ENVIRONMENTAL IMPACT STATEMENT SUMMARY

1.0 INTRODUCTION AND PROJECT OVERVIEW

Treasury Metals Incorporated (Treasury Metals) is proposing to develop the Goliath Gold Project (the Project) and associated infrastructure near Dryden, Ontario. Treasury has been exploring the Project site since 2008 and has completed more than 460 diamond drill holes totalling approximately 135,000 metres (m). Beginning in 2008, Treasury Metals commenced extensive environmental, geotechnical, metallurgical, engineering, socio-economic, and logistical studies in order to advance the Project towards commissioning and operation.

Treasury Metals submitted a Project Description to the Canadian Environmental Assessment Agency (the Agency) on November 26, 2012 and on January 18, 2013 received draft guidelines for the preparation of an Environmental Impact Statement (EIS) for an environmental assessment conducted pursuant to the *Canadian Environmental Assessment Act, 2012*. The EIS guidelines were issued as final on February 21, 2013. In April of 2015 the Agency accepted Treasury Metals' EIS as meeting conformity and the EIS was moved into the technical review and public comment period. As part of the Information Request (IR) process the agency requested a revised EIS.

Treasury Metals submitted a revised EIS to the Agency on September 5, 2017. Following review of the September 2017 revised EIS, the Agency determined that the revised EIS was still deficient in a number of areas, and Treasury Metals was directed to prepare and resubmit a further revision to the EIS. In particular, the Agency determined that the newly revised EIS, as per this document, must include:

- A fully revised EIS that includes insertions or changes made through the EIS main text, Addenda, and the EIS Summary;
- A revised Aboriginal Engagement Report; and
- A revised IR#1 response package that addresses the original IR#1 by correcting all identified deficiencies.

This revised EIS was prepared in accordance with the Agency's request, including additional efforts to incorporate Aboriginal traditional knowledge, a stronger focus on describing the potential for the Project to affect the traditional use of lands and resources by Aboriginal peoples, and the completion of further technical work required as part of the IR responses. A key requirement for revising the EIS document was ongoing engagement with the Indigenous communities potentially affected by the Project.

The Proponent

Treasury Metals Incorporated is the sole Project Proponent and holds a 100% interest in the exploration mining leases that comprise the Project property. Treasury Metals is a TSX-listed (TML) gold exploration and development company, focused on northwestern Ontario mineral

properties. Treasury Metals maintains a corporate and management structure in line with similar publically-traded companies. Directors and officers of the company as disclosed annually in regulatory filings and identified on the Company website. The head office for Treasury Metals is in Toronto while the majority of Project activities are conducted at the Project site just north of Wabigoon and east of Dryden (Table 1.1-1).

Contacts for the Project are:

Mr. Bob MacDonald,
Vice President, Goliath Gold Project
rmacdonald@treasurymetals.com

Mr. Mark Wheeler,
Director, Projects
mark@treasurymetals.com

Mr. Mac Potter,
Environmental Superintendent
mac@treasurymetals.com

Table 1.1-1: Proponent Contact Information

Corporate Contact Information	Mark Wheeler, Director, Projects Treasury Metals Inc. Toronto Office The Exchange Tower 130 King Street West, Suite 3680 P.O. Box 99 Toronto, Ontario, M5X 1B1, Canada T: (416) 214-4654 F: (416) 599-4959
Project Contact Information	Bob MacDonald, Vice President - Goliath Gold Project Treasury Metals Inc. Project Office P.O. Box 783 Dryden, Ontario, P8N 2Z4, Canada T: (807) 938-6961 F: (807) 938-6499

Treasury Metals is a mineral exploration company incorporated in the province of Ontario, Canada, and is listed on the Toronto Stock Exchange (TSX) under the symbol "TML". Treasury Metals was originally a subsidiary of Laramide Resources Ltd. (Laramide) and became listed as a public company on the TSX as of August 19, 2008. It is focused on the acquisition and development of precious metal assets in Canada, with a focus on gold.

As a public company, a number of regulatory requirements for disclosure controls and corporate governance must be met. The Treasury Metals board of directors ensures adherence to published policies, including:

- Code of Business Conduct and Ethics;
- Corporate Disclosure, Confidentiality and Insider Trading Policy;
- Corporate Governance Policy;
- Drug and Alcohol Policy;
- Health, Safety, Environment, and Sustainability Policy;
- Whistleblower Policy; and
- Workplace Violence and Harassment Policy.

1.1.1 Occupational Health and Safety Plan

Treasury Metals is fully committed to providing and maintaining a safe work environment and to ensure that every effort is taken to convey to all employees and contractors that “nothing we do is worth getting hurt over”. Treasury Metals has developed and implemented a Health and Safety Policy at the Project site with the goal of achieving a zero recordable injury rate (Appendix Z). This policy is the responsibility of the Vice President, Goliath Gold Project. The policy covers all current activities at the Project site and is reviewed and updated regularly to include any additional activities. The policy will be updated as the Project progresses to ensure compliance with all current or future regulatory standards.

1.1.2 Aboriginal Engagement and Partnering

The Project is located within the traditional lands of several Indigenous communities, of which the Wabigoon Lake Ojibway Nation, the Eagle Lake First Nation, and the Aboriginal People of Wabigoon are the closest Indigenous communities to the Project and Metis people are known to live across the region. Aboriginal peoples live, work, hunt, fish, trap and harvest throughout their lands, and have a strong cultural and spiritual connection to the land that extends back for thousands of years. In view of this connection, Treasury Metals has engaged and continues to engage with its Aboriginal partners in an effort to:

- Share information;
- Respond to environmental concerns;
- Promote cultural awareness;
- Develop Memoranda of Understandings (or equivalent) with the primarily affected communities;
- Promote economic opportunities for Aboriginal peoples and communities;
- Build trust through mutual respect and following through on commitments; and
- Involve the affected communities in ongoing environmental monitoring, management and follow-up, programs.

1.1.3 Environmental Management Plan

As a corporation, Treasury Metals and all its employees are fully committed to developing the Project in an environmentally responsible manner and incorporating the best environmental practices available into the corporate Environmental Policy. The policy is managed by the Vice President, Goliath Gold Project for the Company. In addition to the policy, Treasury Metals is currently developing an Environmental Management Plan (EMP) for the Project which will incorporate the results of the environmental assessment and permitting processes. Treasury Metals will also develop a series of specific management plans under the framework of the EMP to address specific issues or aspects of the environment. The EMP and the individual management plans to be implemented at the Goliath Gold Project are discussed in Section 12.

1.2 Project Overview

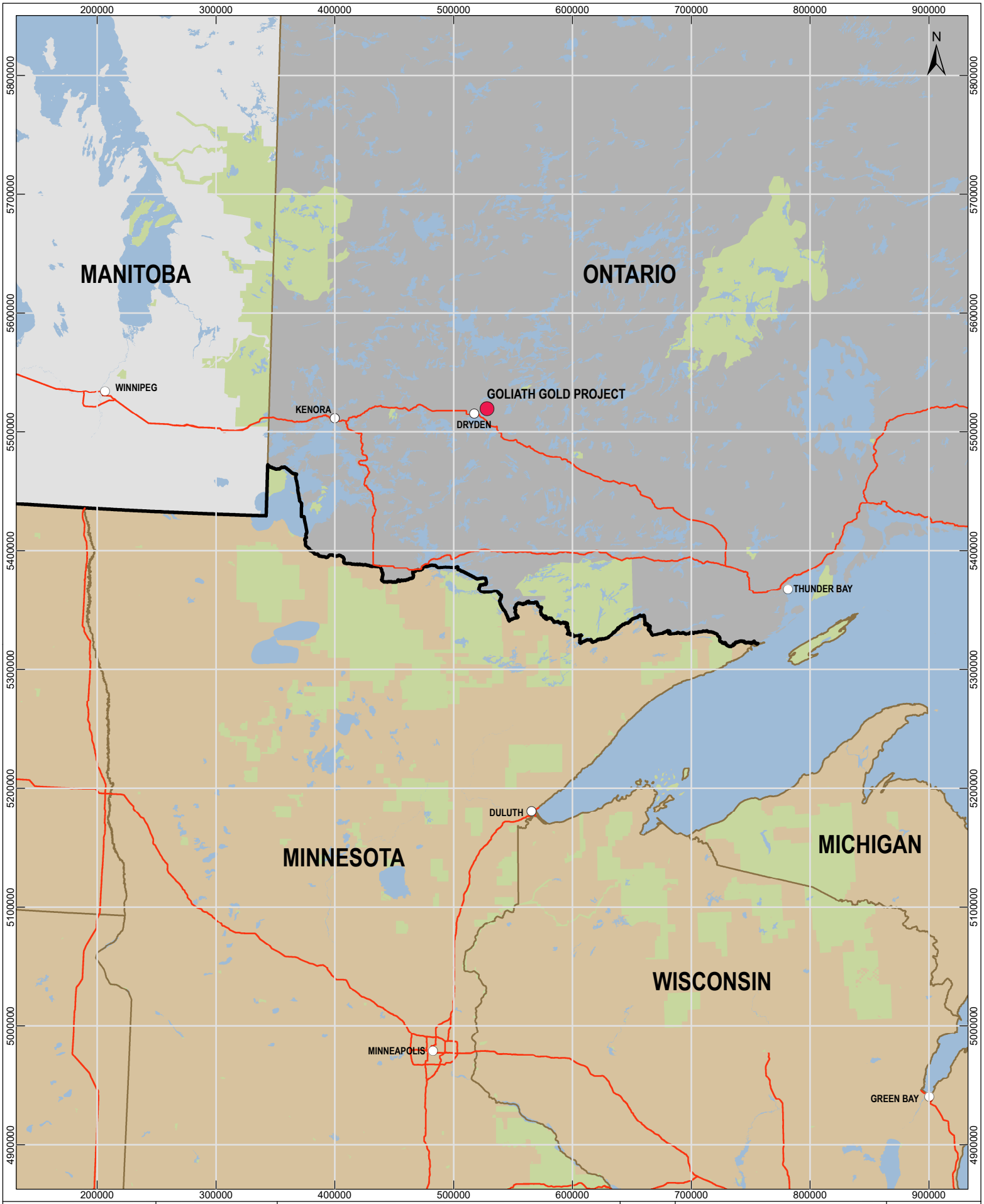
1.2.1 Project Location

The Project is located within with the Kenora Mining Division in northwestern Ontario (Figure 1.2.1-1). The Project site is approximately 4 kilometres (km) northwest of the village of Wabigoon, 20 km east of Dryden and 2 km north of the Trans-Canada Highway 17 and within the Hartman and Zealand townships (Figure 1.2.1-2). Access to the Project property is via existing gravel roads managed through the Local Services Board: Tree Nursery Road and Anderson Road which originates at Highway 17, west of the village of Wabigoon.

The Project is located within the area covered by Treaty #3. The Treaty #3 area includes approximately 14,245,000 hectares (ha) in Ontario ranging from the vicinity of Upsala in the east, following the Canada-United States border in the south, and extending past the Ontario-Manitoba border in the west (Figure 1.2.1-3). The Project is also located within an area identified by the Métis Nation of Ontario as the Treaty 3/Lake of the Woods/Lac Seul/Rainy River/Rainy Lake traditional harvesting territories, also named Region 1. Treaty #3 includes 28 First Nations communities and a number of villages and towns including Wabigoon, Dryden, Eagle River, Vermillion Bay, Sioux Lookout, Atikokan, Fort Frances, and Kenora. The relative locations of the closest First Nations communities are shown on Figure 1.2.1-4.

1.2.2 Project History

The Project is an amalgamation of two exploration properties that are now consolidated: the larger Thunder Lake Property purchased from Teck and Corona and the Laramide Property transferred to Treasury Metals from Laramide Resources Limited upon the Treasury Metals' spin-out in 2008. Laramide continues to hold an 8% interest in Treasury Metals. Treasury Metals took ownership in 2008 and has continued exploration drilling through to present day. Treasury Metals has expanded the Project through a combination of staking and acquisition of mining claims, acquisition of strategic properties, and new option agreements.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

Location of the Goliath Gold Project (Regional Scale)

Figure 1.2.1-1 | REV.01

TREASURY METALS Inc.

DESIGN:	MP	31/07/2017
GIS:	MP	31/07/2017
CHECK:	MW	31/07/2017
REVIEW:	DB	31/07/2017

Canada
Ontario
United States
Population Center
Highway/Interstate
Provincial/State Line
International Boundary

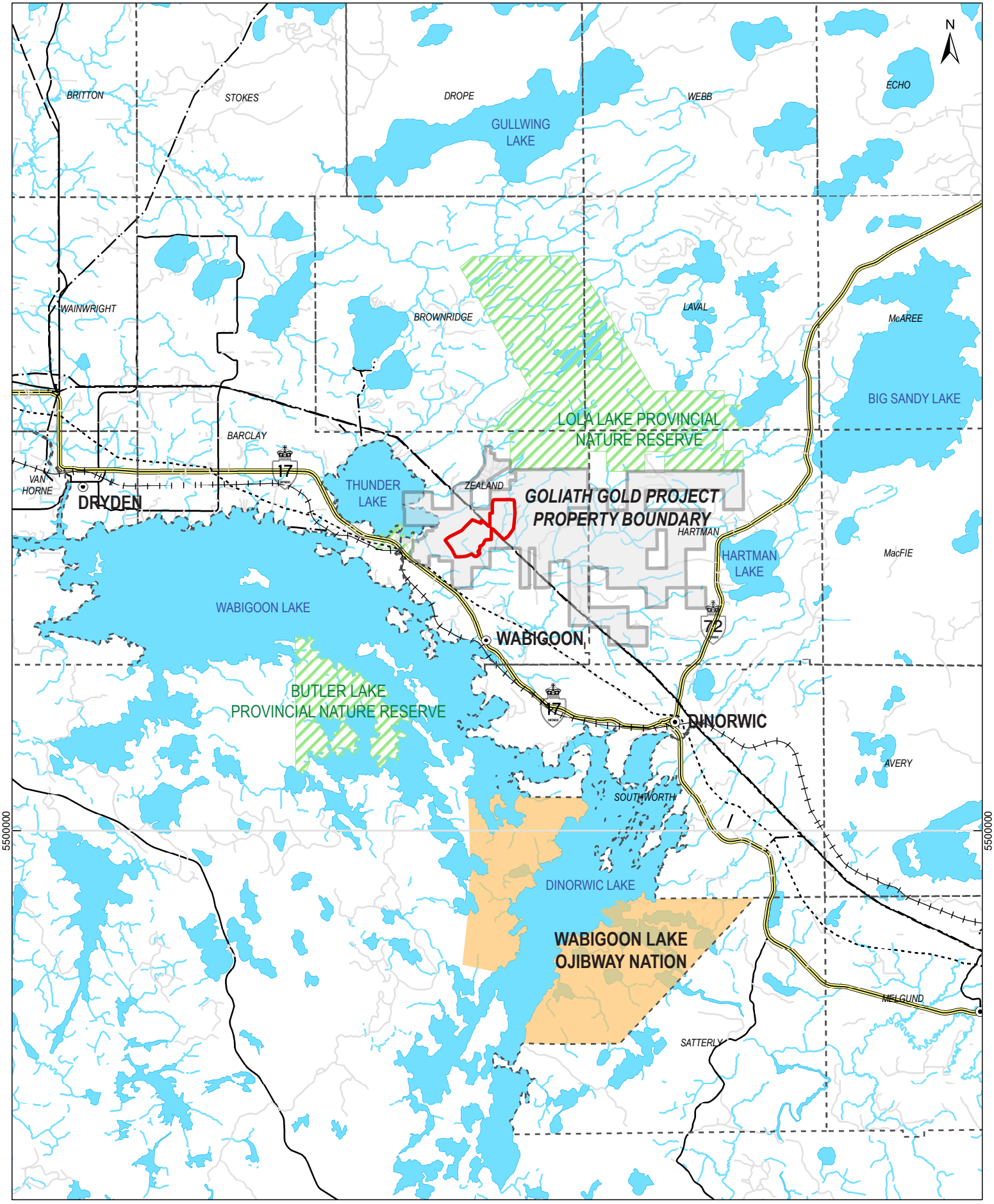
SCALE 1:4,000,000

Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983

0 100 200
Kilometers

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
All details preliminary and subject to change as engineering designs are updated.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

Location of the Goliath Gold Project (Local Scale)

Figure 1.2.1-2 | REV.02

TREASURY METALS Inc.

DESIGN:	MP	17/08/2017
GIS:	MP	17/08/2017
CHECK:	MW	17/08/2017
REVIEW:	MW	17/08/2017

- Operations Area
- Property Boundary
- Townships
- Indigenous Communities
- Provincial Parks
- Populated Area
- Waterbody
- Watercourse
- Railway
- Arterial Roadway
- Expressway / Highway
- Resource / Recreation

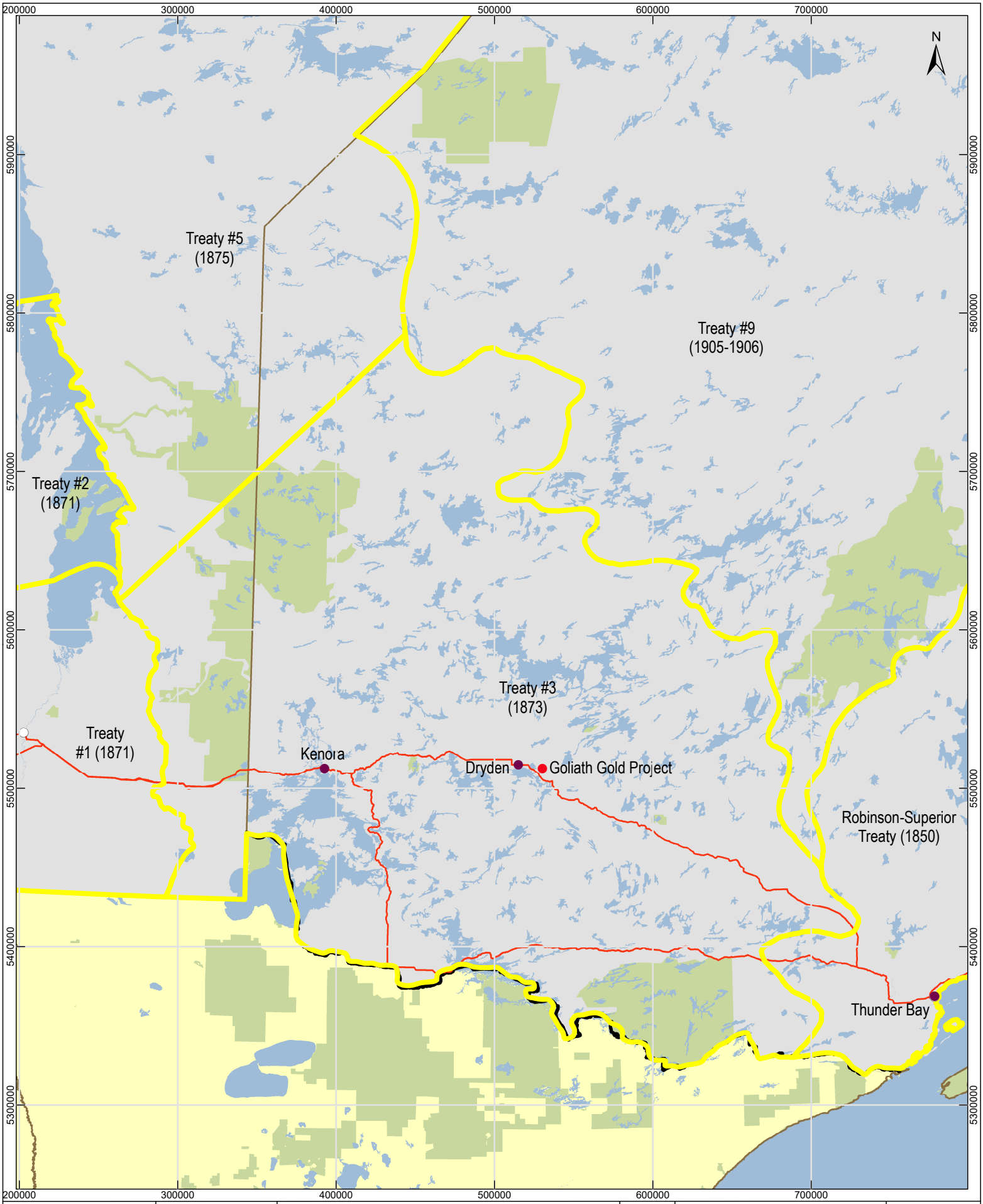
SCALE 1:200,000

Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983

0 1 2 3 4 5 6 7 8 9 10
Kilometers

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
All details preliminary and subject to change as engineering designs are updated.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

Treaty Areas - Regional Scale

Figure 1.2.1-3 | REV.01

TREASURY METALS Inc.

DESIGN:	MP	18/08/2017
GIS:	MP	18/08/2017
CHECK:	MW	18/08/2017
REVIEW:	MW	18/08/2017

Treaty Areas
Canada
United States
Population Center
Highways

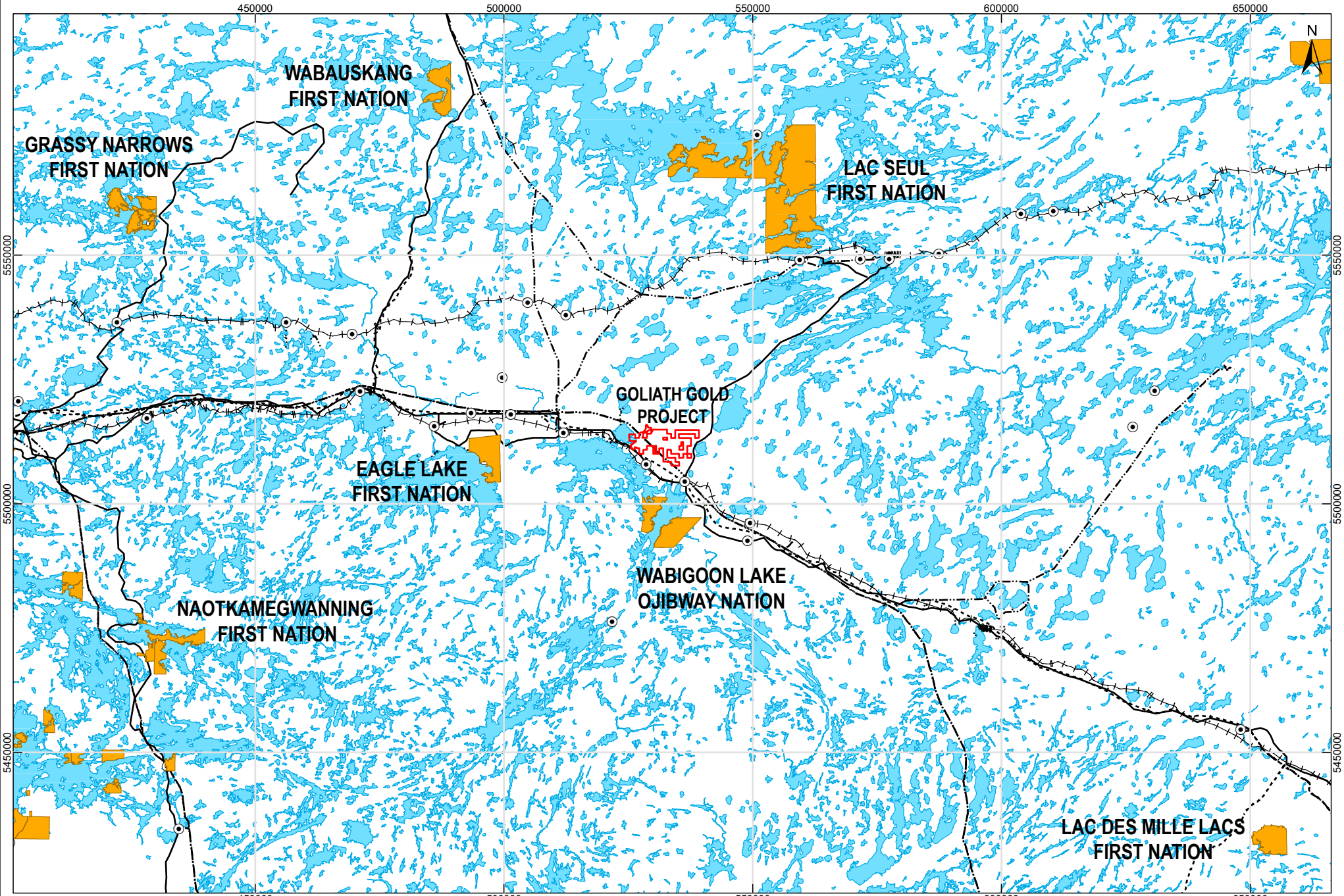
SCALE 1:3,000,000

Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983

0 100
Kilometers

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
All details preliminary and subject to change as engineering designs are updated.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

Indigenous Communities

Figure 1.2.1-4 | REV.02

TREASURY METALS Inc.

