effects
▪ Fish and Fish Habitat: Bernic Lake is the receiving waterbody of effluent and site drainage.	Release of deleterious to downstream fish-bearing waters to reduce habitat quality or affect fish behavior or survival	▪ Follow measures listed in “Spills and Accidents” below to avoid surface water contamination. ▪ There are no project components below the highwater mark of any watercourse proposed.	I
Vegetation			
▪ Vegetation: The project site will have already been cleared during the site preparation phase.	Vegetation clearing.	▪ The project site will have already been cleared during the site preparation phase.	Not Applicable
	Introduction or spread of non-native, noxious or invasive plant species.	▪ The Contractor will develop an Invasive Species and Weed Management Plan as part of the Environmental Protection Plan. ▪ Vehicles and equipment arriving on site should be inspected and cleaned in accordance with applicable best management practices.	I
Wildlife			
▪ Wildlife Habitat: The BLM site is disturbed and the project site will have already been cleared during the site preparation phase.	Habitat loss through vegetation clearing	▪ The project site will have already been cleared during the site preparation phase.	Not Applicable
▪ Wildlife: The BLM site is disturbed and is an active mine site. Several wildlife species are frequently observed within the minesite itself including white tailed deer and red fox.	Wildlife mortality or changes in behavior through noise, light, and traffic changes.	▪ Speed limits on the BLM site will be posted and adhered to. ▪ Follow measures listed in “Noise” above to avoid changes in noise, to limit disturbance to wildlife. ▪ Limit light pollution with directional lighting, limit work to daylight hours, and turn off lights in areas not in use or otherwise requiring lighting. ▪ Employees and Contractors to notify TANCO Site Manager of wildlife sightings and interactions. ▪ Clearing required for this alteration will be scheduled outside of the General Nesting Period for breeding birds, which in this area occurs from April 14 to August 28.	I
	Garbage or waste generated by the project may attract wildlife and lead to wildlife-human interactions.	▪ Feeding, harassment or destruction of any wildlife will be prohibited. Wildlife encountered at or near the project will be allowed to passively disperse without undue harassment. ▪ Waste will be disposed of in appropriate containers and disposed at a licenced facility.	I
Species at Rick and Critical Habitat			
▪ Species at Risk and Critical Habitat: There are no known species at risk or critical habitat at the project site. Caribou sightings have not been reported within the local study area but could potentially occur in the area. TANCO mine staff have not reported caribou on the site or along the mine road.	Habitat loss or changes in survival or behavior (see Wildlife)	▪ Follow measures listed in “Wildlife” and “Vegetation” above to avoid impacts to species at risk.	I
Socio-Economics			
▪ Public Safety and Human Health: Trucks travelling to and from Winnipeg to deliver reagents or transport concentrate will increase traffic volumes on roads that currently experience some heavy vehicles.	Increased traffic volumes associated with delivery of reagents and shipping concentrates	▪ The mine site has been an active mine site for over 90 years and experiences elevated noise and traffic levels. ▪ TANCO will use bulk trucks to reduce the traffic volumes associated with concentrate delivery. ▪ The largest increase in traffic will be restricted to the mine site itself. Additional site signage, turnaround areas, and speed limits will be enforced to protect worker safety. ▪ A traffic management plan is being prepared to mitigate impacts to worker and vehicle safety during operation. ▪ Additional reagent storage on site will reduce the frequency of deliveries to site. ▪ TANCO will work with MTI to develop and implement appropriate traffic management plans, as required.	II
▪ Land and Resource Use: The area hosts a diverse economy, including agriculture, mining, forestry, technology, tourism, and hydro-electric production. The general area brings many vacationers and cottagers in summer months.	Changes in noise and traffic could negatively affect nearby residents (e.g., reduced ‘sense of nature’).	▪ The mine site has been an active mine site for over 90 years and experiences elevated noise and traffic levels. ▪ Follow measures listed in “Climate and Air Quality” above to avoid impacts related to air and noise. ▪ Follow measures listed in “Noise” and “Public Safety and Human Health” for mitigation measures to limit impacts associated with noise and traffic.	I
▪ Protected Areas: The project site is 1 km south of the southern border of the Nopiming Provincial Park.	Changes in noise and traffic could negatively affect nearby protected spaces (e.g., reduced ‘sense of nature’).	▪ Follow measures listed in “Land and Resource Use” to avoid impacts to protected areas.	I
▪ Heritage Resources: There are five archaeological sites within the local study area.	There are no direct impacts to known archaeological features during operation.	▪ Not Applicable	Not Applicable
▪ Indigenous Communities: There are four nearby First Nation communities, with Sagkeeng First Nation being the most actively engaged in the project.	The local study area, including Bernic Lake, has not been a site of traditional resource harvest during the period of mine operation.	▪ TANCO has actively engaged with nearby Indigenous communities to communicate the project, and to solicit concerns or feedback to improve their design and mitigation measures. ▪ TANCO will continue to work with Nations to assist in identifying opportunities and removing barriers of employment.	I