DESIGN: MP 18/08/2017
GIS: MP 18/08/2017
CHECK: MW 18/08/2017
REVIEW: MW 18/08/2017

Indigenous Communities
Goliath Property Boundary
Populated Area
Hydro Line
Natural Gas Pipeline
Railway
Highway
Waterbody

SCALE 1:1,000,000

Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983

0 20 40 60
Kilometers

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
All details preliminary and subject to change as engineering designs are updated.

1.2.3 Land Ownership

The Project property was formed when the Thunder Lake and Laramide exploration properties were combined under Treasury Metals. The Project is located within the Hartman and Zealand Townships in the Kenora Mining Division. The property has a total area of 4,981 ha and is comprised of 120 unpatented mining claims on 3,808 ha, four mining leases for 359 ha, and 20 patented mining claims on 912 ha (Figure 1.2.3-1). Treasury Metals holds the entire property subject to specific royalties to 13 of the patented land parcels. These specific royalties are generally in the form of a Net Smelter Royalty (NSR), with some of the patented land parcels receiving an advanced royalty.

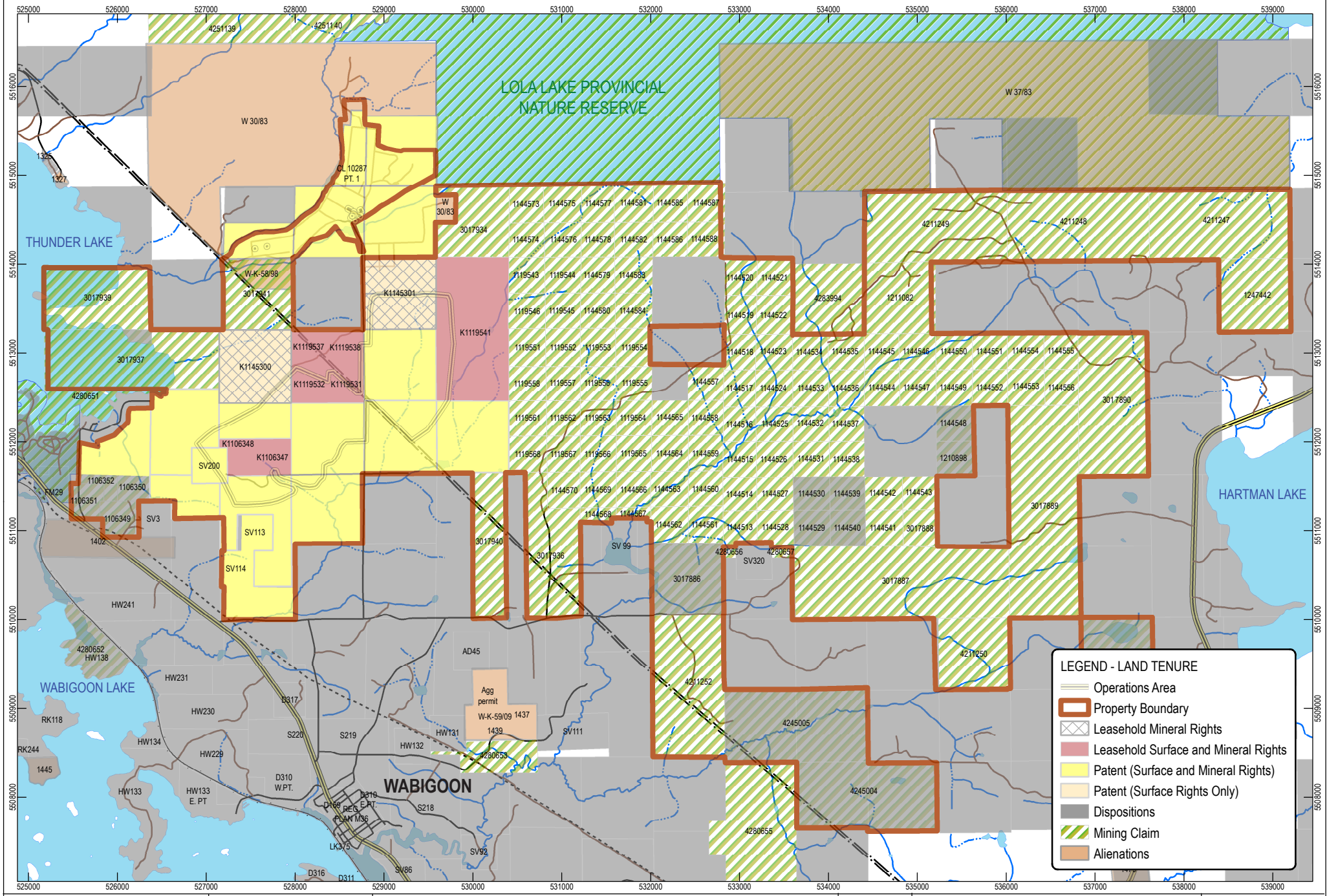
Treasury Metals also owns the former Ontario Ministry of Natural Resources and Forestry (MNRF) tree nursery property. Treasury Metals currently holds 742 ha or 15% of surface rights within the Property including the MNRF tree nursery property. The private holdings are centered on the infrastructure required for the Project.

1.2.4 Current Land Uses

The Project area exhibits rolling terrain, and is drained principally by Blackwater Creek and its associated minor tributaries. The Project site is located in a low density rural area within the Hartman and Zealand Townships. There is some limited local agriculture focused on cattle, as well as logging activities in the area. Immediate adjacent areas show mainly second growth poplar-dominated forests and wetlands.

Regionally the major city closest to the Project is Thunder Bay (population 108,359), which is located approximately 335 km east-southeast of the site. The closest communities and local populations to the Project are located in Wabigoon (population 430; 4 km southwest of site), and Dryden (population 7,500; 20 km east of site). Of local significance is the population proximal to site located on Thunder Lake Road, East Thunder Lake Road, Tree Nursery Road, and Anderson Road (Figures 1.2.1-1 and 1.2.1-2).

Wabigoon Lake Ojibway Nation, Eagle Lake First Nation and the Aboriginal Peoples of Wabigoon are the closest indigenous communities to the Project site (see Figure 1.2.1-4). Other Indigenous communities present in the area include: Wabauskang First Nation, Lac Seul First Nation, Whitefish Bay First Nation (Naotkamegwanning First Nation), Grassy Narrows First Nation, and Lac des Mille Lacs First Nation. The traditional lands of a number of these communities are known to overlap with the Project site and its immediate environs and downstream waters. Traditional activities practiced by members of these communities and by members of the Métis Nation of Ontario in the general region overlapping with and surrounding the Project site include travel, fishing, hunting, trapping, gathering, and other cultural pursuits and activities connected to the land.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

Claims and Dispositions
Goliath Gold Project

Figure 1.2.3-1 | REV.04

TREASURY METALS Inc.

DESIGN:	MP	28/03/2018
GIS:	MP	28/03/2018
CHECK:	MW	28/03/2018
REVIEW:	MW	28/03/2018

Operations Area
Hydro Line
Natural Gas Pipeline
Railway
Expressway / Highway
Local Road
Resource / Recreation Road
Provincial Parks
Waterbody
Intermittent Watercourse
Permanent Watercourse

SCALE 1:55,000

N

0 3,000
Meters

Base Data:
Treasury Metals Inc., LIO Database
Projection:
NAD83 UTM Zone 15N
Notes:
All details preliminary and subject to change as Project develops

1.3 Need for the Project

The purpose of the Project is to extract gold for sale on the open market by mining gold-bearing ore and producing doré product at an onsite gold processing facility. Many in the management and staff at Treasury Metals currently live in the Dryden area and bring a personal interest to returning development and employment to northern Ontario and the regional area. The forest industry has historically been the primary economic influence for the region but in recent years northern Ontario has seen an economic downturn as the forestry industry continues to contract. Dryden and many other northern Ontario communities have seen operational reductions or outright closures of pulp and paper mills, associated facilities, and service industries. These changes have had a direct and negative impact on the socio-economic conditions of many communities across northern Ontario. The Project will bring economic diversity to northern Ontario and provide skilled jobs for the local workforce.

1.4 Project Timeline

Treasury Metals has been developing the Goliath Gold Project since Treasury Metals' inception in 2008. Technical programs have been ongoing for a number of years that include several exploration drill programs, several N.I. 43-101 compliant resource estimates and three Preliminary Economic Assessments that show the Project has economic viability.

A Project Description ("PD") for the Goliath Gold Project was submitted on November 27, 2012 and accepted on November 30, 2012 by the federal government's Canadian Environmental Assessment Agency (the Agency). The Treasury Metals' PD initiated the official permitting and approvals process for mine development. This milestone marked a significant advancement in the development of the Project and officially began the federal government's 365-day legislated period for the completion of the Environmental Assessment ("EA") by the Agency. The 365-day review and approval window includes 45 days the Agency used to determine that an EA for the Goliath Project was required. The Agency used the PD to develop the guidelines for an Environmental Impact Statement ("EIS") that Treasury Metals is required to complete as an integral part of the EA process. These guidelines were received from the Agency on February 21, 2013.

Following the initial submission of the EIS to the Agency in October 2014, the Agency returned with several comments and questions needed to complete the document, so that it could be accepted for concordance with the EIS guidelines. During this year the legislated timeline for completion was officially paused while Treasury Metals made the requested edits. On April 10, 2015, the Agency confirmed that the Treasury Metals Goliath Gold Project EIS conformed to the EIS Guidelines. As a result, the Project moved on to the public comment period and technical reviews conducted by various federal government agencies. The public comment period took place in a 30-day period from April 25 to May 24, 2015, and included Indigenous peoples and general public open house meetings lead by the Agency. Treasury Metals and the consultants who have provided input into the EIS were represented at these meetings to provide technical

content for these sessions. Most meetings occurred in the Dryden, Ontario and Wabigoon, Ontario areas.

On June 30, 2015, as a normal part of the EA process, the Agency returned a series of Information Requests stemming from the public comment period and the Agency's own technical review of the EIS. The Company has compiled replies to these information requests and resubmitted a revised EIS on September 5, 20017. In response to the September 2017 submission, requests for further information were received from the Agency, and Treasury Metals was requested to revise and resubmit the EIS as per this current submission.

Treasury Metals intends to have permitting complete for both the Federal EA and Provincial permitting requirements by 2019, recognizing that the permitting process is subject to a number variables that could alter this timeline. Following the successful completion of mine permits and approvals, the company envisages construction to begin immediately. The construction period is anticipated to take approximately 18–24 months. As planned, Treasury Metals then anticipates mine production to begin in 2021. With an overall mine life of approximately 12 years, this would see the mine operating until the year 2033 with closure and reclamation being complete prior to 2042.

1.5 Regulatory Framework

1.5.1 Canada

The Project is subject to the *Regulations Designating Physical Activities* under the *Canadian Environmental Assessment Act 2012* (CEAA 2012). Specifically, Section 16(c) of the regulations which lists, "*the construction, operation, decommissioning and abandonment of a new… rare earth element mine or gold mine, other than a placer mine, with an ore production capacity of 600 tons/day or more*" is subject to an EA under CEAA 2012.

The Project may also be subject to:

- Section 7(1) of the *Explosives Act* for the on-site storage and or fabrication of explosives;
- Section 35 of the *Fisheries Act*, which prohibits causing serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery; and
- Section 36 of the *Fisheries Act* which prohibits the deposit of a deleterious substance of any type in water frequented by fish. Mine effluent is regulated through the *Metal Mining Effluent Regulations*.

Treasury Metals submitted a project description to the Agency on November 27, 2012 and was notified by the Agency on November 30, 2012 that the Project Description was accepted, which was posted December 3, 2012 for public comment. On January 17, 2013 the Agency confirmed that an EA by a responsible authority (the Agency) was required for the Project and issued draft

EIS guidelines on January 18, 2013 for public comment. Final EIS guidelines were issued by the Agency on February 21, 2013. The Agency advertised the availability funding for public participation in the Project EA on April 26, 2013 and announced the allocation of the funding on July 12, 2013. Treasury Metals submitted its original EIS document which was subsequently accepted as meeting conformity in April of 2015. In June 2015, the Agency issued a series of information requests to Treasury Metals (Round 1 information requests). Through the submission of this revised EIS, Treasury Metals continues to work with the Agency in an effort to complete the EA process.

1.5.2 Ontario

The Project is anticipated to be subject to two Class EAs related to provincial permitting. As the Ontario Government does not require an EA specific to a Mining Project, Treasury Metals will proceed with the specific Class EAs:

- Ministry of Transportation (MTO) – Class EA for Provincial Transportation Facilities; and
- A Ministry of Natural Resources and Forestry – Class EA for MNRF Resource Stewardship and Facility Development Projects.

In addition to the Provincial EA process, there will also be numerous permitting approvals and authorizations that will be required from various provincial Ministries to allow for the development of the Project. The majority of these will be required from the Ministry of the Environment and Climate Change, the Ministry of Natural Resources and Forestry, and the Ministry of Northern Development and Mines.

1.5.3 Federal and Provincial Alignment

Although the Federal EA process differs in structure to the Provincial Class EA process, there are various areas of potential overlap. Treasury Metals has engaged with the respective agencies regarding the organization of these overlapping areas and commits to work with these agencies to reduce duplicate work done between Federal and Provincial Agencies.

The majority of the effort to reduce overlap has been and will continue to be in the areas of engaging Indigenous communities and Aboriginal peoples, as well as public engagement.

1.6 Participants in the Environmental Assessment

Participants in the EA process include Aboriginal communities, Federal, Provincial, and municipal governments, Project stakeholders, the general public and non-governmental organizations. A listing of the participants in the EA is provided below.

1.6.1 Indigenous Communities

'Aboriginal peoples' is a collective name for the original peoples of North America and their descendants. Often, 'Indigenous peoples' is also used. The Canadian Constitution recognizes three groups of Indigenous peoples: First Nations, Inuit, and Métis. These are three distinct peoples with unique histories, languages, cultural practices and spiritual beliefs. The terms "Aboriginal peoples" and "Indigenous peoples", and "Indigenous communities" and Aboriginal Communities" are used interchangeably in this document, and both refer to those peoples who identify themselves as First Nations, Métis, or Inuit.

- First Nations:
  - Wabigoon Lake Ojibway Nation;
  - Eagle Lake First Nation;
  - Whitefish Bay First Nation (Naotkamegwanning First Nation);
  - Wabauskang First Nation;
  - Lac Seul First Nation;
  - Grassy Narrows First Nation;
  - Lacs des Mille Lacs First Nation; and
  - Grand Council Treaty #3.
- Métis Nation of Ontario:
  - Northwest Métis Council;
  - Kenora Métis Council;
  - Sunset Country Métis Council; and
  - Atikokan Métis Council.
- The Aboriginal People of Wabigoon.

Treasury Metals recognizes that Aboriginal people live, work, hunt, fish, trap, and harvest throughout their lands and rely on them for their individual as well as their communities' overall cultural, social, spiritual, physical, and economic well-being. Further to this Treasury Metals recognizes that these traditional lands are inextricably connected to a communities' identify and culture, inclusive of ceremonial and spiritual recognition. In respect to this, Treasury Metals recognizes the importance of assessing any impacts as these relate to traditional land use activities and practices; and Treasury Metals acknowledges that the Project may impact these availability or practices within the Project area, and is committed to working with all communities to identify, mitigate, and avoid these respective aspects.

An important component of the Federal Environmental Assessment process is the provision of funding to participants in the process. This included specific funding to Indigenous communities, to assist them to prepare for and participate in consultation activities associated with the Federal EA process.

1.6.2 Federal Government

The Agency is the responsible authority for the Government of Canada and is responsible for managing the environmental assessment under CEAA 2012 and preparing the EA report for the Project. The Agency is also responsible for engaging and coordinating other federal entities which may have regulatory responsibilities or expert knowledge regarding Project. The Federal bodies engaged by the Agency include:

- Fisheries and Oceans Canada;
- Aboriginal Affairs and Northern Development Canada;
- Natural Resources Canada;
- Environment Canada;
- Health Canada;
- Major Projects Management Office; and
- Transport Canada.

1.6.3 Provincial Government

The Ontario Ministry of Northern Development and Mines (MNDM) is the lead Ministry for the “One Window” approach to the Project review process. MNDM will also lead closure planning and consultation requirements for the Provincial government. The Ministry of Natural Resources and Forestry (MNRF) will lead the Class EA process and work with MNDM to fulfill consultation duties. Further to this, the Ministry of Environment and Climate Change will lead compliance permitting for water management, air quality, and noise approvals. The other Ministries that will participate in the EA and permitting process are:

- Ministry of Northern Development and Mines;
- Ministry of Environment and Climate Change;
- Ministry of Natural Resources and Forestry;
- Ministry of Labor;
- Ministry of Transportation; and
- Ministry of Tourism, Culture and Sport.

1.6.4 Municipal Government

The key municipal government contacts are the Mayor and the Council of Dryden, and the local services board in Wabigoon. They have shown great interest in the Project and have attended multiple meetings. Municipal service providers are also included on the Project stakeholder list through interviews to inform the socio-economic studies and regular updates on the progress of the Project, including the EA.

Consultation has included the following municipal government representatives:

- Village of Wabigoon;
- Town of Dryden;
- Town of Ignace;
- Town of Sioux Lookout;
- Township of Machin;
- Keewatin Patricia District School Board;
- Northwest Catholic District School Board;
- Kenora District Services Board; and
- Dryden Regional Health Center.

1.6.5 Public and Non-governmental Organizations

In general, the public communities of Dryden and Wabigoon have shown great interest in the completion of the EIS and the Project in general. Treasury Metals has made the general public aware of the Project and the EA through advertisements in local newspapers and on radio, community open houses and by making key documents available at the Project office. Public and non-governmental participants in the EA include the following:

- Local residents on Tree Nursery Road, Anderson Road, Highway 17/11, and East Thunder Lake Road;
- The Goliath Mine Stakeholders;
- The Concerned Citizens of Wabigoon;
- Dryden Naturalists;
- Dryden Chamber of Commerce; and
- Dryden Economic Development Corporation.

2.0 ASSESSMENT OF ALTERNATIVES

2.1 Background

A major component of the Environmental Assessment (EA) process is the evaluation of alternative methods to carry out the Project. These alternatives include both “alternatives to” the Project and “alternative methods” to carry out the Project. This evaluation helps to guide the Project in a responsible manner with the assurance that reasonable options have been considered. The assessment of alternatives has been prepared in accordance with the *Canadian Environmental Assessment Act* (CEAA 2012) Environmental Impact Statement (EIS) guidelines.

Alternatives are carried forward through the assessment if they are likely to fulfill the following objectives:

- Does the alternative provide a reasonably viable solution to the problem?
- Is the technology both proven and has the necessary ability to operate at the Project scale?
- Is the alternative consistent with other Project objectives and/or company policies and procedures?
- Is the alternative consistent with Provincial government policy initiatives?
- Could they affect any sensitive environmental features or other valued components (VCs) when compared to other viable alternatives?
- Is the alternative reasonable to implement in a practical and economical fashion?
- Is the alternative within the scope of the company to implement?
- Is it possible to implement the alternative within the defined study area?
- Are they able to meet the purpose of the *Ontario Environmental Assessment Act*?

2.2 Assessment Methodology

The approach to the assessment of alternatives for the Project EA is to compare and evaluate the overall advantages and disadvantages of each reasonable alternative using a numerical scoring value where possible. Where not possible, an objective non-numerical scoring was used to evaluate each alternative. Comparable methodologies have been followed in similar EAs for other regional mining projects.

The alternatives assessment was accomplished with consideration of any comments received to date from; Indigenous communities, the general public, local stakeholder groups and government reviewers. The objective measures used are features that are significant for the realization of the Project as a whole and offer a relative basis to evaluate the distinct alternatives. The following objective measures were used in the comparison of alternatives:

- Overall cost for the life of the Project;
- Technical feasibility and technical reliability;
- Effects to the environment, including human, physical and biological environments; and
- Potential ability for future closure/reclamation processes.

2.2.1 Overall Cost for the Life of the Project

The overall cost is the total sum of all costs to implement and operate an alternative including initial and sustaining capital expenditures, operating costs and closure/reclamation costs (Table 2.2.1-1).

Table 2.2.1-1: Financial Criteria for the Alternatives Assessment

Criteria	Assessment
Goliath Gold Project Financing	Investor desirability and/or risk
Return on Investment (ROI)	Provides a competitive and acceptable ROI
Financial Risk	Provides a manageable or acceptable financial risk

The performance of these criteria is defined as:

- **Preferred**: Carries an acceptable financial risk while making a competitive ROI.
- **Acceptable**: Carries an acceptable financial risk while making an acceptable ROI.
- **Unacceptable**: Carries an unacceptable financial risk or does not provide an acceptable ROI.

2.2.2 Technical Feasibility and Technical Reliability

Technical feasibility and reliability can be used in conjunction to describe the suitability of a specific alternative (Table 2.2.2-1).

Table 2.2.2-1: Technical feasibility criterion for the alternatives assessment

Criteria	Assessment
Readily Available Technology	Has been successfully implemented in similar mining projects and can be relied upon for sufficient performance over an extended period of time.
	New technologies must be supported by sufficient investigations and technical study to provide confidence in their performance abilities

The performance of these criteria is defined as:

- **Preferred**: Well understood technical capability of alternative with supporting contingency options.
- **Acceptable**: Possible technical capability based on theoretical study. Contingency options must be available as a substitute if the alternative fails to perform as expected.
- **Unacceptable**: No readily available technologies, or technologies that rely solely on unproven studies.

2.2.3 Effects on the Environment

For this assessment the term human environment refers to the potential for negative human environment effects. These include a wide range of land use, socio-economic, cultural and community factors as outlined in the following table. The term physical and biological environment refers to a wide range of factors within water, air, rock, soil and/or overburden and physical plant or animal species. The evaluation criteria for each factor are described in Table 2.2.3-1.

Table 2.2.3-1: Environmental Criteria for the Alternatives Assessment

Criteria	Assessment
Local Residents and Recreational Users	• Effect on property values • Effect on employment opportunities • Effect on local access points • Effect on noise levels • Effect on water supply for both well water and drinking water • Effect on visual disturbance • Potential for adverse health effects
Infrastructure	• Effect on local access • Effect on power supply systems
Public Health and Safety	• Attainment of air quality point of impingement standards or scientifically defensible alternatives • Effect on drinking water supply • Effect on local health services
Local Economy	• Effect on local businesses and economic opportunities • Effect on access for tourism operators and/or natural resource harvesters
Tourism	• Effect on local tourism
Regional Economy	• Effect on regional businesses and economic opportunities
Government Services	• Effect on local government services and capacities
Resource Management Objectives	• Effect on established resource management plans
Built and Cultural Heritage	• Effect on any built heritage resource or cultural heritage features • Alteration that is not sympathetic or is incompatible with the historic fabric and appearance of cultural heritage resources • Isolation of a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship

Table 2.2.3-1: Environmental Criteria for the Alternatives Assessment (continued)

Criteria	Assessment
	• Direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes • A change in land use • Avoidance of damage to built heritage resources or cultural heritage landscapes, or document cultural resources if damage or relocation cannot be reasonably avoided
Archaeological Resources	• Effect on land disturbances • Avoidance of archaeological sites or mitigation by excavation if avoidance is not possible, as per the standards and guidelines for Consultant Archaeologists
First Nation Reserves and Communities	• Effect on conditions of community on First Nation reserves
Spiritual and ceremonial sites	• Avoidance of damage or disturbance to known spiritual and/or ceremonial sites
Traditional Land use	• Effect on Traditional Land use as caused by the Project
Aboriginal and Treaty Rights	• Effect on Aboriginal and Treaty rights
Effect on Air Quality and Climate	• Maintain air quality point of impingement standards or defensible alternatives • Emission rates of greenhouse gases (GHGs)
Effect on Aquatic Life and Habitat	• Fulfilment of water quality standards and guidelines for protection of aquatic life or ensuring no further degradation of water quality if current conditions do not match Provincial Water Quality Objectives (PWQO) • Management of water level in effected water bodies and streams to maintain aquatic life • Maintenance of fish populations • Maintenance of groundwater levels for both flows and quality
Effect on Wetlands	• Fulfilment of water quality standards and guidelines for protection of aquatic life or ensuring no further degradation of water quality if current conditions do not match PWQO • Area, type and quality (functionality) of wetlands that would be displaced or altered • Maintenance of wetland connectivity
Effect on Terrestrial Species and Habitat	• Area, type and quality of terrestrial habitat that would be displaced or altered • Effects of noise disturbance generated by the Project • Maintenance of wildlife movement corridors and plant dispersion • Effect on overall wildlife population
Effect on Species at Risk (SAR)	• Sensitivity level of effected SAR (Endangered, Threatened, Special Concern) • Areal extent, type and quality of SAR that would be displaced or altered • Effects of noise disturbance generated by the Project • Maintenance of wildlife movement corridors and plant dispersion

The performance of these criteria is defined as:

- **Preferred**: Has no effect or manages to minimize adverse effects with no additional mitigation measures.
- **Acceptable**: Has no effect or manages to minimize adverse effects with additional mitigation measures.

- **Unacceptable**: Likely to cause significant adverse effects that cannot be reasonably mitigated.

2.2.4 Potential Ability for Future Closure/Reclamation Processes

The performance of this factor is the ability the alternative to successfully be reclaimed and provide closure (Table 2.2.-1).

Table 2.2.-1: Closure Criteria for the Alternatives Assessment

Criteria	Assessment
Public Safety and Security	• Effect on safety and security risks to the community and general public
Environmental Health and Long Term Sustainability	• Effect on long-term air quality and the ability to meet point of impingement standards • Effect on long-term water quality and the ability to meet water quality guidelines • Effect on long-term wildlife habitats including SARs
Land Use	• Effect on long-term land uses including traditional land and resource use • Effect on long-term visual appearance of Project Site

The performance of these criteria is defined as follows:

- **Preferred**: Causes limited alteration to the Project site which will in turn create a reduced effort in reclamation activities.
- **Acceptable**: Causes alteration to the Project site that will require moderate or large reclamation efforts to meet regulatory requirements.
- **Unacceptable**: Causes alteration to the Project to which reclamation and closure is not technically or reasonably feasible.

2.2.5 Identification of Preferred Alternative

Each alternative has been given a classification to be preferred, acceptable or unacceptable relative to the aforementioned categories. The overall preferred alternative was then chosen using a holistic approach as to how the specific alternative interacted with the Project as a greater whole.

2.2.6 Tailings Storage Facility

Two Project facilities (a tailings storage facility [TSF] and a minewater pond) will overprint waters frequented by fish and are subject to a regulatory amendment of Schedule 2 of the Metal Mining Effluent Regulations (MMER). Assessment of potential alternatives for facilities that overprint waters frequented by fish is required under Environment and Climate Change Canada's Guidelines for the Assessment of Alternatives for Mine Waste Disposal (Environment Canada

2013), pursuant to a Schedule 2 regulatory amendment. For the Project, this includes an assessment of tailings deposition technology and tailings storage facility locations.

The alternatives assessment of the TSF and minewater pond was completed as a discrete document with differing methodologies to the alternatives assessment in this section due to previous work completed for the aforementioned requirements. This assessment and methodology is detailed in Appendix D-2 to the revised EIS.

A multiple accounts analysis (MAA) has been prepared, which follows the methodology outlined in the Guidelines for the Assessment of Alternatives for Mine Waste Disposal (the Guidelines), prepared by ECCC. This analysis has been used to examine and compare different effects from mine waste storage alternatives, and to provide a decision-making tool, which is transparent and defensible. A sensitivity analysis is provided to allow for different weightings of key MAA components and to evaluate differing values on potential environmental, technical, economic and social impacts.

2.3 Project Alternatives

2.3.1.1 Alternative Means Evaluated

Alternatives for the Project have been carefully considered, bearing in mind that all mining operations pose some unavoidable on-site safety risks, as do other industrial operations. Treasury Metals is aware of these risks and will put a priority on worker health and safety and training programs. Alternatives for the Project have been considered with respect to the following Project components:

- Mining;
- Minewater management;
- Mine rock and overburden management;
- Processing methodology and gold recovery;
- Process effluent treatment;
- Tailing storage facility (TSF);
- Water supply sources;
- Water discharge location;
- Project infrastructure locations;
- Aggregate supply;
- Non-hazardous solid waste management;
- Hazardous solid waste management;

- Domestic sewage management;
- Explosives storage facility
- Power supply; and
- Mine closure.

2.3.2 Alternatives to the Project

As part of the greater Alternatives Assessment process and in compliance with the CEAA (2012) EIS guidelines, Treasury Metals has assessed three alternatives to the Project. These alternatives to the Project have been identified as:

- Proceed with the Project development, as identified by Treasury Metals;
- Formally delay the Project planning and development until circumstances are more favourable; and
- The “do nothing” alternative (development of the Project is cancelled).

2.4 Summary of Alternatives

A summary of alternatives proposed for the Project is provided within Table 2.4-1.

Table 2.4-1: Summary of Alternatives Assessment

Project Element	Alternatives Assessed	Assessment Results	EIS Section
Alternatives to the Project	Proceed with the Project	Preferred	Section 2.3
	Delay the Project	Acceptable	
	“Do Nothing”	Acceptable	
Mining Method	Open pit only	Acceptable	Section 2.4.1.1
	Underground only	Unacceptable	Section 2.4.1.2
	Combination of open pit and underground mining methods	Preferred	Section 2.1.4.3
Tailings Storage Facility and Minewater Pond	Surface impoundment that utilizes conventional slurry deposition technology northeast of the pit and the minewater pond directly south	Preferred	Section 2.4.2.2.1
	Surface impoundment that utilizes conventional slurry deposition technology	Acceptable	Section 2.4.2.2.2

Table 2.4-1: Summary of Alternatives Assessment (continued)

Project Element	Alternatives Assessed	Assessment Results	EIS Section
	northeast of the pit and the minewater pond to the west		
Tailings Storage Facility and Minewater Pond (continued)	Filtered stack tailings deposition technology located south of the open pit and the minewater pond west of the open pit	Acceptable	Section 2.4.2.2.3
	Surface impoundment that utilizes conventional slurry tailings deposition technology to the east of the open pit and the minewater pond to the northeast of the open pit.	Acceptable	Section 2.4.2.2.4
Waste Rock Management	WRSA north of pit	Acceptable	Section 2.4.3.1
	WRSA south of pit	Acceptable	Section 2.4.3.2
	Combination of surface storage north of pit and in-pit storage	Preferred	Section 2.4.3.3
Overburden Management	Two Stockpiles South of the Open Pit	Preferred	Section 2.4.4.1
	Single Stockpile to the Southwest of the Open Pit	Acceptable	Section 2.4.4.2
Processing Method	Gravity and CIL processing	Preferred	Section 2.4.5.1
	Gravity and floatation with off-site concentrate processing	Unacceptable	Section 2.4.5.2
	Gravity, flotation, and ILR	Acceptable	Section 2.4.5.3
Cyanide Containing Effluent Treatment	Natural cyanide degradation in the TSF	Unacceptable	Section 2.4.6.1
	In-plant cyanide destruction followed by natural degradation	Unacceptable	Section 2.4.6.2
	Natural degradation followed by effluent treatment	Unacceptable	Section 2.4.6.3
	In-plant cyanide destruction, natural degradation followed by effluent treatment	Preferred	Section 2.4.6.4
Cyanide Destruction	Alkalinity chlorination	Unacceptable	Section 2.4.7.1
	Hydrogen peroxide	Unacceptable	Section 2.4.7.2
	Natural degradation	Unacceptable	Section 2.4.7.3

Table 2.4-1: Summary of Alternatives Assessment (continued)

Project Element	Alternatives Assessed	Assessment Results	EIS Section
	Inco SO_2-air	Preferred	Section 2.4.7.4
Water Supply	Wabigoon Lake	Acceptable	Section 2.4.8.1
	Thunder Lake	Acceptable	Section 2.4.8.2
	Tree nursery ponds	Preferred	Section 2.4.8.3
	Groundwater	Unacceptable	Section 2.4.8.4
Water Discharge Location	Wabigoon Lake	Acceptable	Section 2.4.9.1
	Thunder Lake	Acceptable	Section 2.4.9.2
	Hartman Lake	Unacceptable	Section 2.4.9.3
	Thunder Lake tributaries at the tree nursery ponds	Acceptable	Section 2.4.9.4
	Blackwater Creek	Preferred	Section 2.4.9.5
Plant and Infrastructure Location	Plant and infrastructure located northeast of the open pit area	Preferred	Section 2.4.11.1
	Plant and infrastructure located southeast of the open pit area	Acceptable	Section 2.4.11.2
Low-grade Ore Stockpile	Low-grade ore stockpile located east and adjacent to the crushing facilities	Only Feasible Alternative	Section 2.4.12
Aggregate Supply	Mine Rock that is Non-PAG	Preferred	Section 2.4.13.1
	On-site aggregate pit	Acceptable	Section 2.4.13.2
	Commercial off-site aggregate pit	Acceptable	Section 2.4.13.3
Non-hazardous Solid Waste Management	Acquire an off-site landfill	Acceptable	Section 2.4.14.1
	Develop an on-site landfill	Acceptable	Section 2.4.14.2
	Truck waste to an existing off-site landfill	Preferred	Section 2.4.14.3
Hazardous Solid Waste Management	Acquire an off-site hazardous waste disposal facility	Unacceptable	Section 2.4.15.1
	Develop an on-site hazardous waste disposal facility	Unacceptable	Section 2.4.15.2
Hazardous Solid Waste Management (continued)	Truck hazardous waste to an existing off-site facility	Preferred	Section 2.4.15.3
Domestic Sewage Management	Septic tanks and tile fields	Acceptable	Section 2.4.16.1
	Package sewage treatment plant	Acceptable	Section 2.4.16.2

Table 2.4-1: Summary of Alternatives Assessment (continued)

Project Element	Alternatives Assessed	Assessment Results	EIS Section
Domestic Sewage Management (continued)	Trucking domestic sewage waste off-site to licensed treatment facility	Preferred	Section 2.4.16.3
Explosives Storage Facility	Northwest end of the former tree nursery	Preferred	Section 2.4.17.1
	North of the deposit, east of the Tree Nursery Road	Acceptable	Section 2.4.17.2
Electrical Power Supply	Use of Existing Hydro One power infrastructure	Preferred	Section 2.4.18.1
	Develop an on-site natural gas power generation facility	Acceptable	Section 2.4.18.2
	Develop alternative means of power generation such as wind or solar	Unacceptable	Section 2.4.18.3
Open pit closure	Natural flooding	Acceptable	Section 2.5.1.1
	Enhanced flooding	Preferred	Section 2.5.1.2
Underground Closure	Natural flood in accordance with Ontario closure standards	Only Feasible Alternative	Section 2.5.2
Waste Rock Storage Area Closure	Cap and reclaim	Only Feasible Alternative	Section 2.5.3
TSF closure	Permanent flooding	Preferred	Section 2.5.4.1
	Capping and reclamation	Acceptable	Section 2.5.4.2
Building and Equipment Closure	Disassembly and removal	Acceptable	Section 2.5.5.1
	Re-use of acceptable buildings and equipment	Preferred	Section 2.5.5.2
Infrastructure Closure	Decontamination and removal	Preferred	Section 2.5.6.1
	Leave in place for future use	Acceptable	Section 2.5.6.2
	Reclaim in place	Acceptable	Section 2.5.6.3
Minewater Management and Drainage Closure	Stabilize and leave in place	Acceptable	Section 2.5.7.1
	Partial removal (and restoration)	Preferred	Section 2.5.7.2
	Removal (and restoration)	Acceptable	Section 2.5.7.3

3.0 PROJECT DESCRIPTION

3.1 Introduction

This section provides a description of the proposed Goliath Gold Project (the Project) phases, components, and undertakings.

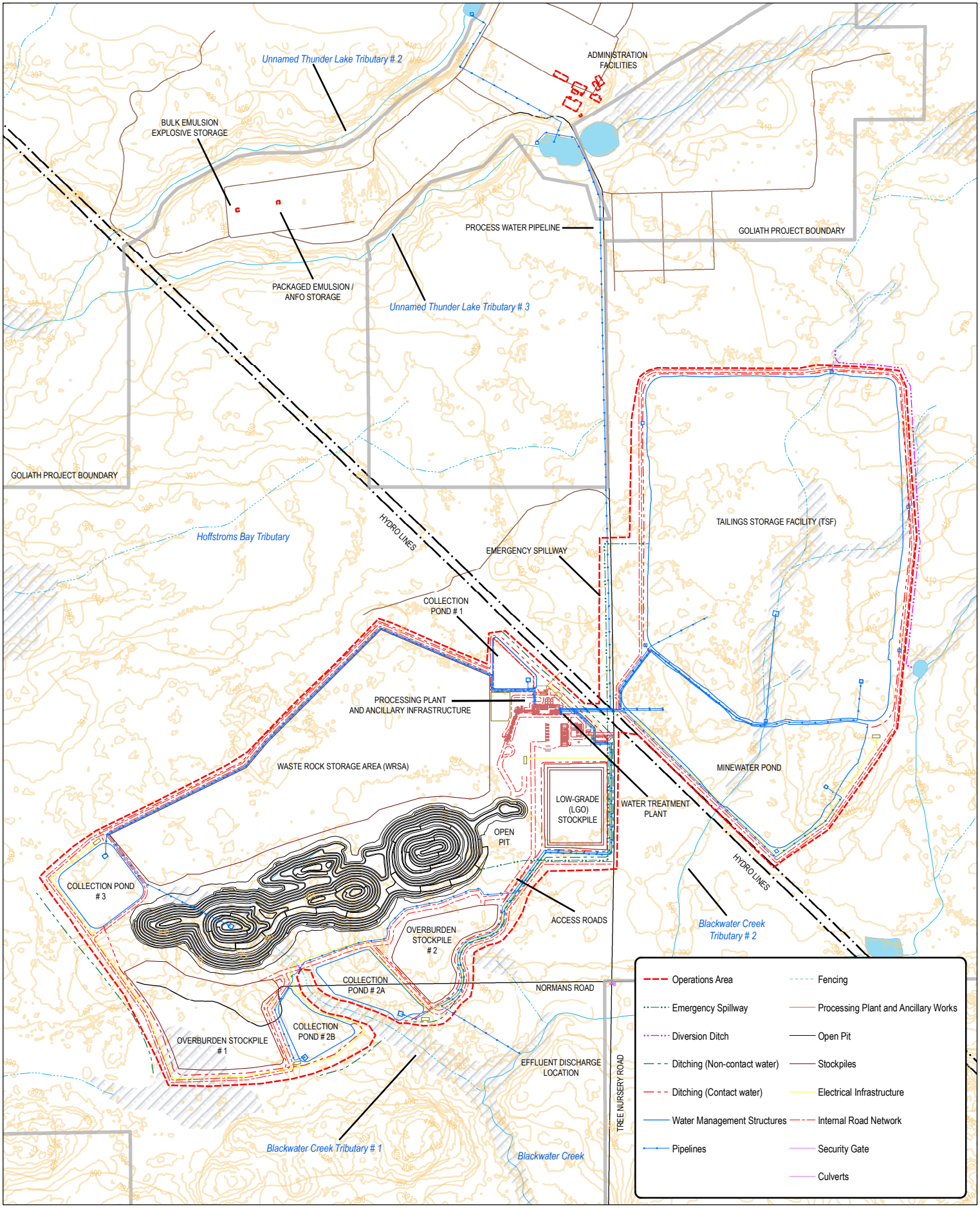
The mine layout places most mine-related facilities in close proximity to the proposed open pit, and to the extent possible, on private lands held by Treasury Metals. The Operations Area (Figure 3.0-1A) will be surrounded by a perimeter ditch, to be constructed in stages, which will prevent direct discharges to the environment. The overall Project footprint will cover approximately 188 ha during the maximum of extent of operations with the entire footprint on Treasury Metals lands that are either patented or leased (mining rights and surface rights). The site plan shown in Figure 3.0-1A shows the preferred alternatives for Project components. Figure 3.0-1B provides an illustration of the Plant site details, while the layout of the Administration Area is provided in Figure 3.0-1C. At closure, Treasury Metals will reclaim the site in a manner that is illustrated in Figure 3.0-1D.

The Project is designed to:

- Use well known, conventional and environmentally sound mining techniques and technologies used commonly in northern environments;
- Minimize overall footprint;
- Minimize associated potential adverse effects;
- Manage water effectively and efficiently;
- Mitigate or compensate for effects on biological habitat; and
- Accommodate effective planning for final closure and site abandonment, rendering the site suitable for other compatible land uses and functions.

3.1.1 Existing Infrastructure and Facilities

The area surrounding the Project is a mixture of abandoned homesteads, small hobby farms and residential dwellings. Most of the properties associated with the Project have been privately owned since around 1900 and have been acquired by Treasury Metals by means of private purchase agreements. Mineral exploration of the Project site has been carried out since 1990 by various companies and is ongoing. The Ontario Ministry of Natural Resources and Forestry (MNRF) established a tree nursery facility, located north of the mineral deposit, which was sold via private consortium to Treasury Metals in 2011 and houses the Project office (Figure 3.1-1).



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

General Arrangement
Operations Phase

Figure 3.0-1A | REV.01

TREASURY METALS Inc.

DESIGN:	MP	03/27/2017
GIS:	MP	03/27/2017
CHECK:	MW	03/27/2017
REVIEW:	DB	03/27/2017

Hydro Line
Natural Gas Pipeline
Railway
Provincial Parks
Expressway / Highway
Local Road
Resource / Recreation Road
Contours (3 meters)
Waterbody
Intermittent Streams
Permanent Streams
Wetland

SCALE 1:16,000

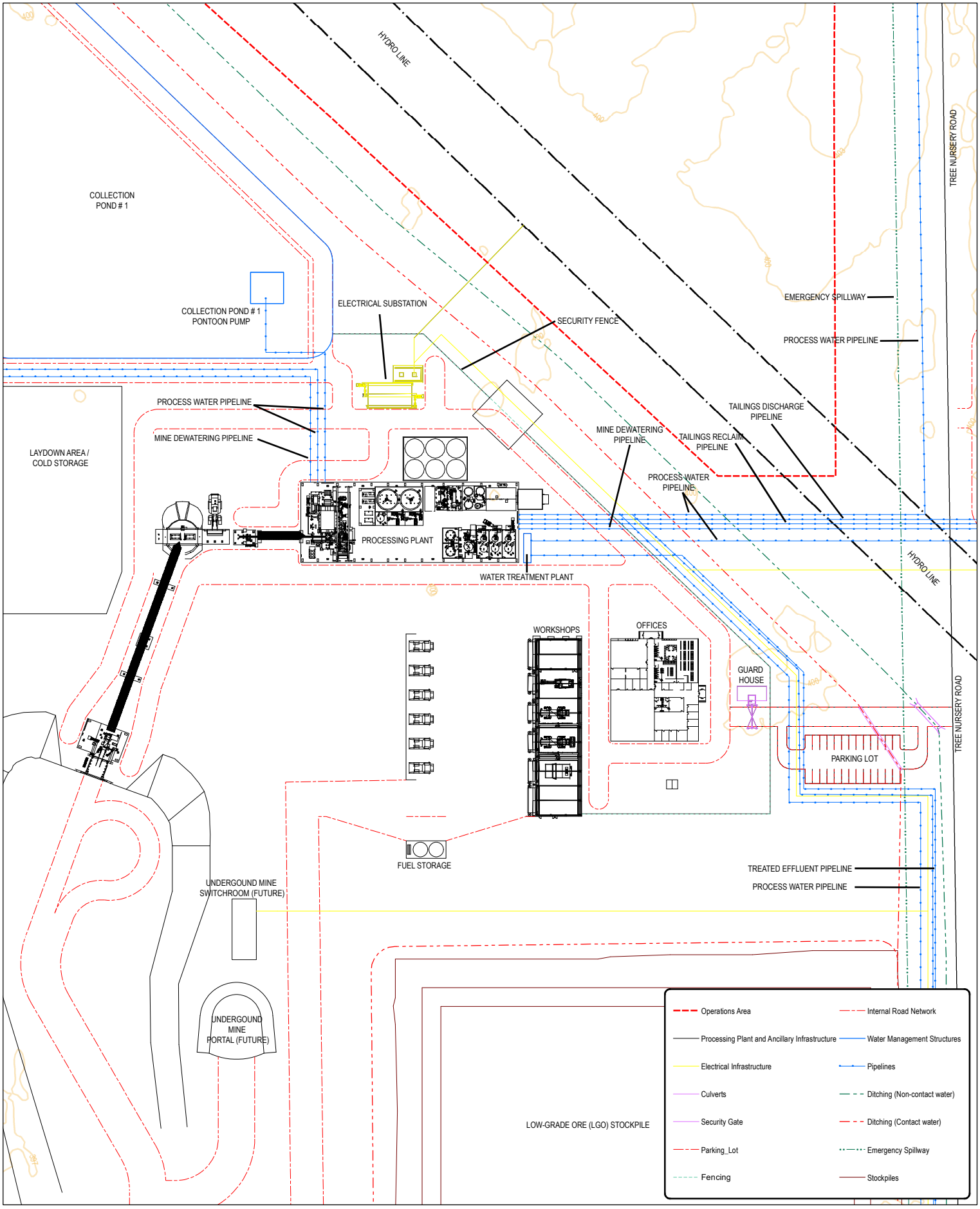
NAD 83, UTM Zone 15

N

0 750
Meters

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
Harvest will be contained within operations area.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

General Arrangement
Operations Phase (Plant Site Details)

Figure 3.0-1B | REV.01

TREASURY METALS Inc.