Valued Component & Baseline Conditions	Type of Interaction	Recommended Mitigations	Significance Level of Residual Effects
Spills and Accidents			
	Spills or discharge of contaminants (such as reagents or fuels) or sediment-laden water may affect surface water, groundwater, or soil quality.	▪ The Contractor will have a Spill Response Plan. ▪ All equipment should be in good operating condition, washed, free of leaks and excess oil, prior to arriving on site. ▪ Appropriately stocked spill kits should be available and on all mobile equipment. Trained personnel should be available to deploy spill kits. ▪ Refueling should occur in designated areas with a spill containment kit available. ▪ Sump pumps will be constructed near each reagent storage tanks to contain spills. ▪ Hazardous materials should be labeled and disposed of according to applicable regulations. ▪ TANCO will update their Emergency Response Plan to include the New Mill and its associated activities. ▪ All spills will be reported to the Manitoba Conservation Emergency Response Team at (204) 944-4888.	I

6.0 INDIGENOUS AND PUBLIC ENGAGEMENT

TANCO has been actively engaging key stakeholders and nearby Indigenous communities to inform them of this project. A summary of the outreach activities is provided below. TANCO is committed to continuing to engage with Indigenous communities and public stakeholders and sharing information related to this project and their ongoing operations and collecting feedback for consideration in design of the Project and ongoing operations.

6.1 Indigenous Communities

TANCO is committed to maintaining and improving its relationship and communications with surrounding stakeholders and communities. TANCO has met recently with Sagkeeng First Nation, Brokenhead Ojibway Nation, Roseau River First Nation, and Manitoba Métis Federation to provide an operational update as well as information on potential future plans (including the Tailings Reprocessing Facility Project). Sagkeeng First Nation representatives have also visited the BLM site and had the opportunity to discuss the operation with TANCO's leadership team as well as its consultant team. TANCO has made attempts to meet with the neighboring First Nations of Hollow Water and Black River and will continue to do so.

6.2 Key Stakeholders

In addition to Indigenous communities, communications have been ongoing between TANCO and various provincial government, rural municipalities, townships, and interest groups within the region. Site tours have been arranged for many of these organizations to see firsthand TANCO's commitment to safety, well being, and the environment. TANCO continues to engage with these and other key stakeholders.

7.0 MONITORING AND MANAGEMENT PLANS

TANCO will adapt its current monitoring plans, as needed, to include the New Mill, including:

- **National Pollutant Release Inventory**: Annual monitoring and reporting of several air emission parameters, including formic acid, sulphuric acid, greenhouse gases, particulate matter and road dust.
- **Noise Monitoring**: Noise levels are regularly monitored inside the operating facilities as required by the *Manitoba Workplace Safety and Health Act and Regulations*. Employees have an annual audiogram, with results submitted to the Manitoba Workplace Safety and Health Division.
- **Effluent Monitoring**: Effluent from the West Discharge will be monitored to meet the requirements of their *Environment Act* licence and the MDMER. There are no proposed changes to this monitoring as a result of this alteration.
- **Environmental Effects Monitoring**: Water quality and biological monitoring of Bernic Lake and the reference lake will continue to be monitored to meet the requirements of the MDMER. There are no proposed changes to this monitoring because of this alteration.

Additional monitoring programs may be designed and implemented as project design is completed.