DESIGN:	MP	03/27/2017
GIS:	MP	03/27/2017
CHECK:	MW	03/27/2017
REVIEW:	MW	03/27/2017

- Hydro Line
- Natural Gas Pipeline
- Railway
- Provincial Parks
- Expressway / Highway
- Local Road
- Resource / Recreation Road
- Contours (3 meters)
- Waterbody
- Intermittent Streams
- Permanent Streams
- Wetland

SCALE 1:2,000

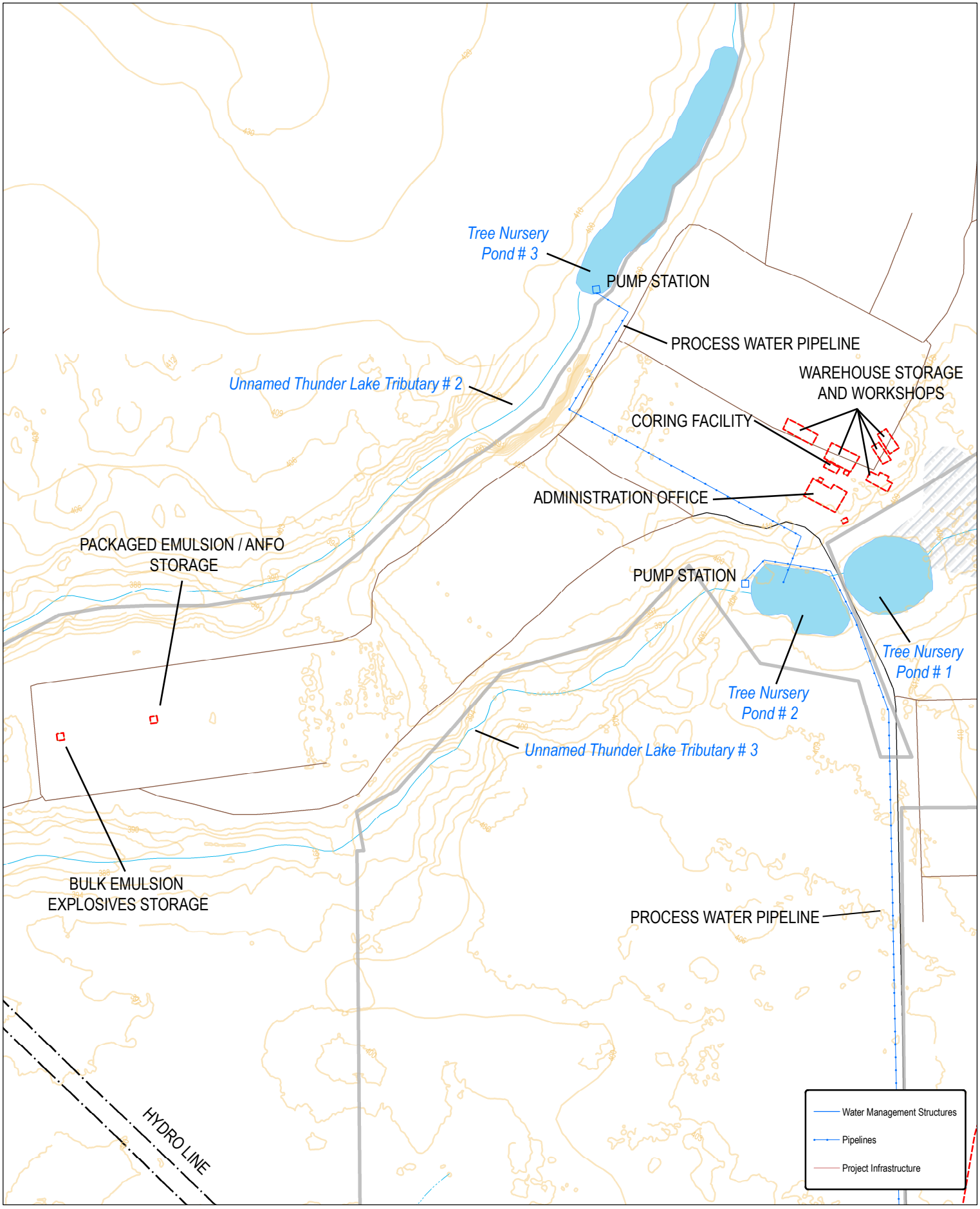
NAD 83, UTM Zone 15

N

0 100
Meters

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
Harvest will be contained within operations area.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

General Arrangement
Operations Phase (Administration Area)

Figure 3.0-1C | REV.01

TREASURY METALS Inc.

DESIGN: MP 03/27/2017
GIS: MP 03/27/2017
CHECK: MW 03/27/2017
REVIEW: MW 03/27/2017

Hydro Line
Natural Gas Pipeline
Railway
Provincial Parks
Expressway / Highway
Local Road
Resource / Recreation Road
Contours (3 meters)
Waterbody
Intermittent Streams
Permanent Streams
Wetland

SCALE 1:7,000

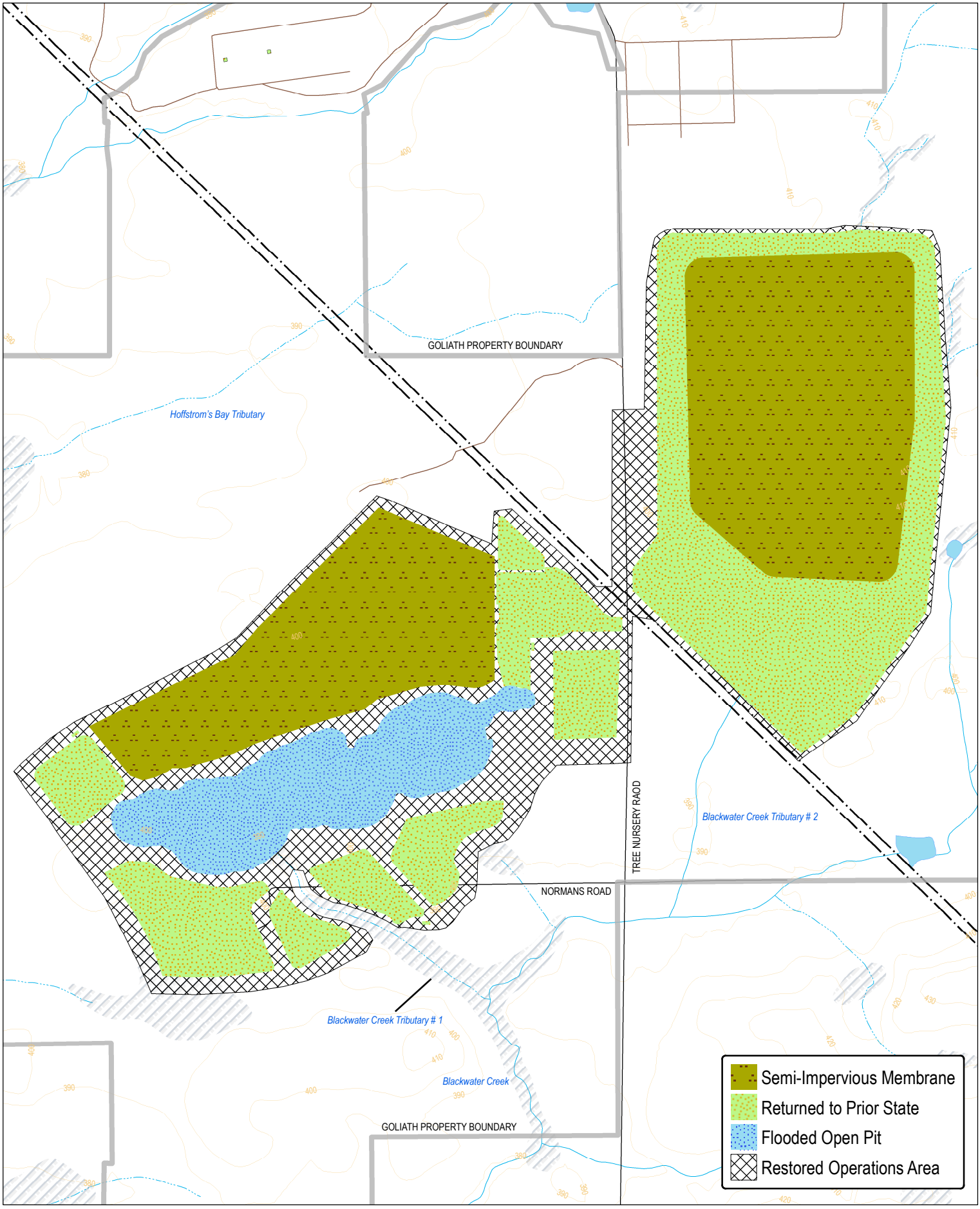
NAD 83, UTM Zone 15

N

0 300
Meters

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
Harvest will be contained within operations area.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

Project Configuration
Post-Closure (Dry TSF Cover)

Figure 3.0-1D | REV.01

TREASURY METALS Inc.

DESIGN: MP 03/27/2017
GIS: MP 03/27/2017
CHECK: MW 03/27/2017
REVIEW: MW 03/27/2017

Hydro Line
Natural Gas Pipeline
Railway
Expressway / Highway
Local Road
Resource / Recreation Road
Provincial Parks
Waterbody
Intermittent Streams
Permanent Streams
Wetland

SCALE 1:15,000

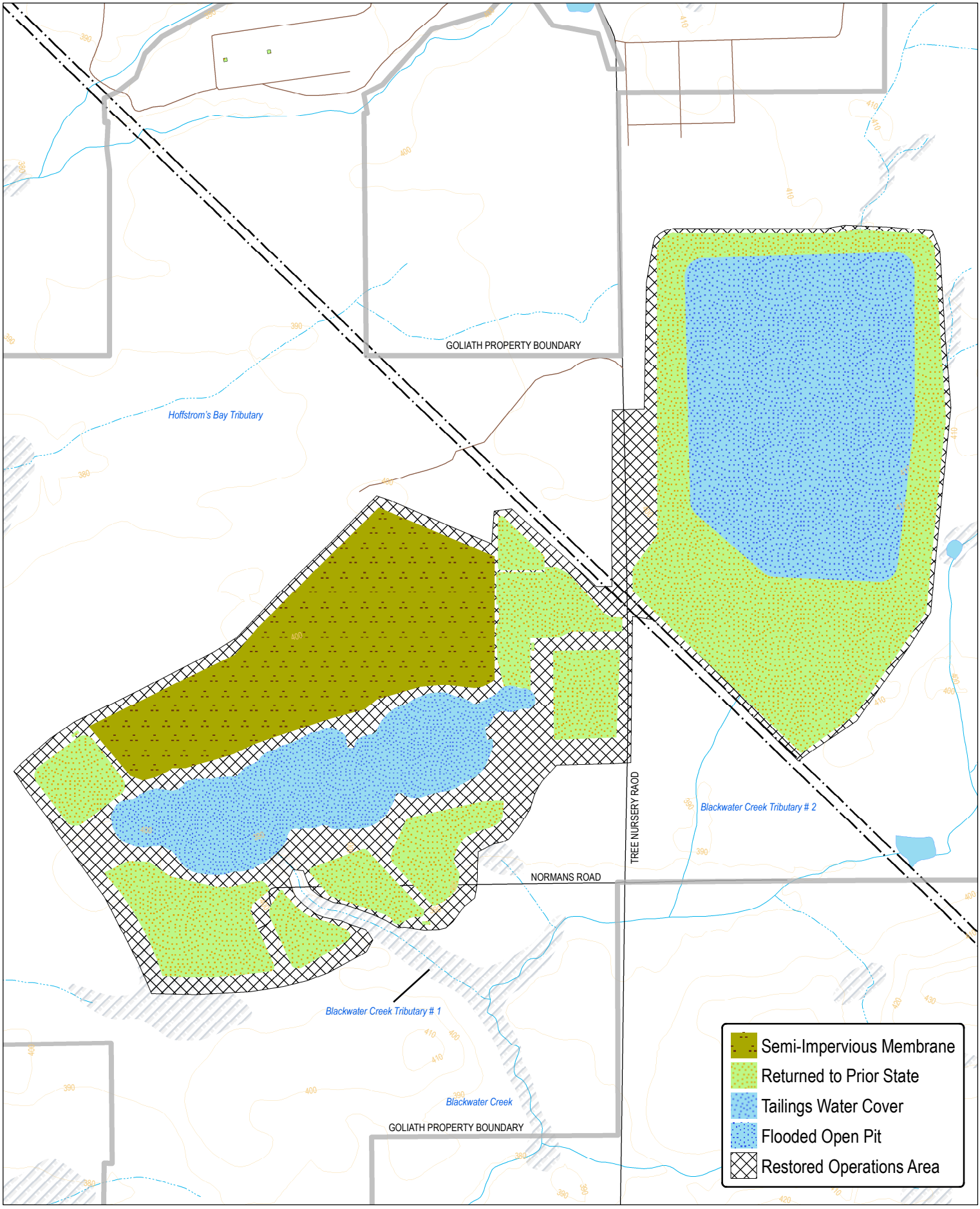
NAD 83, UTM Zone 15

N

0 750
Meters

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
Harvest will be contained within operations area.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

Project Configuration
Post-Closure (Wet TSF Cover)

Figure 3.0-1E | REV.01

TREASURY METALS Inc.

DESIGN: MP 03/27/2017
GIS: MP 03/27/2017
CHECK: MW 03/27/2017
REVIEW: MW 03/27/2017

Hydro Line
Natural Gas Pipeline
Railway
Expressway / Highway
Local Road
Resource / Recreation Road
Provincial Parks
Waterbody
Intermittent Streams
Permanent Streams
Wetland

SCALE 1:15,000

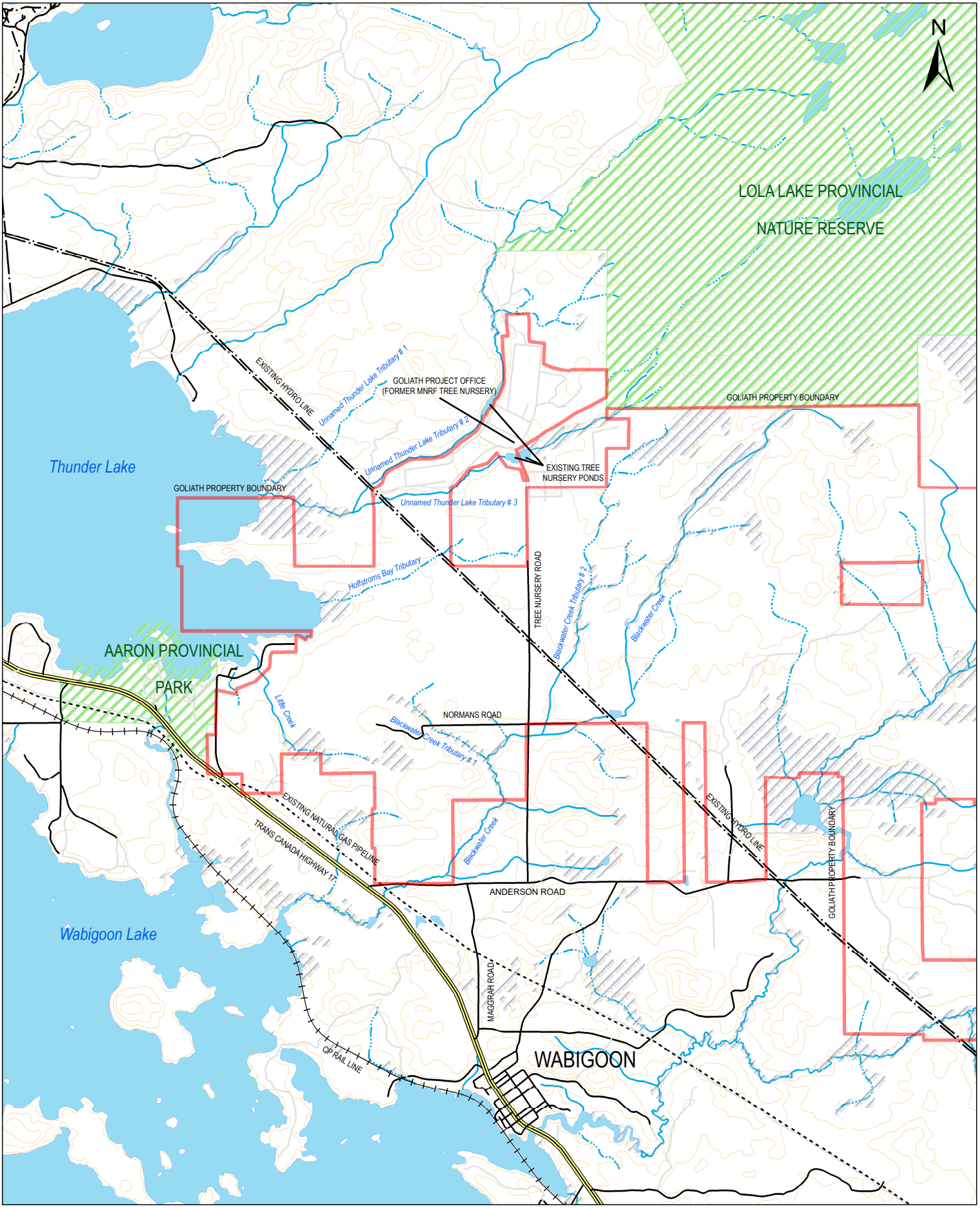
NAD 83, UTM Zone 15

N

0 750
Meters

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
Harvest will be contained within operations area.



GOLIATH GOLD PROJECT
DRYDEN, ONTARIO, CANADA

Existing Infrastructure

Figure 3.1-1 | REV.01

TREASURY METALS Inc.

DESIGN:	MP	01/08/2017
GIS:	MP	01/08/2017
CHECK:	MW	01/08/2017
REVIEW:	MW	01/08/2017

- Hydro Line
- Natural Gas Pipeline
- Provincial Parks
- Railway
- Expressway / Highway
- Local Road
- Resource / Recreation
- Contours (10 meters)
- Intermittent Watercourses
- Permanent Watercourses
- Waterbody
- Wetland

SCALE 1:50,000

Coordinate System: NAD 1983 UTM Zone 15N
Projection: Transverse Mercator
Datum: North American 1983

0 500 1,000 1,500 2,000
Meters

Base Data:
Treasury Metals Inc., LIO Database, KBM Resources Group

Notes:
All details preliminary and subject to change as engineering designs are updated.

3.1.2 Project Phases and Schedule

The total lifespan of the Project is approximately 18 to 20 years beginning with site preparation and ending with the completion of care and maintenance during post-closure (Table 3.2-1). The estimated duration of each key Project phase is:

- Site Preparation and Construction : 2 years
- Operations Phase: 12 years
- Closure Phase: 3 years
- Post-closure (care and maintenance): 3-6 years

Table 3.2-1: Key Project Components Listed by Phase

Project Phase	Duration	Key Components
Site Preparation and Construction Phase	2 years	Site Preparation • Water management and flood protection infrastructure • Surface drainage diversion structures and water realignment channels/ditches • Access roads for planned infrastructure • Support buildings and infrastructure required for the construction phase
		Construction • Additional site access roads and realignment of existing roads • Construction of the (initial) TSF • Site drainage works, including pipelines from freshwater/recycled water sources • Construction facilities • Pit stripping and initial phase mining, including mine rock for aggregate use • Processing plant and associated buildings and facilities • 115 kV transmission line including on-site substation
Operations Phase	12 years	• Open pit • Underground mine development • Process plant • Waste Rock Storage • Overburden Storage • Low-Grade Stockpile • Staged construction to expand TSF capacity
Closure Phase	3 years	• Project site area reclaimed to a naturalized and productive biological state; physically and chemically stable • Initial filling of the pit lake
Post Closure Phase (care and maintenance)	3-6 years	• Filling of the pit lake • Monitoring • Site is without infrastructure

3.2 Refinements to the Project since Filing the Original EIS

Changes have been incorporated to the Project in response to the ongoing engagement process, Information Requests, engineering refinements, measures to ensure compliance with federal and provincial environmental legislation, and evolving environmental best practices that are applicable and feasible for the Project. This Section briefly summarizes the changes to the subject Project components, phases and activities from those described in Section 3 of the original EIS.

3.2.1 Perimeter Ditching

An engineered perimeter runoff and seepage collection ditch will be constructed around the entire Operations Area (refer to Definition of Terms and Acronyms) prior to commencing earthworks for the Project and the collected water will incorporated into the overall water management for the Project. This perimeter structure will ensure compliance with the Metal Mining Effluent Regulations and prevent any direct releases of runoff to the environment once the site preparation commences.

3.2.2 Surface and Mine Water Management

The spoils from the perimeter ditch excavation will be windrowed, compacted in successive lifts, and erosion proofed immediately downstream of the ditch to serve as a containment berm. The berm will be designed to exclude non-contact water from the Operations Area. Generally, these berms will impound runoff so that flow decants to the open pit during an extreme flood event. However, engineered spillways would be incorporated into the perimeter berm where appropriate to prevent overtopping. These design elements will be integrated into the design basis going forward.

Surface runoff and seepage will be collected in perimeter ponds. Runoff will be retained in these ponds until it is required for use in the process plant, or for the management of dust. Surplus water in these ponds will be pumped to the effluent treatment system for treatment and discharge to Blackwater Creek. Adequate freeboard will be maintained in these ponds at all times to manage the environmental design storm (EDS). There will be no direct release of untreated runoff from the operations area to the environment.

A Minewater Pond (MWP) will be constructed south of the Tailings Storage Facility (TSF). Mine water from the pit and the underground mine workings will be pumped to the MWP. Suspended solids will be settled in this pond and biological oxidation of ammonia will be promoted through the use of in-pond aerators and the placement of media to provide increased surface area for ammonia oxidizing bacteria. Water from the MWP will be used in the underground mine, the Process Plant and for dust suppression within the Operations Area. Water that is used within the Operation Area that does not evaporate will be contained by the perimeter runoff and seepage collection ditch and subsequently treated within the effluent treatment system and discharged to Blackwater Creek. Adequate freeboard will be maintained in the MWP at all times to manage the EDS.

3.2.3 Stockpiles

The low grade ore stockpile, the coarse ore pile and the fine ore piles are located near to the Plant Site, resulting in a compact site footprint.

The overburden stockpile has been modified to avoid infilling Blackwater Creek Tributary 1, resulting in two overburden stockpiles located south of the open pit.

The waste rock storage area (WRSA) has been modified to locate it primarily within the Blackwater Creek watershed and minimize the portion that extends into the Thunder Lake watershed. The WRSA will be constructed with an embankment slope that is adequate for long-term physical stability to avoid the need to re-contour the WRSA at closure. As embankments are removed from active fill placement, they will be covered with overburden and vegetated with ground cover species as well as tree species that are consistent with planting prescriptions in the Dryden Forest Management Plan (FMP). Priority will be given to finishing construction of the western perimeter of the WRSA so that this embankment can be prepared and planted to create a green barrier between the mining operations and the residences to the west.

3.2.4 Site Layout and Infrastructure

This section describes the updates to the site layout and infrastructure.

3.2.4.1 Watershed Approach

Treasury Metals has adopted a watershed approach to the site layout. The optimized general arrangement (GA) avoids the Thunder Lake watershed to the extent practical and situates the Project primarily within the sub-watershed of the two westernmost tributaries of Blackwater Creek.

The perimeter runoff and seepage collection ditch will be an engineered feature and will become the new watershed divide between Thunder Lake and Blackwater Creek. This effectively results in the Operations Area being entirely within the Blackwater Creek watershed.

3.2.4.2 Plant Site

Based on the feedback received during the EA process to date, there were concerns associated with the Plant site location presented in the original EIS. Treasury Metals has identified an alternative Plant site location west of Tree Nursery Road. This location is now considered the preferred location for the Plant site for the reasons listed below:

- No removal of fish habitat required and no diversion of Blackwater Creek around the Plant site would be required. This will reduce the impacts to the fish habitat in Blackwater Creek.

- Overburden depth is reduced and projected water table is not as shallow at this new preferred location. This facilitates the effective collection of runoff and seepage from the Plant site. This will reduce the impacts to surface water quality and ground water quality outside of the Operations Area.

- Shallower bedrock and preferable foundation conditions for Plant site infrastructure.

3.2.4.3 Pipelines

Pipelines between the TSF and the Plant site containing tailings and reclaim water will be positioned entirely within a lined swale so that any potential spillage is contained. Furthermore, potential spillage would be contained by the perimeter runoff and collection system that encircles the Operations Area. Dam crests will be sloped towards the inside of their respective ponds to keep spillage within the respective ponds.