In addition to the above monitoring plans, TANCO has robust Safety Health and Environment policies and procedures that list required mitigation measures to protect environmental features. For example:

- **Heritage Resources Protection Plan**: The Heritage Resource Protection Plan will include preventative actions that all mangers, employees and contractors must follow to limit damage or destruction of heritage resources accidently found during work on the site.
- **Contingency and Emergency Response Plans**: TANCO maintains a standard of emergency preparedness to provide timely and coordinated response to an emergency, to minimize the effects of the emergency or disaster on TANCO employees, the public, the minesite, and the environment. TANCO updates and tests its Emergency Response Plan (ERP) annually and recently prepared a new Environmental Emergency (E2) Plan to conform to the latest regulatory requirements implemented in 2019. These plans will be updated, as needed, to include the New Mill and ancillary infrastructure.
- **Dredging Management Plan**: Updates to the existing Operations procedures will be made to include a monitoring plan and mitigation plan to control/settle suspended solids that may result from tailings extraction.
- **Traffic Management Plan**: To mitigate risks to traffic and pedestrian safety on the mine site associated with increases in traffic related to concentrate delivery and mined ore movement, TANCO is further developing a traffic management plan. TANCO will also collaborate with Manitoba Transportation and Infrastructure to mitigate adverse impacts related to increased traffic on provincial roads as necessary.
- **Closure Plan**: The BLM Mine Closure Plan will be updated to include the new mill and ancillary facilities as outlined in this document. Progressive rehabilitation measures (e.g., contouring and revegetation) are considered and implemented by TANCO, for areas or infrastructure that are no longer in use.

8.0 SUMMARY

Advancement of this project will allow TANCO to leverage their existing operational knowledge to create a more modern facility with improvements in operational efficiencies. Although the reprocessing of tailings will not significantly reduce the volume of tailings stored on site, extraction of the maximum value of what would otherwise be considered waste material will create several socio-economic benefits in the region, including increased collaboration with Indigenous communities and local stakeholders resulting in job creation, training, and other business opportunities.

Detailed design of the New Mill is underway. Known project details have been presented in this document and considered in the effects assessment for pre-submission review. Components or activities that require additional information to confirm the anticipated impacts have been noted (e.g., water treatment studies). The results of these studies, including the assessment of impacts and recommended mitigation measures, will be shared with the regulators as an addendum to this submission.

9.0 CLOSURE

We trust this document meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.

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Attachment

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APPENDIX A

LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOENVIRONMENTAL

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, is in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH's professional work product and shall remain the copyright property of TETRA TECH.

The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by third parties other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary exploration, investigation, and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.

APPENDIX B

TANCO'S TAILINGS REPROCESSING FACILITY PROJECT – WORK PERMIT APPLICATION, PROJECT DESCRIPTION (JULY 2023)

Tantalum Mining Corporation of Canada – Bernic Lake Mine

Tailings Reprocessing Facility Project Work Permit Application – Project Description

Date:

July 17, 2023

July 17, 2023

Sent via online submission by email to:

Mining Permit Office
Mines Branch
Resource Development
360-1395 Ellice Avenue
Winnipeg, MB.
R3G 3P2

Dear Madame or Sir:

Re: Tantalum Mining Corporation of Canada Bernic Lake Mine Tailings Reprocessing Facility Project Work Permit Application Project Description

Tantalum Mining Corporation of Canada (TANCO) has prepared this letter to provide a project description and proposed work plan for the Tailings Reprocessing Facility Project at its Bernic Lake Mine (BLM). The work permit application pertains to clearing lands prior to the construction of the new Flotation Mill. TANCO is submitting this application so that the required approvals for tree clearing and general civil fill for leveling of the lands can be obtained from Manitoba Lands, Mines, Heritage, Conservation and Forestry Branches while the necessary approvals are obtained from Environmental Approvals Branch for the construction, operation and decommissioning of the proposed Flotation Mill.

If you have any questions, or require further information on the report, please do not hesitate to contact me.

Sincerely,

[redacted] Date: July 17, 2023

Joey Champagne
Operations Manager
North America Business Division
Tantalum Mining Corporation of Canada Limited

1. Project Description

In 2016, the TANCO BLM completed an internal resource estimate of tailings stored in its West Tailings Management Area (TMA) which identified that the 2.86 million tonnes of tailings contained approximately 1.06% lithium oxide, 0.54% cesium oxide and 0.44% rubidium oxide. Prefeasibility studies confirmed that reprocessing of the existing tailings based on improved recovery rates was economically viable and TANCO began to move forward with plans to reprocess existing tailings.