3.2.5 Tailings Storage Facility

The floor of the TSF will provide a low-permeability barrier to seepage flow. Where native soils do not provide a sufficiently thick low-permeability horizon beneath the TSF, the floor of the TSF will be lined with a low-permeability layer capable of achieving seepage rates that ensure receiving surface water quality is equivalent to baseline, or meet PWQO. The liner would be comprised of natural material, or if necessary, an HDPE liner laid over a prepared basin of sand or comparable material.

The spillway will be positioned on the west side of the TSF so that overflow during an extreme flood event would drain to the open pit where it would be contained.

3.2.6 Water Management

Surface water and mine water will be managed as described in Section 3.2.2.

Grey water (showers) will be pumped to the plant for use in the process.

The only freshwater withdrawals will be from the two existing pumphouse locations at the former tree nursery operated by MNRF. The maximum withdrawal will be 5% of streamflow, as measured on a real-time basis.

The TSF will be managed as a discrete water pond. The only inputs to the TSF will be process water, direct precipitation and water from the TSF's perimeter seepage collection system. Water from the runoff collection ponds and the minewater pond will not be consolidated in the TSF as a normal operating practice, but these ponds will be used as sources of process water for the Plant.

As a future optimization, industrial evaporators could be deployed surrounding the TSF to evaporate surplus water from the TSF, thereby reducing the volume that requires treatment and discharge to Blackwater Creek. Evaporators would be enclosed within noise shrouds to contain noise from the fans.

In-pond aerators would be positioned within runoff collection ponds, the minewater pond and the TSF supernatant pond, as required, to minimize ice build-up and promote the oxidation of ammonia. Decreasing the ice cover would increase the volume of water that is available for use in the Plant during winter months.

3.2.7 Watercourse Realignment

As described in Section 3.2.4.2, the re-location of the plant site eliminates the need to realign the segment of Blackwater Creek Tributary 2 downstream of the Project. As part of the site preparation activities, Treasury Metals will still need to construct a diversion that connects the portions of the Blackwater Creek Tributary 2 watershed upstream of the Project to Blackwater Creek.

3.2.8 Explosives Storage Facility

Minimum permissible distances from Natural Resources Canada have been reviewed and the proposed explosives storage facility will be located on land owned by Treasury Metals, which is removed from any known recreational trails. The facility would be self-contained with zero discharge.

3.2.9 Closure and Decommissioning

Closure strategies have been refined since the submission of the EIS in April 2015 and these are described below.

3.2.9.1 Watershed Approach

During post close out, the necessary segments of the perimeter runoff and seepage collection ditch will remain in place to ensure that the Operations Area remains within the Blackwater Creek watershed. The majority of the Operations Area will drain to the open pit post close out. Once the pit is flooded to the spillway elevation, it will decant to the existing tributary of Blackwater Creek.

3.2.9.2 Strategy to Ensure Chemical Stability Post Close Out

For planning purposes, Treasury Metals is preparing to manage waste rock, ore and tailings as Potentially Acid Generating (PAG). Treasury Metals has refined the closure strategy to ensure long-term chemical stability and this is described in the following Sections.

Waste Rock Storage Area

Treasury Metals will further evaluate the geochemical properties of waste rock and the feasibility of a real-time characterization program to segregate non-acid generating (NAG) and PAG waste rock. Confirmed PAG rock would be placed beneath the static water level in the pit and/or underground mine to the extent practical, thereby minimizing the volume of PAG rock in the WRSA. If operational monitoring of the WRSA confirms that it is PAG, a low-permeability dry cover will be constructed over it at closure, in accordance with Section 59 of the Mine Rehabilitation Code of Ontario (O. Regulation 240/00).

Plant Site

The upper portion of the Plant site will be scarified, reclaimed at the end of the mine life. Any PAG rock that remains at the Plant site would be managed using one of the alternatives outlined below that is deemed most appropriate using empirical data that is gathered at close out.

- Re-location to the open pit and/or underground mine below the static water level; or
- Placement on the WRSA prior to installation of the low-permeability dry cover.

Tailings Storage Facility

Treasury Metals will optimize an engineered cover to mitigate chemical instability, in accordance with Section 59 of Schedule 2 of O. Regulation 240/00, using empirical data that is gathered during the life of the Project. For example, empirical data will help guide Treasury Metals choice of whether the best closure option for the TSF will be a dry, low-permeability cover, or a wet cover.

4.0 ACCIDENTS AND MALFUNCTIONS

4.1 Approach

Accidents and malfunctions were identified using a Failure Mode and Effects Analysis (FMEA) methodology. An FMEA is a risk analysis procedure used to identify and characterize accidents and malfunctions (i.e., failure) based on the likelihood of an accident or malfunction occurring and the severity/magnitude of the failure. Through the FMEA process, a total of 463 failure modes were identified and analyzed, as described in the following sections.

The FMEA process for this Project assessed the likelihood of a potential failure and the consequences of the failure in three main categories:

- Environment;
- Safety and health; and
- Production.

The FMEA process was completed in four general phases:

- Data input;
- Summary of risks and risk matrices;
- Likelihood and severity assessment; and
- Analysis of controls.

A team of experts involved with the Project was assembled and an FMEA workshop was conducted from January 30, 2015 to February 1, 2015. The potential environmental risks were identified, including potential consequences of the occurrence. The likelihood and magnitude of an accident and/or malfunction were also identified. Once the accidents and malfunctions were identified, control measures were established to protect against such occurrences as well as emergency response procedures if accidents or malfunctions failures occur. The FMEA data were gathered and input to a worksheet that uses a structured approach to identify and assess potential risks.

4.1.1 Activities Considered

Potential accidents and malfunctions are organized into categories and each category is further divided into sub-categories or items. The major categories evaluated are:

- General development;
- Mine underground;

- Mine open pit;
- Mine site process;
- Mine site utilities;
- Mine site facilities;
- Mine site tailings;
- Mine site temporary facilities; and
- Off-site infrastructure.

4.1.2 Hazard / Aspect or Threat

The Hazard/Aspect or Threat describes the potential risk or type of failure being evaluated. A failure mode can occur naturally, by an engineering system failure, or operational failure due to inadequate control measures or operator error. For example, the clearing of vegetation (site preparation category) requires heavy equipment and hydrocarbon releases from equipment failure are a potential hazard or threat. Since there may be several hazards in one category, the FMEA only includes the most significant or likely hazards that may potentially occur.

4.1.3 Impact Categories

As indicated in Section 4.2, the impact categories are:

- Environment;
- Safety and health; and
- Reputation.

4.1.4 Rank and Risk Level

The rank and risk levels are determined using the likelihood and severity categories for each failure mode. The combination of likelihood and severity for a failure mode assigns a risk ranging from 1 to 25. The greater the likelihood and/or severity, the lower the rank (i.e., smaller ranks represent greater risk). For example, a failure mode that has a high likelihood (i.e., likelihood rating of A - almost certain to occur) and high severity (i.e., severity rating of 5) would be considered the highest rank (i.e., rank = 1). The risk level is based on ordering the 25 ranks into three risk management categories: low, medium, and high.

4.1.5 Evaluation of Potential Environmental Failure Modes

To evaluate the environmental residual risks, the following steps were taken:

- Filtering from the FMEA worksheet the failure modes exclusive to the environment category;
- Selecting the failure modes in the environment category that had risk rankings (both residual and inherent) of high- or medium-risk levels (i.e., yellow or red on risk matrix); and
- Documenting the rationale behind their rank and subsequent risk level assignment.

The environment impact category has a total of 137 potential failure modes. 123 of these failure modes are considered low-residual risk and 14 are considered medium-residual risk. There were no high-residual risk environmental failure modes identified during the FMEA.

4.1.5.1 Low Environmental Risks

All of the 123 low residual risk environmental failure modes were considered to have a low severity rating with limited to minor potential environmental effects (i.e., severity rating of 1 or 2). There were no environmental low-residual risk failure modes with a severity of greater than 3. Of the low-residual risk environmental failure modes, two were determined to be “expected” to occur (i.e., likelihood rating B), eight were found to be “likely” to occur (i.e., likelihood rating C), 56 were determined to be “unlikely” to occur (i.e., likelihood rating D), and 57 were found to be “rare” (i.e., likelihood rating E).

4.1.5.2 Medium Environmental Risks

Fourteen of the failure modes are considered medium environmental risks. Of the 14 medium residual risk environmental failure modes, three were considered to have a severity rating of 2 (i.e., minor environmental effects) and the remaining 11 were considered to have a severity rating of 3 (i.e., moderate environmental effects). Of all the medium-risk environmental failure modes, three were determined to be “almost certain” to occur (i.e., likelihood rating A), four were considered to be “unlikely” to occur (i.e., likelihood rating D), and seven were considered to be “rare” (i.e., likelihood rating E).

4.1.5.3 High Environmental Risks

There were no high-residual risk environmental failure modes identified during the FMEA.

4.1.6 Effects of Failure Modes on Environmental Valued Components

The medium risks identified within the environment category were selected for further analysis and categorized into the following three failure modes for further assessment:

- Failure of TSF;
- Spills and releases; and

- Cyanide related accident.

4.2 Natural Hazards

Natural hazards that could potentially affect the Project include extreme flooding, natural fires, earthquakes, tornadoes and climate change. Additional items identified in the EIS Guidelines as potential natural events (e.g., ice jams, geohazards) are not likely to occur due to the topographical characteristics of the Project. All facets of the Project have been designed, and will be constructed and operated with consideration for local environmental conditions and the potential for extreme natural hazards.

4.3 Conclusions

Accidents and malfunctions were identified using an FMEA process. Through this process, a total of 463 potential failure modes were identified and analyzed within the environment, safety and health, and reputation impact categories.

Once all risks were identified, Treasury Metals focused on the potential effects of accidents and malfunctions identified in the environment impact category. The environment impact category had a total of 137 potential failure modes; 123 of these failure modes are considered low-risk and 14 are considered medium-risk. There were no high-risk failure modes identified during the FMEA process.

The medium risks identified within the environment category were selected for analysis and were placed into broader failure modes for further assessment. There were three categories of failure modes considered for further environmental assessment: failure of the TSF, releases to land and water, and cyanide releases to land, water, and air. Potential primary environmental effects of the three categories of failure modes were generally to the terrain and soil and surface water. Potential secondary effects were generally determined to be to aquatic resources, groundwater, fish and fish habitat, and wildlife habitat.

As per the EIS guidelines, preventative procedures were identified to minimize impacts to the identified VCs, as well as contingency/emergency response procedures and follow-up monitoring for each failure mode.

Overall, the residual effects of the failure modes on the environment were determined to be not significant if all preventative procedures are adhered to throughout all phases of the Project.

5.0 EXISTING ENVIRONMENT

As part of the process to revise the EIS, Treasury Metals has expanded the existing environment section to incorporate traditional knowledge shared by the Indigenous communities. Additionally, an Indigenous Community subsection has been added that presents descriptions of the various Indigenous communities, their population demographics and information regarding their current use of land and resource for traditional purposes (i.e., traditional land and resource use (TLRU)). The information presented in Section 5 of the EIS including traditional knowledge and TLRU were used, as described in Section 6, for refining the selection the valued components, determining the local and regional study areas for the various disciplines, and considered in the description of the effects of the Project.

5.1 Climate and Meteorology

The Project site is located in the west-central portion of the Boreal Shield Ecozone, experiencing a continental climate, generally characterized by short mild summers and long cold winters with relatively low precipitation. The terrain is generally flat and absent of orographic features which can block air masses or produce localized increases in precipitation. Long-term climate statistics for the regional climate stations, maintained by Environment and Climate Change Canada, are monitored in Dryden.

Air temperature in the region follows an annual sinusoidal pattern typical of northern continental climates at mid-latitude with minimum average daily temperature occurring in January and maximum average daily temperature occurring in July. The mean daily temperature in July is approximately 19°C with an average daily maximum near 24°C and an average daily minimum near 13°C. The mean daily temperature in January is -18°C with an average daily maximum near -13°C and an average daily minimum near -23°C.

Based on historical observations at Dryden, mean annual precipitation at the Project site is 705 mm, of which, between 20% to 24% falls as snow. Precipitation recorded at Dryden is considered as being representative of the local study area (LSA) due to the proximity and the lack of significant elevation differences or geographic features.

5.2 Air Quality

The Project is located in a rural area of Northern Ontario and is at least 10 km from any existing sources of significant air emissions. Regional air quality data was attained from Ministry of the Environment and Climate Change stations in Thunder Bay. As these stations are located in a more urbanized area compared to the study area, they are likely to capture higher concentrations of the contaminants of concern. The ambient monitoring data collected from these stations are therefore likely to provide conservative estimates of the future background conditions experienced in the study area. There are no anthropogenic sources of air emissions located proximal to the development.

5.3 Noise and Light

The measured ambient sound levels at the Project site were similar to background ambient sound levels characteristic of remote areas (25 dBA to 45 dBA). The existing baseline noise levels are typical of Northwestern Ontario conditions.

Baseline light conditions (as illuminance) was measured at residential locations within about 1 km of the expected processing plant, as well as at representative receptors located on Thunder Lake. The illuminance levels at the receptors are below levels expected in rural residential areas, with the exception of sample sites that were located in proximity to artificial light sources such as exterior home light or street light.

5.4 Geology and Geochemistry

The Project area is located within the volcano-plutonic Eagle-Wabigoon-Manitou Greenstone Belt in the Wabigoon Subprovince of the Archaean Superior Province, and is on the north side of the regional Wabigoon fault. This Greenstone Belt consists of a 150 km-wide domain that has an exposed strike extent of 700 km. The full strike length of the Greenstone Belt is unknown since it is overlain by Palaeozoic strata on both ends. The geology on the northern side of the Wabigoon Fault is characterized by generally southward-facing, alternating panels of metavolcanic and metasedimentary rock.

Three major rock groupings are consistently recognized from south to north at the Project site:

- A hanging-wall unit of altered felsic metavolcanic rocks (sericite schist, biotite-muscovite schist) and metasedimentary rocks.
- A central unit of approximately 100 m to 150 m true thickness, which hosts the most significant gold concentrations and consists of intensely deformed and variably altered felsic, fine to medium grained, quartz-feldspar-sericite schist and biotite-quartzfeldspar-sericite schist (BMS) with minor metasedimentary rocks.
- A footwall unit of predominantly metasedimentary rocks with some porphyritic units and minor felsic gneiss and schist.

The gold mineralization is located primarily in the central unit, and is concentrated in a pyritic (phyllic) alteration zone, consisting of the muscovite sericite schist, quartz-eye gneiss and quartz-feldspar gneiss. This area of mineralization appears to extend to a maximum drill-tested depth of 805 m below grade, over a strike length of approximately 2,300 m, with the possibility of this strike length extending to greater than 5,000 m.

A preliminary geochemical assessment was completed in 2011 as part of the baseline studies for the site and involved the characterization of 54 drill core samples. An additional 112 drill core samples representing potential mine rock material were selected and characterized in June 2012. The samples included the four dominant mine rock types; biotite muscovite schist (BMS), biotite

schist (BS), muscovite sericite schist (MSS), and meta- sediment (MSED). A sample of the tailings material, produced in metallurgical tests completed by ALS-Kamloops, expected to be produced during the mill process, was also characterized in August 2012. The mine rock and tailings samples were assessed as outlined in the prediction guidelines by Price (2009).

Static testing on the mine rock samples and one composite tailings sample consisted of metals analysis, acid base accounting (ABA), and shake flask extraction tests. Kinetic testing, included humidity cell tests (HCT) and field-scale barrel tests with representative samples of the BMS, BS, MSS, MSED rock types as well as one composite tailings sample. Subsequently, loading rates were calculated for constituents of potential concern (COPC). The metals that exceeded the ten-times the average crustal abundance screening values in mine rock samples included antimony, arsenic, cadmium, cobalt, lead, molybdenum, selenium, silver, and zinc. All four mine rock types were generally classified as PAG with neutralization potential (NP) to acid potential (AP) ratios (NP/AP) that are less than one. However, several samples were shown to be have NP/AP ratios greater than 2 which indicate there may be opportunity for further testing to define subsequent areas of NAG rock within specific areas of the Project area.

Generally for all mine rock HCTs, pH values decreased from approximately 8.0 to 6.0 over the initial 20 weeks, increased slightly between weeks 20 and 50, and then decreased to below 5.0 at termination on week 85. Sulphate concentrations exhibited initially elevated values, which decreased rapidly between approximately weeks 1 to 5. Similarly, several dissolved metals demonstrated initial elevated concentrations followed by substantial decreases over the first 5 to 18 weeks. Some COPCs exhibited increasing concentrations between weeks 60 and 85. Seven of the HCTs were terminated at week 63 after stabilization of COPC concentrations in the leachate and the remaining four at week 85, prior to the establishment of stable conditions.

Duplicate humidity cells were initiated for the tailings composite sample. Measured pH values exhibited steady and consistent declines, from approximately 7.8 to 3.7 over 78 weeks. Sulphate concentrations exhibited initially elevated values, which decreased rapidly over approximately weeks 1 to 10 and increased slightly between week 40 and 78. Similarly, a majority of metal constituents demonstrated initial elevated concentrations followed by substantial decreases over the initial 20 weeks. Higher initial concentrations are related to an initial flush of tailings, while lower values at later times are representative of a relatively constant, natural, rate of release associated with oxidation or other weathering reactions. In addition to arsenic, a majority of the acid soluble trace metal concentrations began to increase at approximately week 20, including cadmium, cobalt, copper, nickel, lead, and zinc. The duplicate tailings HCT was terminated at week 59 and the first tailings HCT at week 78.

The four barrel tests initiated for the BMS, BS, MSS, and MSED mine rock samples had been operating for approximately two years as of this report. The leachate pH values were typically between 4.7 and 6.7 with the exception of values for the MSED field cell which exhibited pH values up to 9.5 in July 2014. Sulphate concentrations in the water collected from the barrels varied between approximately 11 and 90 mg/L. Dissolved arsenic, cadmium, cobalt, lead, nickel, and zinc concentrations were similar among the four mine rock types and appear to be exhibiting a

cycling behaviour, with peak values associated with samples collected between March and April. However, dissolved sulphate, cobalt, and nickel concentrations were relatively higher for the BS barrel test, compared to the BMS, MSS, and MSED barrels.

Loading rates were calculated from the available HCT results for the BMS, BS, MSS, and MSED samples. The evaluation of the HCT results for each mine rock type indicated that loading rates for some COPCs were correlated to either sample sulphide content, solids metal contents, or were related to geochemical equilibrium. A good correlation was observed between sulphate loading rates and sulphide content for BMS, BS, and MSS samples. Correlations with either sulphide or metal contents were observed for the BMS (aluminum, cadmium, lead), BS (iron, lead, uranium, zinc), and MSS (cobalt, iron, lead, nickel, zinc) mine rock samples. Correlations were not determined for MSED as results for only two HCTs were available. Loading rates for tailings HCT results were also calculated. The loading rates from all tests were also scaled to field conditions by accounting for the assumed temperature and particle size differences between the laboratory test conditions and field conditions.

The loading rates from the humidity cells and barrel tests are suitable for incorporation into a water quality model to assess the effects of contact water with pH values above 5 on downstream water quality or to determine what mitigation may be required for contact waters. If acidic conditions develop, loading rates may be expected to increase for several COPCs.

The conclusions from this ongoing assessment are as follows:

- The majority of the rock samples, including representative samples from all rock types, that were characterized in this investigation can be classified as PAG, with specific areas that warrant further follow-up for confirmation of possible NAG status;
- The one tailings sample that was characterized can be classified as PAG; and
- Mitigation strategies will be required to manage mine rock and tailings and to prevent acidic drainage and negative effects on downstream water quality at the site following closure.

It should be noted that the majority of the sampling to date has focused on the mineralized areas of the deposit. Treasury Metals are currently developing a testing program that would help identify the characteristics of materials near the periphery of the open pit to determine whether sufficient there are sufficient volumes of NAG materials suitable for use as a construction present.

5.5 Soils

The dominant regional landform in the vicinity of the Project is predominately a Glaciolacustrine Plain (Figure 5.5.1-1). The regional soils were categorized based on visual observations by Klohn Crippen Berger (KCB 2012) and by mapping available from the Ontario Institute of Pedology (OIP 1984) for the Dryden-Kenora Area. The three major soil classifications found in the regional study

area (RSA) that will play a role in Project development, land use, reclamation, and water management are: Gray Luvisols, Gleysols, and Podzol.

The potential for the local soils in the Project area to be used as material in reclamation is good. Soil management would be required for stockpiling to maintain the nutrient content and the physical and chemical stability of the organic material. Mixing the organic topsoil with the finer textured subsoils would be beneficial for soil structure and provide optimal rooting conditions and water holding capacity. Soils sampled had low metal contents generally at or below Ontario typical range soil conditions.

5.6 Hydrogeology

An assessment has been made of the occurrence of private water wells within a 5 km radius of the proposed pit using geographic location data from the Ontario Ministry of the Environment and Climate Change's (MOECC) water well information system (WWIS). A total of 139 wells were identified within this area based on the UTMs provided on WWIS, with ten being subsequently removed from the data set for being identified as outside of the study area. Seventy percent of these wells derive their water from the shallow bedrock horizon.

The closest water wells outside of the Company's property are those on Thunder Lake, approximately 1.5 km from the proposed pit. Otherwise, there are no wells within 2 km of the proposed pit and no wells identified to the north or east.

Overburden thickness in the Project area averages approximately 7.5 m with thickness rarely exceeding 15 m. The overburden material is comprised of mainly clay with subordinate silt (i.e. clay; silty clay; clay; layered clay and silt). A relatively, discontinuous thin basal sand layer may occur at the bottom of the clay and has an average thickness of 3 m to 4 m.

The Project is located in the Wabigoon Subprovince with rock structure dipping at approximately 70 to 80 degrees to the south-southeast. The Wabigoon Fault is located approximately 2 km to 3 km to the south of the Project.

Hydrogeological data were collected on the property from spring 2012 to early 2014 using methods of:

- Hydraulic conductivity testing using existing boreholes;
- Three additional deep holes drilled to specifically target further test areas;
- Installation of vibrating wire piezometers;
- Eight overburden monitoring wells for water quality and level testing;
- 9 existing exploration holes for water level monitoring; and
- 20 geotechnical boreholes across the Project area.

Slug testing of the majority of the groundwater quality wells was conducted by in February 2014. Overall the majority of values obtained appear to be representative of the overburden bedrock contact when silty sand is present.

Groundwater levels in the groundwater quality wells and also a selection of open exploration boreholes were measured in 2013. Water levels measured were consistently within 7 m of ground surface and on average within 3 m of ground surface. Groundwater level fluctuations are typically in the order of 1 m to 2 m. Two of the exploration holes measured were flowing intermittently and two of the 2014 geotechnical holes had water levels at surface after the 2014 freshet.

Overall it appears that groundwater levels are relatively close to surface and approximately follow topography. Groundwater flow from the Project site follows the surface drainage with flow both to the west towards Thunder Lake and to the south towards Wabigoon Lake.

Most of the groundwater flow that occurs around the Projects site is expected to follow the topography with greatest flows along the contact between the upper weathered and fractured bedrock and the basal sand. Rates of groundwater flow are expected to be much lower in the deeper bedrock. The following four hydrostratigraphic units have been identified for the bedrock:

- Shallow Bedrock – this is expected to occur within 10 m of the bedrock surface due to near-surface weathering and fracturing;
- Intermediate Bedrock – this refers to bedrock from approximately 10 metres below grade (mbg) to a depth of around 400 mbg (~ 0 metres above sea level [masl]);
- Deep Bedrock – this refers to bedrock where there are very few fractures (rock quality designation [RQD] > 90%) and very low hydraulic conductivities, which is expected to occur below 400 mbg (~ 0 masl); and
- Deformation Zone of the Central Unit – this is a steeply inclined zone that occurs in all three of the above units. It is expected to have half to one order of magnitude higher conductivities in the units not affected by near-surface weathering (i.e. intermediate and deep bedrock).