The ability to recover the remaining lithium, cesium and rubidium reserves in tailings is dependent on the construction of a new Flotation Mill at the BLM. The new Mill will allow TANCO to process an additional 3,000 tonnes per day (tpd) of tailings reclaimed from the West TMA or ore supplied by the underground mine at the facility. There is also some ancillary infrastructure that is required for the operation of the Flotation Mill such as an access road, parking lot, electrical substation, thickener tanks and reagent storage building which will be located within footprint of the Mill (Figure 1). There are also supporting infrastructure for the project located within the boundaries of the West TMA which includes a Dry Tailings Sump Area used to repulp dry tailings and a dredge used to recover wet tailings from the Tailings Pond (Figure 1). The West TMA Pump House will also be upgraded to transport reclaimed tailings from the West TMA to the Flotation Mill through HDPE pipelines.

2. Project Schedule

The predevelopment stage beginning in the summer of 2023 involves relocating existing tailings within the West TMA so that existing economically viable tailings do not become contaminated with spent tailings once reprocessing begins in the new Mill. Clearing and leveling of the land required for the construction of the new Mill and ancillary infrastructure will take place later in 2023 after approvals have been obtained for the construction of the Flotation Mill which has a tentative completion date of early 2024. The operational phase of the project which involves tailings extraction and reprocessing is expected to start in 2024 and continue through 3 stages until 2029 until all existing tailings in the West TMA have been reprocessed.

3. Permit Application

The TANCO BLM is submitting an application for a work permit for tree clearing and general civil cut and fill for leveling of the area required for the construction of the new Flotation Mill and ancillary infrastructure located immediately adjacent to the Mill (Figure 2). No land clearing is required for construction of infrastructure contained within the footprint of the West TMA.

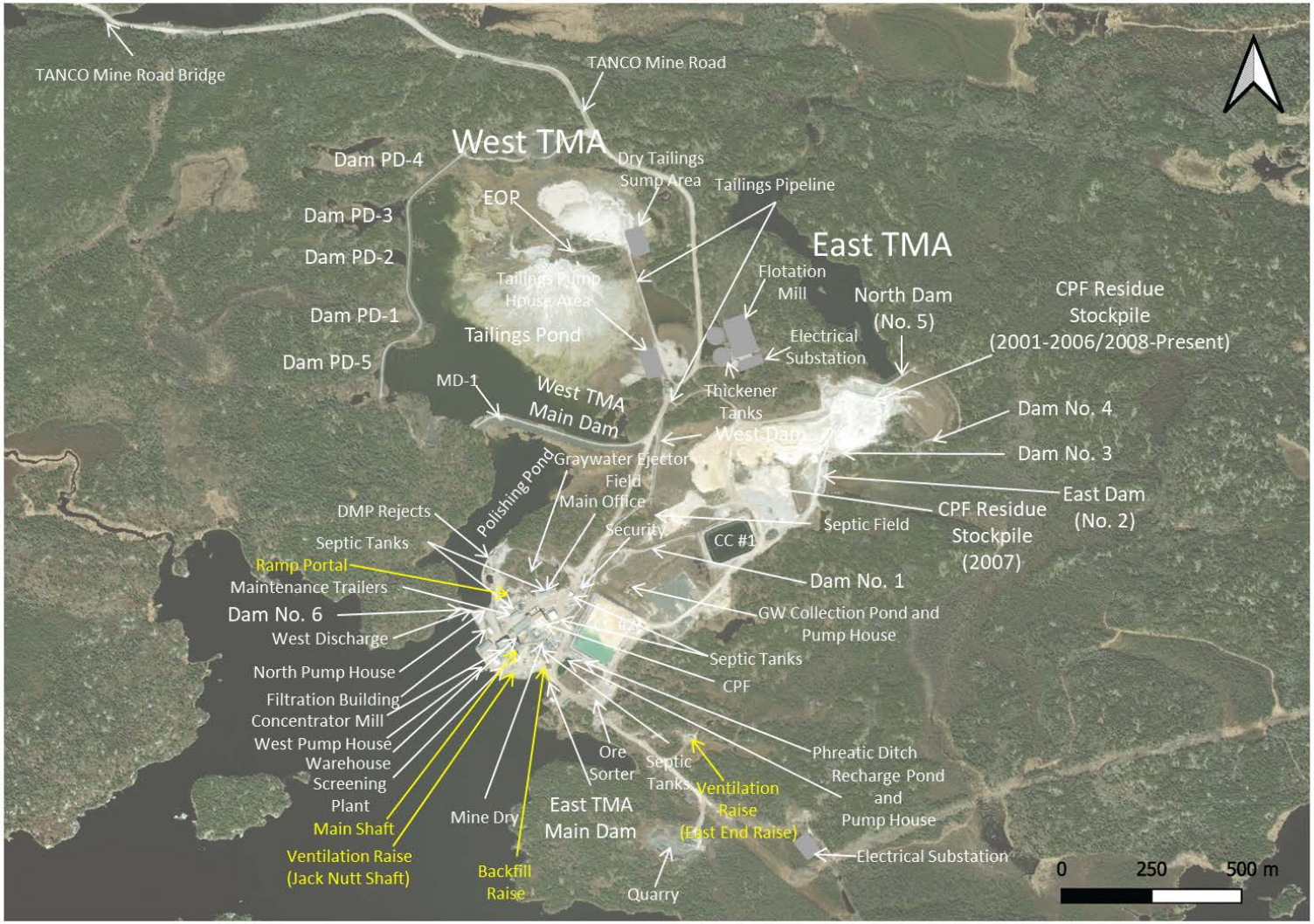

Figure 1 TANCO Bernic Lake Mine Site Plan.

Figure 2 Surface area requiring clearing for the new Mill.

The area to be cleared for the new Mill and infrastructure are located on Crown Land entirely within the boundary of surface lease SL-3 which TANCO currently holds (Figure 3). The area is already partially subjected to mining activities as a portion of the site is where the Mine's Waste Transfer Station is currently located. This infrastructure will have to be relocated as part of the proposed alteration at the Facility.

The total surface area to be cleared is approximately 25.1 ha. This includes area already cleared for current access roads and the Waste Transfer Station. The vegetation in the area is a mix of grasslands, shrubland and woodlands. There is a small pond that has formed between current access roads that will remain and be utilized to collect surface water runoff. The land clearing portion of the project is expected to take place after the general nesting period for breeding birds which in this area occurs from April 14 to August 28 (Manitoba Breeding Bird Atlas 2010; MCDC 2021). Timber and material removed as part of the work permit will be offered up to TANCO Employee's for their personal use or stacked in piles and left on the site.

The proposed work will have some impacts through the loss of vegetated habitat and through changes in behavior of wildlife caused by increases in noise, light and traffic in the immediate area surrounding the project site. The area to be cleared is located adjacent to current mine operations and changes in wildlife behavior are likely already being observed in the proposed project site; however, the zone of influence may be extended further into the surrounding area. The site for the Flotation Mill was selected as it borders the Mine's current infrastructure and will not result in any additional habitat fragmentation. The pond that will be used for surface water collection is a manmade formation and is not considered fish habitat. It is anticipated that no species at risk or critical habitat will be affected by the development as there have been no records of species at risk observed within the BLM.

The proposed work is not expected to have any additional negative sociological impacts because of the remote location of the project and its close proximity to current mining operations. There are significant positive sociological benefits associated with the overall project as the construction and operation of the Tailings Reprocessing Facility is expected to substantially increase the size of the workforce and also extend mine life by 5 years above the current forecasted life expectancy.

The TANCO BLM is located in Treaty Area 3 (1873) within the Unextinguished Aboriginal Title Claim Area of Sagkeeng First Nation. Black River, Brokenhead and Hollow Water First Nations are also in the general vicinity of the Mine. TANCO has been in communication with local First Nations regarding planned alterations at the BLM.

There are no Heritage Resources in the immediate work area and the TANCO BLM will have a Heritage Resource Protection Plan (HRPP) in place prior to commencement of the prosed work. The HRPP will be reviewed daily at morning safety meetings to ensure that all TANCO employees and contractors working of the project will be familiar with the protocols outlined in the plan.