These aspects of the conceptual hydrogeological model have been used to build a numerical model to estimate groundwater inflows to the mine, its zone of influence, base flow depletion at sensitive creeks and leakage from the tailings management area (TMA) and WRSA to groundwater and the potential location of discharge of this water.

Little Creek and Hoffstrom's Bay Tributary are located on clay overburden and have very limited base flow. Blackwater Creek is also predominantly on clay overburden and similarly has limited base flow. Thunder Lake Tributaries 2 and 3 are situated in a watershed with a higher percentage of granular materials, and base flow from groundwater discharge is expected to be a larger contributor to flows in these watercourses.

5.7 Surface Hydrology

Surface water flows at the Project site are limited to creeks which flow ultimately to Wabigoon Lake. The Project area is located in a catchment with an area of approximately 122 km^2 located within the Wabigoon watershed. The average slope within the Project area is approximately 4% and the elevations vary from 370 m to 495 m. Surface water flow at the Project site is currently monitored by seven hydrological stations distributed throughout the Wabigoon Lake and Thunder Lake sub watersheds.

Sediment analysis on site has indicated good sediment quality, with the majority of parameter concentrations below Provincial Sediment Quality Guidelines and Federal Canadian Environmental Quality Guidelines. Metal parameters were detected at higher concentrations include chromium, copper, iron and magnesium, zinc and nickel. Exceedance in total organic carbon were also seen across the site.

5.8 Aquatic Resources

The aquatic resources of the Project area, as described below, have been adapted from various reports prepared to support the EIS. The first of these was prepared by Klohn Crippen Berger (2012), and represent a broadly based evaluation of the existing environmental conditions. This report was included as Appendix G to the original EIS, but has been largely replaced by subsequent studies completed since 2012. Where information from the KCB (2012) report are still relied on in the EIS, the information has been incorporated into subsequent studies. Specifically, Appendix Q (Summary Fisheries Baseline Report [2011 to 2016]) to the revised EIS consolidates the fisheries information used from KCB (2012), the baseline fisheries information compiled by DST Consulting Engineers (included as Appendix Q to the original EIS), as well as additional fisheries work completed since the filing of the EIS. The surface water quality information is derived from the sampling work completed in 2012/2013 by DST (Appendix P to the revised EIS).

5.8.1 Surface Water Quality

More than two years of surface water quality samples have been collected in or near the Project area beginning November 2010 (KCB 2012) and again in 2012/2013. Sites were initially selected to capture pre-development site conditions and, during the planning process, considered the distribution of catchments, creeks, rivers, and other waterbodies to characterize the spatial and/or temporal variability in water chemistry (KCB 2012). The 2010/2011 survey identified sample locations in the local study area (LSA) that included Blackwater Creek, which is of concern because it is the primary watercourse draining the proposed Project. Blackwater Creek drains into the Wabigoon Lake Watershed. The larger regional study area (RSA) also included areas of Blackwater Creek, Hughes Creek, and Thunder Lake sub-catchment and their associated tributaries. Also during the 2010/2011 survey, a far-field station (SW3 at McHughs Creek and Highway 17) was sampled to capture information in a catchment that will not likely be impacted by mining developments as planned at the time of study.

Following the 2010/2011 survey, the specific location of sampling sites evolved as additional information about the Project footprint was developed. Nine locations were added and three locations were discontinued during the 2012/2013 sampling program. Additional sites include tributaries to Thunder Lake and locations along Blackwater Creek. At each surface water sampling site, in situ field measurements included: water and air temperature, pH, conductivity, total dissolved solids, dissolved oxygen, and turbidity. Oxidation reduction potential was measured during 2012/2013 only. Samples were also collected and analyzed for physical and inorganic parameters, as well as total and dissolved metals. The results of inorganics and dissolved and total metals surface water analyses were compared to the Ministry of Environment and Energy Provincial Water Quality Objectives (PWQO) for the protection of aquatic life and recreation in freshwater (MOEE 1994).

There are two surface waterbodies in the LSA/RSA that are known to be sources for potable water: Wabigoon Lake and Thunder Lake. Wabigoon Lake provides raw water for the City of Dryden and some residences along the shore. The City of Dryden provides water treatment prior to distribution. Some residences along the shore of Thunder Lake draw water for residential use. As these are private dwellings it is unknown whether secondary treatment is conducted.

5.8.2 Benthic Invertebrate Community

Benthic invertebrate samples were collected in October of 2011 and 2012 at the locations shown in Listed in Table 5.8.3-1 and shown in Figure 5.8.3-1. In 2011, three replicate samples were collected from six locations in the Blackwater Creek watershed using a Ponar grab. In 2012, samples were collected from 6 locations in the Blackwater Creek watershed and four locations in the Thunder Lake Tributary 2 and Tributary 3 watershed using the Ontario Benthic Biomonitoring Network travelling kick and sweep method, with samples from two riffles and one pool at each location combined in the field to form one composite sample. In 2012 benthic invertebrates samples, consisting of three composited Ponar grabs, were also collected from the bay in Thunder Lake that Unnamed Tributary 2 drains to and from two locations in Wabigoon Lake.

Results of benthic invertebrate sampling from Blackwater Creek in 2011 indicated a general increase in mean number of taxa and taxa richness from upstream to downstream sites with mean number of taxa ranging from approximately four to 14. Additionally, approximately 61% of the total specimens within all samples consisted of chironomids (order Diptera) which is typical of slow moving streams with silt and clay substrates or where oxygen availability is limiting to many other taxa.

5.8.3 Fish and Fish Habitat

The proposed project is in the English River watershed, which is a tributary to the Winnipeg River and in the Nelson River primary watershed. There are two large lakes in the vicinity of the Project, Thunder Lake and Wabigoon Lake. There are also a number of small streams and tributaries in the vicinity of the Project that drain to Thunder Lake and Wabigoon Lake. The primary watercourse is Blackwater Creek, which runs generally north to south through the Project area,

draining into Keplyn's Bay on Wabigoon Lake. Based on the current Project design, two tributaries of Blackwater Creek (referred to as Blackwater Creek Tributary 1 and Blackwater Creek Tributary 2) will be partially overprinted by the Project and directly impacted. In addition, Blackwater Creek and its tributaries will experience changes in flows as a result of the Project, and will also be the recipient of the treated effluent discharged during operations. Thunder Lake Tributary 2 and Thunder Lake Tributary 3 are located to the north of the Project and drain into Thunder Lake. During operations, fresh water needed to supplement the Project will be withdrawn from the former MNRF tree nursery irrigation ponds located on these watercourses. Additionally, there is the potential that the dewatering of the open pit and underground mine required to provide a safe working environment could affect flows in these watercourses that are underlain by glacial outflow deposits. As part of the refined Project design, a perimeter berm and inboard perimeter ditch will be constructed around the operations area to isolate it from surrounding environment. The perimeter berm and ditch will enclose a small portion of the catchments for Hoffstrom's Bay Tributary and Little Creek, resulting in decreased flows in each watercourse. The fisheries field investigations were focused on those waterbodies likely to be affected by the Project, including Blackwater Creek and its tributaries, Thunder Lake Tributary 2, Thunder Lake Tributary 3, Little Creek and Hoffstrom's Bay Tributary, as well as those portions of Thunder Lake and Wabigoon Lake in the vicinity of those waterbodies.

A total of 10,236 fish were captured at 130 sample sites: 8,265 fish were captured by Klohn Crippen Berger (2012) at 66 sample sites and DST (2014b) captured a total of 1,971 fish over 68 sites. Thirty-six fish species were identified during a review of historical records while presence of only thirty one fish species, including two identified to the genus level, was confirmed by field sampling. Fish indicated in historical reviews but not confirmed by field surveys include: Cisco, Lake Trout, Lake Whitefish, Longnose Sucker, Muskellunge and Nine-spine Stickleback. Fish captured in field surveys but not included in the historical records include Brassy Minnow. No records of fish SAR were found within the regional study area (RSA) and none were encountered during field surveys.

Traditional knowledge available from local Aboriginal communities indicated that Blackwater Creek supports baitfish species, as well as sucker which spawn as far upstream as Tree Nursery and Norman Roads. The lower reaches of Blackwater Creek, most notably the creek mouth area, were also noted as providing spawning habitat for northern pike and muskellunge. Traditional knowledge also identified spawning by northern pike and muskellunge in the mouth area of Thunder Creek, and spawning by walleye and sucker within the creek. Baitfish have also been identified as occurring in the tree nursery ponds, and in Project area creeks, including beaver ponds. Nugget Creek to the south of the Project area was also noted as a spawning area for walleye. Thunder Lake was noted as a coldwater, spring fed lake that supports a trout (lake trout) population, among other species. Both the Wabigoon Lake Ojibway Nation and Whitefish Bay First Nation hold commercial fishing licences on Wabigoon and Thunder Lakes.

5.9 Terrestrial Resources

5.9.1 Vegetation

The Project is located within the Ontario Shield Ecozone, the largest ecozone in Ontario. This ecozone is typified by extensive wetlands and boreal forests. Within the ecozone, the Project is situated within the Lake Wabigoon Ecoregion (Ecoregion 4S), within the Lower English River Section of the Boreal Forest Region. This ecoregion is characterized by a range of forest types (mixed forest 25%, sparse forest 24%, and coniferous forest 14%) and open water (24%). Typical tree species include trembling aspen (*Populus tremuloides*), balsam poplar (*Populus balsamifera*), spruces (*Picea glauca, Picea marina*), white birch (*Betula papyrifera*) and willows (*Salix spp.).* Biologists detected 270 vascular plant species in the LSA during the course of field survey activities, 25 of which were introduced species commonly associated with disturbed habitats. Most of the remaining species are typical of Ontario's boreal forest. The only plant species at risk observed within the LSA (during all field work activities) was the floating marsh marigold (*Caltha natans*) observed in the Thunder Creek wetland near the mouth of Thunder Creek.

Blueberries and other types of berries, such as raspberries and pin cherries, frequently occur in more open, often previously disturbed areas, and are an important food source for local Aboriginal peoples. Traditional knowledge shows that blueberry harvesting areas occur within and near to the Project site including within the TSF footprint, and just south of the tree nursery area. Blueberry patches are often associated with sandy, more open areas. Wild mushrooms (chanterelles and morels), which are harvested by local Aboriginal peoples, also occur within and near to the Project area. Medicinal plants such as cedar, white birch, Labrador tea and low bush / ground hemlock are common throughout the area.

Wild rice (*Zizania palustris*) communities were detected at the mouths of Thunder, Blackwater, and Nugget creeks and at Hughes Pond. These communities occupy an estimated area of 12.8 ha within the LSA. Wild rice is a traditional food source for many First Nations, and is harvested commercially in the region by members of the Wabigoon Lake Ojibway Nation. Waterfowl are commonly associated with wild rice beds.

Landcover in the regional Project area is 61% forest, 20% wetland, 14% water, 5% development land and <1% barren land. Locally land cover is 62% forest, 21 % water, 9% developed land, 8% wetland, and <1% barren land. The diversity of underlying landforms within Ecoregion 4S has resulted in a wide diversity of habitats within the regional area.

5.9.2 Wildlife

Wildlife surveys conducted between 2011 and 2012 identified species of birds, reptiles and amphibians, mammals and species at risk. The area exhibits a relatively high diversity of avian and mammalian species that reflect the diversity of available habitats. Species observed during

surveys in the regional and local study areas are considered to be largely abundant and common to region.

Moose are the dominant ungulate in the area, but white-tailed deer also occur. Both are important game species to local Aboriginal peoples and moose have been noted through traditional knowledge as occurring in the Blackwater Creek area. Also based on traditional knowledge, a number of furbearers occur in the area, with marten, fox and beaver being among the most important and commonly cited species. Fox denning habitat has been identified in the vicinity of the TSF. Traditional knowledge has also indicated that the general Project area is positioned within a fly through area for migratory birds, and that migratory birds nest in the area, and particularly in an area located just to the north of the Project site area. Species such as robins and other birds were noted as feeding on blueberries and other berry species. Wild turkeys and owl species were also noted by Aboriginal peoples as occurring in the area.

Two terrestrial mammalian SAR were observed within the LSA during field survey efforts: Little Brown Myotis (2011 and 2012) and Northern Myotis (2012). Seven bird SAR were observed within the LSA during the field survey efforts. Bald Eagle, Peregrine Falcon, Black Tern, Common Nighthawk, Barn Swallow, Canada Warbler, Olive-sided Flycatcher. Seven additional bird SAR are potentially present (at least in some years) but have not yet been reported from the LSA: American White Pelican, Bobolink, Eastern Whip-poor-will, Golden Eagle, Least Bittern, Short-eared Owl, and Yellow Rail. Snapping Turtles, Northern Leopard Frog, and Green Frog are known to occur in the Dryden vicinity but were not observed during field survey efforts within the LSA.

As part of traditional knowledge gathering, someone shared that a Barn Owl had been observed in the Project area. Barn Owl are an Endangered Species and are protected provincially in Ontario, as well as federally. According to the Ontario Ministry of Natural Resources and Forestry (MNRF) website there are fewer than five pairs of Barn Owls in Ontario, all of which were observed in southern Ontario. This species does not tolerate severe winter temperatures, and southern Ontario is the northern limit of its range. Therefore, the observation of a Barn Owl in the vicinity of the Project is seems highly unlikely as northern Ontario does not support a suitable habitat for this particular endangered species. It is possible that the observer may have seen another species of owl that was mistakenly identified as a Barn Owl, or the reference may have been to a Barred Owl which is much more common and widespread.

5.9.3 Wetlands

Initial surveys of nine wetlands were conducted in 2012 by DST. Wetlands were selected based on the potential for adjacent developments. Supplementary surveys were conducted in 2016, which expanded data collection to 11 wetlands. Upon request, KBM also compiled all available historical data for Lola Lake Provincial Nature Reserve. The purpose of completing the wetland evaluations within the Project area was to acquire baseline data on all wetlands, peatlands, and riparian plant communities, as well as to map and describe wetlands following the Ontario Wetland Evaluation System (OWES). The specific objectives were to:

- Characterize all riparian/wetland vegetation communities according to the appropriate classification guides (OWES).
- Describe individual wetland vegetation community distribution, structure, and diversity.
- Identify any provincially significant wetlands (PSWs).
- Wetlands are defined by OWES as “lands that are seasonally or permanently flooded by shallow water as well as lands where the water table is close to the surface; in either case, the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic or water tolerant plants.” There are four recognized OWES wetland types: bog, fen, swamp and marsh. Any discrete wetland may be composed of one or more of these wetland types.
- Prior to fieldwork, Forest Resource Inventory (FRI) data and 1:6,500 Google Earth satellite images of each wetland were examined. A first estimate of wetland boundaries and vegetation community boundaries were interpreted and marked onto each image. All vegetation communities were visited in the field to confirm vegetation community boundaries and to identify vegetation forms and species. Wetland boundaries on satellite images were corrected as required in the field.

During the wetland surveys, efforts were made to identify any observations of wild rice. As identified during the engagement process wild rice represents an important resource to Indigenous communities. The figure also illustrates the local study area used for evaluating the potential effects of the Project on wild rice. One wild rice stand was identified in during wetland surveys and a further 14 stands were identified in the wild rice LSA from Watershed data from Land Information Ontario (LIO) data.

5.9.4 Mammals

Several mammal surveys were conducted within the LSA, including:

- Encounter surveys (i.e., meandering transects through potential habitat) focused on key ungulate habitats (e.g., winter deer yards, potential calving areas, mineral licks, and potential denning sites) and SAR habitats (e.g., grasslands for American Badger, Taxidea taxus taxus);
- Moose Aquatic Feeding Area surveys (2012, 2016)
- Presence/absence acoustic monitoring for bats (2011 and 2012); and
- An extensive monitoring program established to identify bat maternity roost (2015).

Twenty mammal species were documented in the LSA across the 2011 to 2016 field seasons. Several large mammals and furbearers were regularly observed in the Project area.

Small mammal trapping surveys in October 2012 and July 2016 documented six species over a total of 119 and 160 trap-nights, respectively.

Passive acoustic monitoring of bat activity in 2011 and 2012 detected five species: Hoary Bat (*Lasiurus cinereus*), Silver-haired Bat (*Lasionycteris noctivagans*), Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*) and Big Brown Bat (*Eptesicus fuscus*). Both the Little Brown Myotis and Northern Myotis are listed as endangered in Canada.

Potential bat maternal roosts were sparse within the Project area. Although snag density ranged from 40-50 snags/ha, only five high quality roosts were identified in roughly 22 ha of forest assessed. These snags represent a highly limited resource. No bat species were observed using the roosts during an exit survey in 2015, but two bats of unknown species were observed flying over the area.

Beaver activity was recorded opportunistically as encountered in the field (dams, lodges). Historical beaver activity was determined through a review of past satellite imagery.

The moose aquatic feeding area (MAFA) survey located one potential high quality MAFA in wetland WLD9. This wetland, which is situated on Thunder Lake Tributary 3, upstream from the irrigation ponds at the former MNRF tree nursery.

No targeted moose calving surveys were completed during the field program; however, efforts to observe evidence of moose calving while conducting other field surveys was made, particularly when surveying wetlands, and peninsulas (i.e., suitable calving areas). No evidence of moose calving was observed during any field surveys. Searches were made for calving evidence during all wetland evaluations and MAFA surveys.

No targeted mineral lick or den site field surveys were completed during the field program. According to the MNRF's Significant Wildlife Habitat Technical guide, observing and locating mineral licks and den sites, is extremely difficult. With regard to denning sites, The Significant Wildlife Habitat Technical Guide states "*Exhaustive searches are not recommended, since feeding and denning sites for all these mammals are usually very hard to find. Long-term survival of these species and other carnivores with large ranges is best assured by taking a broad, landscape approach to Natural Heritage System planning by identifying and protecting large natural areas that include the best quality habitat for these species. Protection of sufficient habitat for these area-sensitive species will also help provide suitable habitat for many other species*." Locating den sites can be very challenging and is usually accomplished opportunistically. If a den site was observed during any other field survey it would have been documented and marked with a GPS point. No den sites were observed during any field surveys.

Mineral licks are found in association with upwelling groundwater and the soil around these seepage areas. It typically occurs in areas of sedimentary and volcanic bedrock. In areas of granitic bedrock, the site is usually overlain with calcareous glacial till. Suitable surface and sub-surface (i.e., soil) conditions were not observed within the LSA that would support a mineral lick.

5.9.5 Birds

Several bird surveys were conducted within the LSA and RSA, including:

- Breeding Bird Surveys (2011 to 2012, 2016);
- Barn Swallow nest searches (2012, 2016);
- Bird Migration Surveys (2011);
- Marshbird and Waterfowl Surveys (2011 to 2012, 2016);
- Bobolink Surveys (2011);
- Whip-poor-will and Common Nighthawk Surveys (2011 to 2012); and
- Stick Nest Surveys (2010 to 2011, 2015).

A total of 100 bird species were encountered across 140 breeding bird surveys stations. Avian species richness was highest in developed areas (76 species) when compared to deciduous (65), coniferous (63), wetland (37), successional (35), and upland habitats (28). The most frequently encountered species were: White-throated Sparrow (*Zonotrichia albicollis*, 177 observations), Red-eyed Vireo (*Vireo olivaceus*, 104), Nashville Warbler (*Oreothlypis ruficapilla*, 97), American Robin (*Turdus migratorius*, 85), Swanson's Thrush (*Catharus ustulatus*, 75), Ruby-crowned Kinglet (*Regulus calendula*, 72), Ovenbird (*Seiurus aurocapilla*, 67), Hermit Thrush (*Catharus guttatus,* 57), Red-breasted Nuthatch (*Sitta canadensis*, 50), and Magnolia Warbler (*Dendroica magnolia*, 49).

5.9.6 Amphibians and Reptiles

Several reptile and amphibian field surveys were conducted in the LSA and RSA, including:

- Visual Encounter Surveys (2011); and
- Roadside Call Surveys (2011 and 2012).

Further, passive acoustic monitors were deployed in 2011 to record calls from birds, frogs, and bats (33 recorder location-nights). Six amphibian species have been recorded within the LSA: Spring Peeper (*Pseudacris crucifer*), Boreal Chorus Frog (*Psuedacris maculata*), Grey Treefrog (*Hyla versicolor*), Wood Frog (*Lithobates sylvaticus*), American Toad (*Anaxyrus americanus*), and Blue-spotted Salamander (*Ambystoma jeffersonianum-laterale* "complex").

Extensive visual encounter surveys specifically targeting Snapping Turtles (*Chelydra serpentine*) were conducted in appropriate habitats (e.g., basking logs, soil banks) throughout the field program. Western Painted Turtle (*Chrysemys picta belli*) and Eastern Garter Snake (*Thamnophis sirtalis sirtalis*) were regularly detected within the LSA, but no reptile or amphibian SAR were encountered.

5.9.7 Invertebrates

Incidental observations gathered during the 2011 field efforts included four butterflies (*Papilo glaucus candensis*, *Colias eurytheme*, *Celastrina ladon*, *Nymphalis antiopa*), two damselflies (*Calopteryx aequabilis*, *Nehalennia irene*) and 16 dragonflies (*Aeshna canadensis*, *Aeshna interrupta*, *Arigomphus cornutus*, *Boyeria grafiana*, *Dorocordulia libera*, *Dromogomphus spinosus*, *Epitheca cynosura*, *Gomphus graslinellus*, *Gomphus lividus*, *Hagenius brevistylus*, *Leucorrhinia hudsonica*, *Libbellula lydia*, *Libellula pulchella*, *Libellula quadrimaculata*, *Macromia illinoiensis*, *Sympetrum danae*).

Only one invertebrate SAR, Monarch (*Danaus plexippus*) is known to occur within the RSA, but was not observed throughout the field program

5.9.8 Significant Wildlife Habitat

An inventory of significant wildlife habitat, as described in MNRF (2000), was conducted across the LSA in 2010 to 2011 and 2015. Specifically, these habitats include colonial and raptor nest sites, migratory bird staging and stopover areas, ungulate wintering areas and calving/fawning sites, winter deer yards, moose aquatic feeding areas (MAFAs), mineral licks and hibernacula (reptiles and bats).

5.10 Migratory Birds

Several bird surveys were conducted within regional and local study areas associated with the Project, including:

- Breeding Bird Surveys (2011 to 2012, 2016);
- Barn Swallow nest searches (2012, 2016);
- Bird Migration Surveys (2011);
- Marshbird and Waterfowl Surveys (2011 to 2012, 2016);
- Bobolink Surveys (2011);
- Whip-poor-will and Common Nighthawk Surveys (2011 to 2012); and
- Stick Nest Surveys (2010 to 2011, 2015).

A migratory bird survey was conducted in 2011, following the *Hawk Migration Association of North America protocol* (HMANA 2011). The survey was intended to identify the potential for migratory route and/or stopover habitat based on known regional bird migration patterns in the LSA. Six survey stations, focusing on shoreline and wetland habitats, were established to describe potential stopover habitats. These stations offered an unimpeded view for at least several hundred meters to the north, east, and/or west to observe birds migrating south. Only migratory birds (i.e.,

bird species known to migrate and that were purposively flying south or southwest at the time of the survey) were documented during the surveys.

5.11 Species at Risk

The only plant SAR observed within the LSA (during all field work activities) was the floating marsh marigold observed in the Thunder Creek wetland near the mouth of Thunder Creek.

Two terrestrial mammal SAR were observed within the LSA during field survey efforts: Little Brown Myotis (2011 and 2012) and Northern Myotis (2012). The maternity roost survey (2015) determined that some high quality roosts are present in the Project area, but at very low densities. No bat species were observed using the roosts during an exit survey in 2015, but two bats of unknown species were observed flying over the area.

Eight bird SAR were observed within the LSA during the field survey efforts. Bald Eagle, Barn Swallow, Black Tern, Canada Warbler, Common Nighthawk, Olive-sided Flycatcher, Peregrine Falcon and Rusty Blackbird. Of these, only Barn Swallows are listed as Threatened, and are therefore afforded additional protection. Barn Swallows were observed foraging over ponds, lakes, fields and other open habitat in the LSA and were commonly observed along roads. Active nests were observed on buildings on the former tree nursery grounds in June 2011 and in 2012. No active nests were observed in 2016, as Treasury Metals personnel had made concerted efforts to restrict access to many of the outbuildings on the property.

5.12 Human Environment

5.12.1 Land Use

The Project is located within with the Kenora District in northwestern Ontario (Figure 5.12.1-1). The Project site is approximately 4 kilometres (km) northwest of the Village of Wabigoon, 20 km east of the town of Dryden and 2 km north of the Trans-Canada Highway 17 and within the Hartman and Zealand townships. Access to the Project property is via existing gravel roads managed through the Local Services Board: Tree Nursery Road, and Anderson Road which originates at Highway 17, west of the village of Wabigoon.

The Project area includes the following towns and communities within the Kenora and Thunder Bay Districts:

- First Nations Reserves:
  - Wabigoon Lake 27, First Nation reserve, Ontario;
  - Eagle Lake 27, First Nation reserve, Ontario;
  - Wabauskang 21, First Nation reserve, Ontario;
  - Lac Seul 28, First Nation reserve, Ontario;

- Whitefish Bay 32A, First Nation, Ontario;
- Whitefish Bay 33A, First Nation, Ontario;
- Whitefish Bay 34A, First Nation, Ontario;
- Lac des Mille Lacs 22A1, First Nation, Ontario;
- Lac des Mille Lacs 22A2, First Nation, Ontario; and
- Grassy Narrows (English River 21), First Nation, Ontario.

- Cities, Towns, Municipalities:
  - Village of Wabigoon, Ontario;
  - City of Dryden, Ontario
  - Eagle Lake & Vermilion Bay (Machin), Municipality, Ontario;
  - Sioux Lookout, Municipality, Ontario; and
  - Atikokan, Town. Ontario.

While there are no Federal Parks near the Project site, there are two Provincial Nature Reserves located proximal to the Project site, Lola Lake Nature Reserve (5 km northwest), and Butler Nature Reserve (10 km southwest). Aaron Provincial Park which is owned by the City of Dryden and operated by Ontario Parks is located adjacent to the Project boundary. The Project is located within the area covered by Treaty #3. The Treaty #3 area includes approximately 14,245,000 hectares (ha) in Ontario ranging from the vicinity of Upsala in the east, following the Canada-United States border in the south, and extending past the Ontario-Manitoba border in the west (Figure 5.12.1-3). Treaty #3 includes 28 First Nation communities and a number of villages and towns including Wabigoon, Dryden, Eagle Lake, Vermillion Bay, Sioux Lookout, Atikokan, Fort Frances, and Kenora. The Project is also located within an area identified by the Métis Nation of Ontario as the Treaty 3/Lake of the Woods/Lac Seul/Rainy River/Rainy Lake traditional harvesting territories, also named Region 1.

Wabigoon Lake Ojibway Nation and Eagle Lake First Nation are the closest Indigenous communities to the Project site. Other Indigenous communities present in the area include: Wabauskang First Nation, Lac Seul First Nation, Whitefish Bay First Nation (Naotkamegwanning First Nation), Grassy Narrows First Nation, and Lacs des Mille Lacs First Nation. The traditional lands of a number of these communities are known to overlap with the Project site and its immediate environs and downstream waters. Traditional activities practiced by members of these communities and by members of the Métis Nation of Ontario in the general region overlapping with and surrounding the Project site include travel, fishing, hunting, trapping, gathering, and other cultural pursuits and activities connected to the land. The current uses of the land and resources for traditional purposes by Aboriginal peoples is specifically discussed in Section 5.13 of the EIS.

Key uses of the land by the general population include forestry, harvesting of plant materials such as berries, mushrooms, and wild rice, hunting and trapping, and fishing.

Fish represent an important nutritional source in Ontario and this becomes especially true in northern Ontario. To assist those ingesting fish in Ontario, the MOECC provides fish consumption advisory tables for regions where the ingestion of fish may pose risk to human health. In the area directly surrounding the Project, the MOECC provides a fish consumption advisory for the following lakes and species of fish:

- **Wabigoon Lake**: Black Crappie[1], Cisco (Lake Herring)[1], Lake Whitefish[2], Muskellunge[1], Northern Pike[1], Redhorse Sucker[1,] Rock Bass[1], Sauger[1], Smallmouth Bass[1], Walleye[1], White Sucker[1], and Yellow Perch[1]; and
- **Thunder Lake**: Lake Trout[1,2], Northern Pike[1], Smallmouth Bass[1], Walleye[1], and White Sucker[1].

Superscripts in the consumption tables and in the list above identify the contaminant or group of contaminants that are causing consumption restrictions within a given species/location. In the Project area, the following two contaminants are considered as part of the consumption advisories:

- **(1) Mercury:** Mercury, is converted to methylmercury and absorbed by a fish either from water passing over its gills or it is ingested with its diet. Since fish eliminate mercury at a very slow rate, concentrations of this substance gradually increase. Fish at the top of the food web such as Walleye and Pike usually have the highest mercury levels.
- **(2) Polychlorinated biphenyls (PCBs):** PCBs are a group of chlorinated organic compounds first commercially developed in the late 1920s and banned in the 1970s. They persist for decades in the natural environment and readily accumulate in the aquatic ecosystem

5.12.2 Social Factors

Population data were collected from the Statistics Canada 2016 census for general population statistics for the regions surrounding the Project site. In Section 5.13 the data are further grouped by the demographics of the population who define themselves as having Aboriginal identify or part of an Indigenous community (i.e., First Nations, Métis, or Inuit).

According to the Statistics Canada 2016 census data the City of Thunder Bay represents the highest concentration of population (107,909), the City of Kenora, the second largest (65,533) followed by the City of Dryden (5,586) and Sioux Lookout (5,272) for the Project. For most regions the median age (mean 44.6, n= 9) is over the provincial (41.3) and Canadian national median (41.2). Generally, the population in these regions of north western Ontario are decreasing, whereas the provincial and national population are increasing. This along with a percentage decrease on the 20 to 24 age group in comparison with 2011 points to an outmigration of young adult population. In most cases this pattern is due to the pursuit of school and work opportunities

outside of their work communities due to the reduction of employment opportunities in the mining and forest industry sectors.

The 2016 census data indicates that in these regions surrounding the Project site, the percentage of the population identified as being third generation or more Canadian was substantially higher (range: 75% to 85%, n= 8) than those observed in Thunder Bay (69%) and the provincial (45%) and national (57%) rates. In addition, these regions have a substantially higher percent of the population who identify as members of an Indigenous communities (range 13% to 51%, n=8) versus the Thunder Bay (12%), provincial (2.7%), and national (4.6%) statistics. The 2016 census placed a large emphasis on immigrations statistics and languages spoken, however the regional demographics in these areas indicate that the areas surrounding the Project have experienced very little immigration, which will be an important determinant for social programs. A detailed discussion of Indigenous communities is provided in Section 5.13.

Information regarding education, housing, crime and justice, and poverty and social issues were also presented.

5.12.3 Economic Factors

On the provincial level, Ontario's unemployment rate was 7.4% in 2016 which was slightly lower than the national rate of Canada of 7.7%. Unemployment rates in the Study Area ranged from 6.1% in Sioux Lookout to 16.7% in Wabigoon.

Historically, northwestern Ontario's economy has been tied to its landscape and the abundant natural resources contained therein, particularly in forestry and mining as well as tourism. In Thunder Bay the largest amount of labour force participation is in the Sales and Services category. The lowest labour force is in the Natural Resources and Manufacturing occupations.

The main sources of income in Kenora come from different industries that include tourism and tourism-related service businesses, recreation businesses, cottage building and services, value-added forestry, mining and mining services. The two largest private employers in Kenora are the Trus Joist Weyerhaeuser TimberStrand mill and the Canadian Pacific Railway.

5.12.3.1 Income Levels

The median household income for the cities, towns and municipalities surrounding the project area (range, $26,432 to $43,173) were generally lower or consistent with the provincial and notational averages of $33,539 and $34,204, respectively.

Lower median household incomes in some communities in the Study Area may be attributed to an aging population reaching or entering into retirement. Pension or retirement income is considerably lower than working income, which may partially contribute to lower median incomes.

5.12.3.2 Economic Development

Historically, northwestern Ontario's economy has been tied to its landscape and the abundant natural resources contained therein, particularly in forestry and mining as well as tourism. Prior to 2006, northwestern Ontario's primary economic driver was the forestry sector. However, the global recession combined with recent falling lumber prices resulted in devastating impacts on forestry sector. Many local mills were closed or significantly downsized as a result of falling demand. Recently, the forestry sector has seen increased activity, such as the re-opening of the Eacom Forest Products (Ear Falls) and Mckenzie Forest Products (Hudson) sawmills in 2014, but it seems unlikely the industry will return to its previous levels of activity. Many communities are now struggling to diversify their economies to keep dollars circulating locally, meanwhile many workers and families continue to migrate out of the region in search of employment opportunities.

The rich mineral deposits of the Canadian Shield have attracted many mining companies to the region for exploration and extraction. In the wake of the recent recession of the forestry sector, mining activity in the region has received increased attention as a major employer. Speculation regarding the Ring of Fire has also lead to increased political interest in current mining infrastructure and development projects. There are currently six active mines in the region, with many more exploration activities ongoing.

5.12.4 Heritage Resources

The Project is located in the DgJc Borden block. A site registration database information request made through the Ministry of Tourism, Culture and Sport resulted in no reported archaeological sites within two kilometres of the Project.

Archaeological sites are most often associated with major waterways and with well-drained, sandy soils. The Project site is set back from the shorelines of Wabigoon Lake and Thunder Lake. The soils within the Project area are silt and wet clay over bedrock, which suggests low archaeological potential. Site inspection of disturbances and access roads with disturbed exposures found no cultural material. The several small areas of elevated topography were observed to have been disturbed by past wood harvesting activities. The Project site therefore does not have topological, surface water, or soil characteristics that would indicate any archaeological potential. This has been confirmed by an on-site Archaeological Assessment completed by a qualified archaeologist.

No built heritage resources have been identified in the Project area. The regional area has a number of historical mine sites due to turn of the century mining activities.

5.13 Indigenous Communities

'Indigenous peoples' is a collective name for the original peoples of North America and their descendants. Often, 'Aboriginal peoples' is also used. The Canadian Constitution recognizes three groups of Aboriginal (Indigenous) peoples: First Nations, Inuit, and Métis. These are three distinct peoples with unique histories, languages, cultural practices and spiritual beliefs. According

to the most recent 2016 census, more than 1.67 million people in Canada identify themselves as an Aboriginal person or a member of an Indigenous community.

This section of the EIS has been added to reflect the meaningful traditional knowledge gained via engagement activities with Indigenous communities. The purpose of this subsection is to provide an understanding of the current use of lands and resources for traditional purposes by Aboriginal people to specifically address subparagraph 5(1)(c)(iii) of CEAA 2012 “with respect to aboriginal peoples, an effect occurring in Canada of any change that may be caused to the environment on the current use of lands and resources for traditional purposes”. The information presented herein was obtained via meaningful engagement activities with the Indigenous communities defined by the Agency, in accordance with paragraph 4(1)(d) in promoting communication and cooperation with Aboriginal peoples with respect to EAs as one of the purposes of CEAA 2012.

Treasury Metals recognizes that Indigenous people live, work, hunt, fish, trap, collect water, and harvest throughout their lands and rely on them for their individual as well as their communities’ overall cultural, social, spiritual, physical, and economic well-being. Further to this, Treasury Metals recognizes that these traditional lands are inextricably connected to a community’s identify and culture, inclusive of ceremonial and spiritual recognition. Treasury in respect to this recognizes the importance of assessing any Project-related impacts as these relate to traditional land and resource use activities and practices; and Treasury Metals acknowledges that the Project may impact these activities or practices within the Project area, and is committed to working with all communities to identify, mitigate, and avoid or minimize any such related impacts.

Treasury Metals remains committed to ongoing engagement with local Indigenous communities in the local area regarding their traditional knowledge and traditional land and resource use to ensure that the Project does not have significant adverse effects on these communities. An important component of the federal EIS process is the provision of funding to participants in the process. To date, the Agency has provided $365,933 to assist Indigenous communities to prepare for and participate in consultation activities associated with the federal EA.

The current use of lands and resources for traditional purposes by Aboriginal peoples is specific to each Indigenous community. The following Indigenous communities are included as part of the environmental assessment for the Project:

- First Nations
  - Wabigoon Lake Ojibway Nation;
  - Eagle Lake First Nation;
  - Wabauskang First Nation;
  - Lac Seul First Nation;
  - Whitefish Bay First Nation (Naotkamegwanning First Nation);
  - Grassy Narrows First Nation;

- Lacs des Mille Lacs First Nation; and
- Grand Council Treaty #3.

- Métis Nation of Ontario
  - Northwest Métis Council;
  - Kenora Métis Council;
  - Sunset Country Métis Council;
  - Atikokan Métis Council; and
- The Aboriginal People of Wabigoon.

5.13.1 Community Profiles

The closest Aboriginal communities to the Project site are those of the Wabigoon Lake Ojibway Nation, the Eagle Lake First Nation, and the Aboriginal People of Wabigoon. Other communities considered in this environmental assessment include: the Wabauskang First Nation, Lac Seul First Nation, Whitefish Bay First Nation (Naotkamegwanning First Nation), Grassy Narrows First Nation, Lac des Mille Lacs First Nation, and the MNO.

The Wabigoon Lake Ojibway Nation is located 19 km southeast of Dryden, and about 10 km south of the Project site. The official title of the reserve is Wabigoon Lake 27 which is 5,209.2 hectares in size. As of February 2018, the total registered population of the Wabigoon Lake Ojibway Nation was 738 (192 individuals on the reserve, 546 off the reserve or on other reserves). The Eagle Lake First Nation reserve is located 13 km southwest of Dryden and about 30 km west of the Project site. The most populated site is Eagle Lake 27 and the official reserve is 3,592 ha in size. As of February 2018, the total registered population was 623 (358 individuals on the reserve, 253 off the reserve or on other reserves).

The other First Nations are further removed from the Project site with the Lac des Mille Lacs First Nation, approximately 145 km to the southeast, and the Grassy Narrows First Nation, approximately 105 km to the northwest, being the furthest removed communities from the site. Registered populations of these other First Nation communities range from 336 for the Wabauskang First Nation, to 3,493 for the Lac Seul First Nation.

5.13.2 Demographics of Indigenous Communities

For interpretation of the demographics of indigenous communities, data was collected largely form the 2016 census reported by Statistics Canada in 2017. Statistics Canada provided data on the following nine First Nation communities:

- Wabigoon Lake 27;
- Eagle Lake 27;

- Lac des Mille Lacs 22A1;
- Wabauskang 21;
- Lac Seul 28;
- Whitefish Bay 32A (Naotkamegwanning First Nation);
- Whitefish Bay 33A (Naotkamegwanning First Nation);
- Whitefish Bay 34A (Naotkamegwanning First Nation); and
- Grassy Narrows (English River 21).

The surrounding nine “cities, towns, and municipalities” refer to the following areas referred to by Statistics Canada as census divisions:

- Dryden;
- Wabigoon (the Village of Wabigoon);
- Machin (includes Eagle Lake & Vermilion Bay);
- Kenora (Township of Ignace);
- Atikokan;
- Rainy River;
- Fort Frances;
- Sioux Lookout; and
- Thunder Bay.

5.13.2.1 Population

Population data was collected from the Statistics Canada 2016 census for general population statistics for the regions surrounding the Project sites including nine First Nation Reserves. Although Lac des Mille Lacs 22A1 First Nation was assessed, it appears as though no information was shared to the Government of Canada aside from the area of land, as all other parameters were blank in the 2016 Census Profile for this community.

The 2016 census data indicated the population was declining in six of the nine First Nation Reserves by an average of 5.45%. The 2016 census data indicated that the percentage of the population identifying as a member of an indigenous community (i.e. First Nations, Métis, or Inuk (Inuit)) was substantially higher that the provincial and national average for all towns, cities, municipalities, and official First Nation reserves in the areas surrounding the Project. For the First Nation Reserves that Statistics Canada collected population data for, the percentage of the total population identifying as First Nation ranged from 95.25% (Wabigoon Lake, 27) to 100% (Wabauskang 21). The 2016 census data indicates that only 2.69% of the total population in

Ontario and 4.64% of the total population of Canada identifies as a member of an Indigenous group. No data were available on the population of Lac des Mille Lacs. The closest city, town, or village to the project is Wabigoon, which is also referred to as the Village of Wabigoon. Over half of the population (50.94%) identifies as having indigenous identity which is comprised as 33.51% First Nation and 17.43% Métis. The data also indicates that a large proportion of the indigenous population resides in larger towns and cities. For example, the population in Sioux Lookout identifies as 31.87% First Nations, 4.27% Métis, and 0.19% Inuk (Inuit); Kenora identifies as 42.40% First Nations, 5.75% Métis, and 0% Inuk (Inuit); and Thunder Bay identifies as 9.42% First Nations, 2.83% Métis, and 00.3% Inuk (Inuit).

5.13.2.2 Education

For all First Nations, and cities, towns, or municipalities surrounding the study area, the percentage of individuals without a certificate, diploma or degree was higher than the provincial and national numbers.

5.13.2.3 Income and Work Force Status

The median age reported from the First Nations reserves ranged from 25.7 (Whitefish Bay 34A) to 39.2 (Wabigoon Lake, 27). Data with respect to medium income were only available for Lac Seul 28, Whitefish Bay 32A, and Grassy Narrows (English River 21), which reported $17,675, $19,947, and $9,696, respectively, which are all well below the Provincial and National statistics of $33,539 and $34,204, respectively.

The average employment rate was lower on average on the seven First Nation reserves relative to the average rate in the towns, cities, and municipalities surrounding the Project site. The average employment rate on the First Nation reserves was 44% compared to 54% in the surrounding cities, towns, and municipalities. These statistics are lower than the Provincial and National averages of 60%.

5.13.2.4 Crime and Justice

The Project and surrounding towns and municipalities are policed by the OPP as part of OPP North West Region. The City of Dryden is policed by the local Dryden Police Service. There are nine detachments that work collaboratively with First Nation police services and are directly involved in the administration and delivery of policing arrangements under the Ontario First Nations Policing Agreement.

The First Nations police services do not publish detailed records of crime statistics annually in the same manner as the OPP. Additionally, statistics Canada does not collect crime and justice data as part of the census. Treasury Metals completed a review of available literature to better understand the subject of crime and justice for Indigenous communities and provided those details in Section 5.13.2.4 of the EIS.

Although specific crime and justice statistics are unavailable that are specific to Aboriginal peoples of First Nation, Métis, or Inuit status in the project area, from the 2016 census data support the conclusion that social factors such as employment rate, educational background, and age of population may contribute to an elevated risk of offending and/or victimization in the areas surrounding the project.

5.13.3 Traditional Land and Resource Use

For the purposes of the EIS, Aboriginal and Treaty Rights are defined as the historic and current uses of lands and resources for traditional purposes by members of Indigenous communities. It is Treasury Metals' understanding that Aboriginal peoples are entitled to access to their lands according to their Aboriginal and Treaty #3 (1873) Rights, and Treasury Metals is committed to working with the Indigenous communities to ensure that the effects of the Project on their traditional land and resource use, or alternatively referred to as Aboriginal and Treaty Rights, are appropriately considered and protected.

Treasury Metals recognizes that Aboriginal people live, work, hunt, fish, trap, drink water, and gather/harvest throughout their lands and rely on them for their individual as well as their community's overall cultural, social, spiritual, physical, and economic well-being. Further to this, Treasury Metals recognizes that these traditional lands are inextricably connected to a community's identity and culture, inclusive of ceremonial and spiritual recognition. Treasury Metals, in respect to this, understands the importance of assessing any potential effects of the Project as they relate to traditional land and resource use activities and practices; and acknowledges that the Project may affect the availability of resources or practices within the Project area. Treasury Metals is committed to working with all communities to identify, mitigate, and avoid, or otherwise minimize, these potential effects to the extent practicable.

Treasury Metals is committed to engaging with local Indigenous communities in the local area regarding their traditional knowledge and traditional land and resource use to ensure that the Project does not have a residual adverse effect on these communities. The following subsections provide a summary of the traditional land and resource use information shared with Treasury Metals or obtained by Treasury Metals regarding traditional use of the land. Treasury Metals obtained the traditional land and resource use information via primary sources of information including engagement activities such as community meetings, phone calls, emails and feedback received from Indigenous communities following their review of the original EIS submitted in April 2015. Secondary sources of information were also utilized where appropriate to support information obtained through primary engagement.

Past and present First Nation and Métis land and resource use activities in and around the Project area include harvesting and gathering, hunting, fishing, camping, trapping, use of travel ways and cultural and spiritual uses. The area surrounding the Project is rich in natural resources which support these activities.

5.13.1 Wabigoon Lake Ojibway Nation

Treasury Metals understands that traditional land and resource use activities of the Wabigoon Lake Ojibway Nation include harvesting of plants, hunting and trapping of animals, collection of potable water, fishing, and use of the land for cultural and spiritual purposes.

Based on information available from all sources, a major focus of community activities appears to be on aquatic based resources, large game hunting, and timber harvesting. Aquatic based resources include wild rice harvesting (for domestic and commercial purposes), fishing (for domestic and commercial purposes), waterfowl hunting, and trapping of aquatic furbearers (beaver, muskrat and otter). Moose, and to a lesser extent white-tailed deer, are important game species. Walleye (pickerel), northern pike, and whitefish are the more important fish species taken. Commercial forestry and tree nursey operations are an important mainstay of the community. The harvesting of blueberries, other berries, and mushrooms in and around the Project site area, is also an important activity practiced by community members. Wabigoon Lake Ojibway Nation along with the Whitefish Bay First Nation holds commercial fishing licenses on Wabigoon and Thunder Lakes.

Wild rice harvesting occurs throughout lake systems within upper portions of the Wabigoon River system including Wabigoon Lake, Dinorwic Lake, and Oval Lake. In 1988 a commercial wild rice processing plant was established on the Wabigoon Lake Ojibway Nation Reserve (the Kagiwiosa Manomin cooperative) (Chapeskie 1993, Kroeker 1998, Wabigoon Lake Ojibway Nation 2018: *website).* According to the community website, the processing of wild rice at the Kagiwiosa Manomin facility is an important success story for the community, with product being shipped to markets worldwide. A number of other traditional land and resource use activities carried out by Wabigoon Lake Ojibway Nation peoples are associated with the rice beds. This includes waterfowl harvesting, and the importance of the rice beds as spawning, brooding and feeding habitat for pike and muskellunge.

Traditionally the peoples of Wabigoon Lake Ojibway Nation used timber products for a variety of uses. A natural expansion of these activities was to participate in area commercial forestry operations. This includes the Noopimiing Anokeewin Inc. forestry operation, which is a privately owned Indigenous forestry enterprise operated on the Wabigoon Lake Ojibway Nation reserve. The community also maintains a tree nursey on the reserve.

5.13.2 Eagle Lake First Nation

Treasury Metals understands that traditional land and resource use activities of the Eagle Lake First Nation include harvesting of plants, hunting and trapping of animals, fishing, and use of the land for cultural and spiritual purposes. This includes the harvesting of blueberries, other berries and mushrooms from the general Project area; wild rice harvesting; the hunting of moose, white-tailed deer and partridge within the general Project area; and trapping. Baitfishing reportedly occurs within the Project area but outside of the Project footprint.