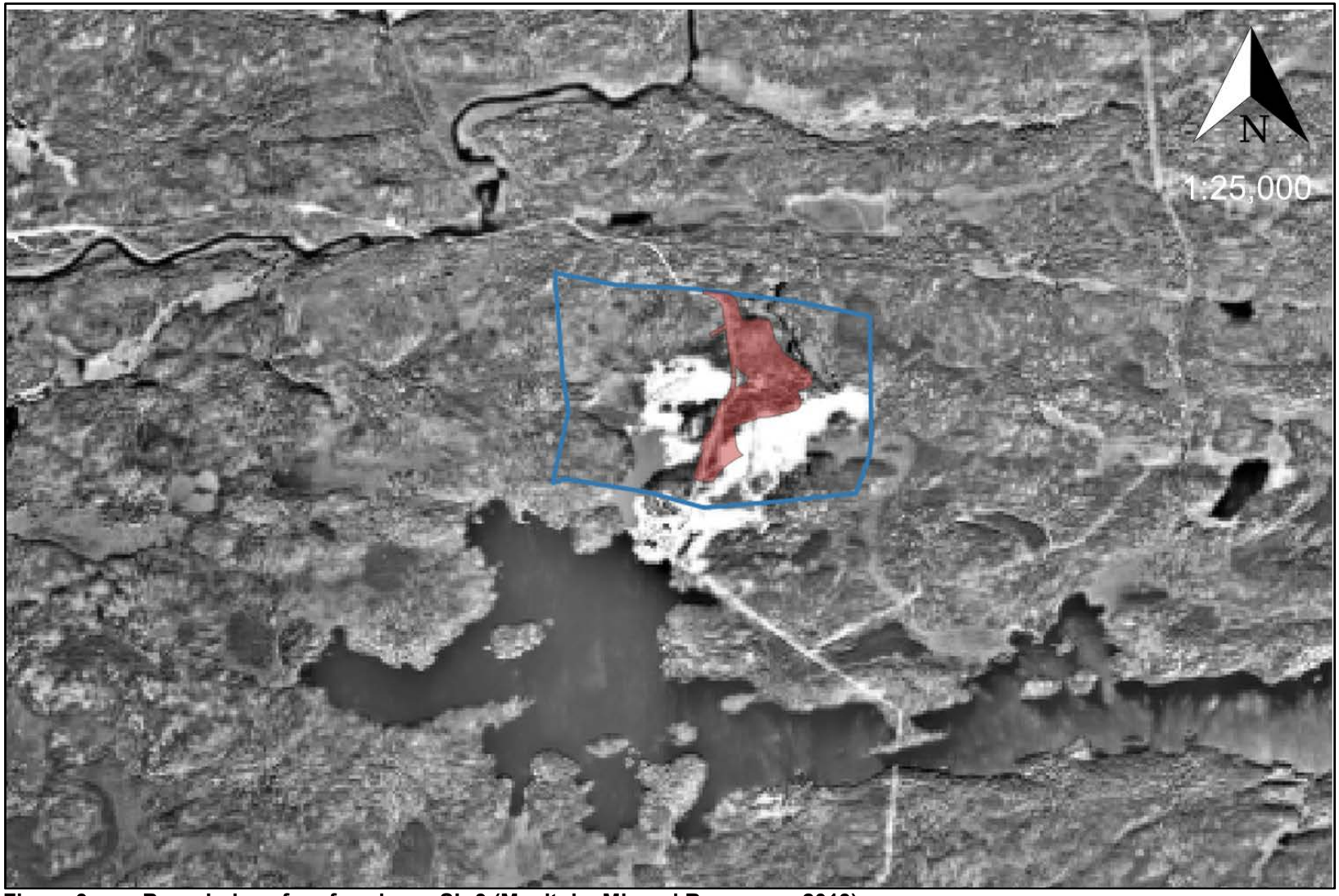

Figure 3 Boundaries of surface lease SL-3 (Manitoba Mineral Resources 2013).

References

Manitoba Breeding Bird Atlas. 2010. Manitoba Breeding bird Atlas – Safe Dates. Retrieved on May 30, 2023, from https://www.birdatlas.mb.ca/download/safedates.pdf .

Manitoba Conservation Data Centre Wildlife, Fisheries, and Enforcement Branch (MCDC). 2021. Recommended development distances and restricted activity periods for birds by wildlife feature type. Retrieved May 30, 2023, from https://www.gov.mb.ca/nrnd/fish-wildlife/cdc/pubs/mbcdc-bird-setbacks-nov2021.pdf .

Manitoba Mineral Resources. 2013 Mining and Quarrying; in Map Gallery – Mineral Depositions Maps, Manitoba Mineral Resources, URL https://rdmaps.gov.mb.ca/Html5Viewer/index.html?viewer=IMaQs_Mining.iMaQs_Mining&locale=en-US&appAcronym=imaqs .