Historically, the Eagle Lake First Nation previously held a commercial fishing licence on Eagle Lake, but that this licence apparently lapsed in 1982. Data from MNR, however, show that a commercial fishing licence existed for Eagle Lake as of 2012, but the licence holder is not identified (MNR 2012). Data from DeLisle (2001) indicate that the Eagle Lake First Nation holds (or did hold) the harvesting licence to the Dryden area Unit 9 Registered Wild Rice Harvesting Area. Eagle Lake First Nation members are also actively engaged in timber harvesting activities, principally through the Eagle Lake Loggers. Eagle Lake First Nation members also reportedly hold rights to five traplines that intersect the Wabigoon Forest Management Unit.

5.13.3 Wabauskang, Lac Seul and Whitefish Bay First Nations

Treasury Metals understands that traditional land and resource use activities carried out by the Wabauskang, Lac Seul and Whitefish Bay First Nation include plant harvesting (principally blueberries, but also other species), hunting and trapping of animals, fishing, and use of the land for cultural and spiritual purposes. Members of all three First Nations reported gathering blueberries and mushrooms, and hunting moose and white-tailed deer within the general Project area, along with hunting for partridge. Waterfowl hunting also occurs but not likely in the immediate vicinity of the Project. Fishing is focused on walleye, whitefish and pike, as well as for baitfish. Members of the Whitefish Bay First Nation (along with the Wabigoon Lake Ojibway Nation) hold commercial fishing licences on Wabigoon and Thunder Lakes.

Also, while these communities are further removed from the Project site, compared with the Wabigoon Lake Ojibway Nation and Eagle Lake First Nation communities, it needs to be kept in mind that roadways from the three communities (as well as from Grassy Narrows and Lac des Mille Lacs) pass by the general Project site area. Local harvesting, hunting and fishing opportunities, in the general Project area, are therefore available to members of these more remote communities.

An historical perspective of life for Wabauskang First Nation peoples is provided in a 2008 Nation Talk session, by Simpson (2008) entitled "*Final Report of the Wabauskang First Nations Indigenous Knowledge and Contaminants Program*". Much of the information from that document is from interviews with Elder Bertha Petiquan. She discusses the gathering of wild rice and berries, and that the people's diet consisted mainly of pike, whitefish, walleye, deer, moose, ducks, beaver and rabbits, occasionally along with bear and porcupine. Fishing and the use of fish was severely impacted by mercury contamination of the English-Wabigoon River system by operation of the Dryden pulp and paper mill. Historically, blue berry harvesting involved the cooperative efforts of many families, with at least a portion of the harvest being sold commercially. Elder Petiquan was instrumental in the establishment of a wild fruit processing facility on the Wabauskang First Nation reserve (Chapeskie 1993).

5.13.4 Grassy Narrows and Lac des Mille Lacs First Nations

Little in the way of primary traditional land and resource use information was received from either of the Grassy Narrows or Lac des Mille Lacs First Nations. As noted above, these two

communities are located at considerable distances from the Project site. From secondary sources of information, it is Treasury Metals understanding that members of the two First Nation communities use the land for gathering of plants, hunting and trapping, and cultural and spiritual purposes.

To date, the only information Treasury Metals has been able to receive from Grassy Narrows First Nation, is that the community is concerned with water management, and the potential downstream impacts of the Project specifically with respect to mercury. Treasury Metals is mindful of the legacy mercury contamination in the English/ Wabigoon River system due to the improper release of mercury into the environment from the Dryden Paper Mill, and recognizes that this is not only a concern to members of the Grassy Narrows First Nation, but also to other Aboriginal communities in the area.

5.13.5 Métis Nation of Ontario

The Métis Nation of Ontario (MNO) was established in 1993, with the goal of all Métis communities coming together throughout Ontario to create specific Métis governance structures. Based on the existing research on Métis communities in Ontario and the criteria established by the Supreme Court of Canada in R. v. Powley (“Powley”), a historic Métis community developed from the inter-connected Métis populations along Rainy Lake and Rainy River at Lac La Pluie (Fort Frances) and Hungry Hall (Rainy River) as well as at Rat Portage (Kenora) and Eagle Lake (Dryden/Wabigoon) in the Lake of the Woods area. The Lake of the Woods area also includes White Fish Lake, Northwest Angle, Wabigoon and Long Sault (collectively known as the “Historic Rainy Lake/Lake of the Woods Métis Community”). It is estimated that area outposts within the Wabigoon/Dryden area were established in the 1850s. Currently 452,600 Canadians self-identified at Métis, and with 86,020 Ontario residents identifying as Métis. Currently, the members of the Métis Nation of Ontario do not live in a specific community but reside in various locations throughout the region. The closest regional office of the Northwest Métis Council is located in Dryden.

Treasury Metals highlights that a formal traditional knowledge/ traditional land and resource use study is in progress with the Métis Nation of Ontario. It is Treasury Metals’ understanding that traditional land and resource use activities of the Métis Nation of Ontario include harvesting of wild food, gathering of plants for consumption and medicinal purposes, camping on the land and other spiritual and cultural purposes, hunting and trapping, and fishing.

5.13.6 Aboriginal People of Wabigoon

Information obtained from Aboriginal People of Wabigoon regarding traditional land and resource indicates that traditional land and resource use activities undertaken by the Aboriginal People of Wabigoon include harvesting or gathering of plants, including wild rice, fishing, hunting, and possibly trapping and other cultural pursuits. Baitfishing and minnow trapping are reportedly conducted within the general Project area, but outside of the Project footprint. The community of Wabigoon is located only a short distance (approximately 4 km) from the Project site.

5.13.7 Grand Council Treaty #3

The Grand Council Treaty #3 represents 28 First Nation communities, including those identified for engagement on the Project. In July 2015, the Agency responded to a letter from Grand Council Treaty #3 that acknowledged a Grand Council Treaty #3 comment that Treaty #3 First Nations could potentially be impacted by the Project. The Agency went on to say that CEAA would continue to consult directly with Treaty #3 First Nations, and if Grand Council Treaty #3 desired to act on behalf of all of the First Nations, formal written communications to that effect would be required from each of the First Nations. Subsequent to the above noted communications, Treasury Metals has included Grand Council Treaty #3 in communications.

6.0 PROJECT EFFECTS AND MITIGATION

6.1 Environmental Components Considered

As part of the approval process Treasury Metals is undergoing for their Goliath Gold Project, they completed a thorough and comprehensive environmental assessment in accordance with the Project-specific EIS Guidelines prepared by the Agency. Treasury Metals submitted an EIS for the Project to the Agency in March of 2015, with a revised EIS submitted in September 2017. This further EIS revision responds to additional information requests received from the Agency in October 2017, and lays out the evaluation of potential effects of the Project in a traceable and methodical manner, based on the most updated information. The effects of the Project were evaluated for the following disciplines:

- Terrain and soils;
- Geology and geochemistry;
- Noise;
- Light;
- Air quality;
- Climate;
- Surface water quality;
- Surface water quantity;
- Groundwater quality;
- Groundwater quantity;
- Wildlife and wildlife habitat;
- Migratory birds;
- Fish and fish habitat;
- Wetlands and vegetation;
- Land use;
- Social;
- Economic;
- Human health;
- Heritage resources; and
- Aboriginal peoples.

For each of these disciplines, valued components (VCs) were identified. The Agency describes VCs as "…environmental features that may be affected by a project and that have been identified to be of concern by the proponent, government agencies, Aboriginal peoples or the public." (CEAA 2015b). From an ecological perspective, a VCs can be an aspect of the physical environment (e.g., air quality or surface water quality), and individual species (e.g., walleye or northern pike), or a range of species that serve as a surrogate for species that interact similarly with the environment (e.g., upland birds). From a socio-economic perspective, VCs could represent an aspect of community well-being, such as housing or employment. The VCs, which are described fully in Section 6.1.3 of the EIS, and are summarized in Table 6.1-1.

Table 6.1-1: Disciplines and VCs used in the Revised EIS Assessment

Discipline	Valued Components (VCs)	Indicators
Terrain and soils	Natural landscapes	Viewscapes
	Overburden	Erosion of disturbed overburden
	Soil chemistry	Changes in soil chemistry
Geology and Geochemistry	Pit lake water quality	Concentrations of indicator compounds
Noise	Environmental noise levels	Equivalent noise levels, L_{EQ}
	Noise disturbance to wildlife (including SAR)	Area predicted L_{EQ} above 50 dBA
	Blasting noise and vibration	Peak sound pressure level
		Peak particle velocity
	Noise related health effects	Absolute sound pressure, L_{DN}
		Percent highly annoyed, %HA
Light	Light trespass	Ambient light levels
Air quality	Air quality	Concentrations of indicator compounds
Climate	Project GHG emissions	Annual equivalent carbon dioxide emissions (eCO_2)
	Changes in climate due to the Project	Changes in annual temperature
		Changes in annual precipitation
Surface water quality	Surface water quality	Concentrations of indicator compounds
Surface water quantity	Surface water quantity	Increase in surface water flows
		Decrease in surface water flows
		Change in lake levels
Groundwater quality	Groundwater quality	Concentrations of indicator compounds
Groundwater quantity	Groundwater quantity	Decrease in groundwater elevations in private water wells
Wildlife and wildlife habitat	Wildlife Species at Risk	Common Nighthawk
		Northern Myotis/Little Brown Myotis
		Barn Swallow
	Ungulates	Moose
	Furbearers	American Marten
		American Beaver
	Upland birds	Upland birds
	Wetland birds	Marsh birds
	Small mammals	Small mammals
	Reptiles and amphibians	Reptiles and amphibians
	Invertebrates	Terrestrial invertebrates
Migratory Birds	Upland birds	Upland birds
	Wetland birds	Marsh birds
Fish and fish habitat	Stream-resident fish population	Direct loss or alteration of habitat
		Changes in flows or water levels
		Changes in water quality

Table 6.1-1: Disciplines and VCs used in the Revised EIS Assessment (continued)

Discipline	Valued Components (VCs)	Indicators
		Blasting
	Migratory fish populations	Direct loss or alteration of habitat
		Changes in flows or water levels
		Changes in water quality
		Blasting
Fish and fish habitat (continued)	Lake-resident fish populations	Direct loss or alteration of habitat
		Changes in flows or water levels
		Changes in water quality
		Blasting
	Fish species-at-risk	Direct loss or alteration of habitat
		Changes in flows or water levels
		Changes in water quality
		Blasting
Wetlands and vegetation	Wetlands	Wetland extent
		Wild rice
		Floating Marsh Marigold (*Caltha natans*)
	Vegetation communities	Predominantly coniferous forest
		Predominantly deciduous forest
		Successional areas
		Potential berry harvesting areas
Land and resource use	Land Use Planning and Policies	Conflict with accepted land uses as stipulated in approved land use plans.
		Overlap with protected areas.
	Aggregate Operations	Change in access to aggregate resources.
		Change in demand of aggregate resources extraction.
	Forestry	Change in access to forestry resources.
		Loss of forestry resources.
	Mineral Exploration	Change in access to mineral claims for exploration and production.
	Fishing - Recreational and Commercial	Change in access to fisheries resources.
		Change in the abundance of fisheries resources.
		Change in contaminant levels in fish
		Diminished experience of being on the land.
	Hunting	Change in access to wildlife resources.
		Change in abundance of wildlife resources.
		Diminished experience of being on the land
	Trapping	Change in access to wildlife resources.
		Change in abundance of wildlife resources.
		Diminished experience of being on the land

Table 6.1-1: Disciplines and VCs used in the Revised EIS Assessment (continued)

Discipline	Valued Components (VCs)	Indicators
	Cottagers and Outfitters	Diminished experience of being on the land.
		Change in access to cottage and/or outfitter areas.
		Changes in clientele for outfitters with lodges located near the Project.
Land and resource use (continued)	Other Recreational Uses	Change in access for residents and visitors to public lands for non-consumptive purposes
		Change in access for residents and visitors to public lands for consumptive purposes.
		Change in abundance of berries, mushrooms and/or other vegetation used for consumption
		Diminished experience of being on the land.
Social	Population demographics	Population change
	Education	Capacity of education services
		Education attainment
		Project-specific Training
	Infrastructure and services	Municipal Services
		Community services (e.g., health, social services)
	Housing and property values	Housing availability
		Property values
	Public safety	Crime rate
		Capacity of emergency services
		Requests for emergency services by Project
	Transportation and traffic	Road network capacity and conditions
Economic	Labour force, labour participation and employment	Labour income employment
	Income levels	Income levels and categories
	Cost of living	Current prevailing cost of living
	Real estate	Housing prices and affordability
	Economic development	Municipal taxes and contribution to economic development projects
	Existing businesses	Local business availability
	Government revenues	Taxes and revenues
Human health	Non-Indigenous Human Health	Subsurface/Construction Worker
		Outdoor Worker
		Indoor Worker
		Site Visitor, or Harvester
		Resident
	Indigenous Human Health	Resident
		Site Visitor, or Harvester
		Subsurface/Construction Worker
		Outdoor Worker

Table 6.1-1: Disciplines and VCs used in the Revised EIS Assessment (continued)

Discipline	Valued Components (VCs)	Indicators
		Indoor Worker
Heritage resources	Archaeological sites	Archaeological sites
	Historic heritage sites	Historic heritage sites
Aboriginal Peoples	Human Health	Risk Assessment for Indigenous Human Health
	Harvesting and gathering of plant material	Wild rice
		Berry Harvesting
		Medicinal plant harvesting
		Changes in access
		Diminished on-the-land experience
	Hunting	Ungulates
		Furbearers
		Waterfowl
		Changes in access
		Diminished on-the-land experience
	Trapping	Furbearers
		Changes in access
		Diminished on-the-land experience
	Fishing	Sport fish
		Baitfish
		Commercial fishing
		Changes in access
		Diminished on-the-land experience
	Cultural and spiritual	Cultural or spiritual sites
		Traditional Travel routes
		Diminished on-the-land experience
	Socio-economic factors	Economic effects
		Social effects

As set out in the EIS Guidelines, a series of spatial and temporal boundaries were established for evaluating the effects of the Project. Section 6.1.4 provides a description and justification for the spatial boundaries, referred to as study areas, used for each discipline. In most cases, both a local study area (LSA) and regional study area (RSA) were defined. The LSAs selected usually included the areas where the direct effects of the Project were considered to be likely, while the RSA enclosed the larger regional context. In some cases, only a single study area was used for a discipline (e.g., social factors) as the effects were most appropriately addressed on a broader, regional scale. The temporal boundaries were selected to correspond with the following phases of the Project life:

- Site preparation and construction phase;

- Operations phase;
- Closure phase; and
- Post-closure phase.

The methodical steps taken for evaluating the effects of the identified disciplines and VCs included the following:

- **Identify the Likely Potential Effects of the Project on the Environment**: The likely potential effects of the Project on each discipline during each of the four Project phases were identified, along with the possible linkages between the various disciplines and VCs.
- **Predict the Effects of the Project**: Using clearly described approaches, the effects of the Project on the disciplines and VCs. The prediction of effects needs to identify and evaluate those measures incorporated in the Project to avoid effects. The results of the effects prediction should cover all Project phases, and indicate whether the Project is predicted to result in adverse effects.
- **Mitigation Measures**: As set out in the EIS Guidelines, mitigation measures need to be identified in those cases where adverse effects were predicted, In keeping with the EIS Guidelines, such mitigation should be technically and economically feasible.
- **Residual Effects**: Residual adverse effects are those effects that remain after consideration of the application of technically and economically feasible mitigation measures. The residual effects that remain after mitigation are those that are carried forward for consideration of possible cumulative effects (Section 7) and ultimately for the determination of significance (Section 8).

6.2 Terrain and Soils

The effects of the Project on terrain and soils are described using qualitative and semi-qualitative methods consistent with the nature of the potential effects. With consideration of the effects avoidance and mitigation measures, the following residual adverse effects remain for the terrain and soils VCs:

- **Natural Landscapes**: While smaller features on the site, including the overburden stockpiles and the LGO stockpile would effectively not extend above the treeline, and thus would not be visible beyond the operations, the WRSA will be developed to a higher elevation and while constructed with relatively shallow 3:1 (horizontal to vertical) side slopes, it may be visible from certain areas of Thunder Lake.
- **Overburden**: There would be no residual effects on overburden as the material will be stockpiled during the site preparation and construction phase, and then covered to prevent erosion.

- **Soil Chemistry**: Finally, the soil chemistry will be protected through the implementation of procedures to minimize the potential for equipment leaks and spills at the Project. In the unlikely event that leaks or spills were to occur, procedures to remediate any affected soils will be implemented. There would be no residual effects for soil chemistry.

6.3 Geology and Geochemistry

Although geology and geochemistry would not normally be considered assessment endpoints; they are important for understanding how the Project could affect the environment. The materials handled as part of the Project have been identified as being PAG, which could results in acid rock drainage (ARD) and associated metals leaching (ML) if not managed properly. Specifically, geology and geochemistry will influence the quality of seepage from the TSF and the WRSA, as well as dictating the quality of the water in the pit lake that is allowed to form following closure. Pit lake quality was the VC identified for evaluating the effects of the Project on geology and geochemistry. As the pit lake will not form until after dewatering activities cease, at the end of the operations phase, there would be no residual adverse effects on pit lake quality during the site preparation and construction, operations, and closure phases. In addition to affecting the pit lake water quality, both ARD and ML are important parameters that could influence other components, such as surface water quality. Those effects are evaluated as part of the evaluation of surface water quality effects.

6.4 Noise

Equipment and activities associated with the Project have the potential to produce emissions that will affect the noise levels in the vicinity of the Project. In addition, Treasury Metals plan to use blasting to advance the mining activities in the open pit and underground mine, which has raised concerns about noise and vibration associated with blasting. The effects assessment for noise considered the following VCs:

- Environmental noise levels;
- Noise disturbance to wildlife (including SAR);
- Blasting noise and vibration; and
- Noise related health effects.

A numerical assessment of noise from the Project was done using the Cadna/A noise model, a commercially available implementation of the ISO 9613 (ISO 1994b and ISO 1996) algorithms. Noise emissions were calculates using the expected activity levels, given the size and production rates, and published noise characteristics. Noise predictions were made for a series of residential noise receptors around the Project, including receptors along East Thunder Lake Road and tree Nursery Road. Blasting noise and vibration were calculated using established IEEE procedures. Details of the noise sources and modelling are provide in Appendix H-4 to the revised EIS.

Residual adverse effects were predicted for each of the VCs, and they were advanced for the determination of significance. Although residual adverse effects were identified for the "noise disturbance to wildlife" VC, the determination of significance of these effects was assessed as a component of the wildlife and wildlife habitat discipline (Section 6.11). In addition, it should be noted that the prediction of residual adverse effects for the noise related health effects VC does not mean the Project noise levels will cause health effects. The predicted residual effects means that the modelling predicted that the Project would result in a change from the baseline conditions for the two indicators used for evaluating that VC (absolute sound pressure [LDN] and percent highly annoyed [%HA]).

6.5 Light

The effects of the Project on light were evaluated using the light trespass VC, and were predicted using a numerical model of the proposed lighting at the processing plant. Light trespass levels during the operations would drop to 0 within the operations area, and were not predicted to affect any of the nearby residences. Generally there will be no illumination required for nighttime operations during the site preparation and construction, or closure phases. If nighttime lighting is required for safety reasons during the during site preparation and construction, or closure phases then shielded portable light directed away from any residences will be used. There will be no sources of light during the post-closure phase.

There were no residual adverse effects predicted for the light trespass VC.

6.6 Air Quality

Equipment and activities associated with the Project have the potential to produce emissions that will affect the air quality in the vicinity of the Project. These effects have been evaluated using a single VC, namely air quality. A series of indicator compounds were selected based on the expected emissions. Air emissions were calculated using published literature and expected production rates at the mine. Predicted concentrations and deposition rates for the indicator compounds were determined along the property line and at sensitive residential receptor locations around the Project using the AERMOD dispersion model, which is the recommended model for such uses in Ontario. Conservative background concentrations were added to the model predictions to incorporate the contributions from existing activities in the region. Details regarding the model selection and emission calculations are provided in Appendix J-2 to the revised EIS. The modelling predicted there would be residual adverse effects for the air quality VC, which were advanced for the determination of significance. These effects were predicted for the site preparation and construction, operations, and closure phases. There would be no sources of air emissions during the post-closure phase and therefore no residual adverse effects for this phase.

6.7 Climate

The equipment to be used for mining at the Project rely on internal combustions engines, and will therefore result in greenhouse gas (GHG) emissions. The Project GHG emissions are a potential

concern as they could contribute to climate change. Additionally, both the federal and provincial governments have implemented initiatives to manage and mitigate the GHG emissions. The GHG emissions from the proposed Project are expected to be similar to, or smaller than, those for comparable projects given the availability electrical power from the Hydro One 115 kV transmission line that runs through the Project site. This avoids the need to generate electrical power on site, avoiding addition GHG emissions. The potential effects of the Project on climate were evaluated using the following VCs:

- Project GHG emissions, and
- Changes in climate due to the Project.

Despite measures to avoid and mitigate effects, the Project will result in GHG emissions, and thus will have a residual adverse effect on the "Project GHG emissions" VC. These emissions will be regulated as part of the Ontario Cap and Trade Program (O.Reg. 144/16). Based on the conservative assessment of expected emissions, the Project is likely to need to report GHG emissions as per the requirements of Section 46 of the *Canadian Environmental Protection Act*, which includes emissions from mobile and stationary sources. However, the Project does not meet the Provincial regulatory reporting requirements for the Ontario Cap and Trade Program Regulation 144/16, which is applicable to stationary sources only. The Project would not be considered a large emitter of GHG emissions.

Although the GHG emissions from the Project are large enough to meet reporting requirements of Section 46 of the *Canadian Environmental Protection Act*, the GHG emissions were shown to be too small to have a measurable effect on climate. This is consistent with the current federal guidance for incorporating climate impacts in environmental assessments (FPTCCCEA 2003), which states that "…unlike most project-related environmental effects, the contribution of an individual project to climate change cannot be measured." Therefore, there were no residual adverse effects for the "changes in climate due to the Project" VC.

6.8 Surface Water Quality

The effects of the Project on surface water quality was evaluated using a single VC, surface water quality, and a series of indicators (compounds) was selected to capture the range of potential effects likely to be associated with the Project. Surface water quality effects were calculated using a numerical model developed to cover all of the watercourses likely to be affected by the Project, and to capture the likely discharges and effects. The model incorporates the refinements to the Project since the filing the original EIS (see Section 3.2). Some of the important factors that contribute to the protection of surface water quality include the following:

- A perimeter runoff and seepage collection ditch will be constructed in stages around the operations area. This system will capture all of the runoff from the developed site area, which will be directed to the water management system for use at the site and in the process.

- There will be no effluent released to surface water during the site preparation and construction phase. The runoff collected within the perimeter ditch will be held for use in initiating the TSF and for use in the process once operations commence.
- During operations, all excess water not required in the process will be treated to concentrations that meet Provincial Water Quality Objectives (PWQO) or background concentrations if background levels are above the PWQO. Where there is no PWQO for a parameter, effluent will be treated to meet the Canadian Water Quality Guidelines (CWQG). In the case of mercury, effluent will be treated to meet the background concentrations in Blackwater Creek.
- Dewatering of the open pit and underground mine workings will provide dry working conditions and safe working environment. These dewatering activities will lower the groundwater table around the perimeter of the open pit and mine workings, creating what is referred to as a drawdown zone. Within this drawdown zone, groundwater will migrate towards the open pit. Therefore, seepage that escapes the seepage collection systems will be captured within the drawdown zone, and ultimately report to the open pit.
- During closure, the site will be graded such that runoff for the operations area will be directed to the open pit during closure. There will be no releases from the Project to surface waters during the closure phase.
- It will take between 6 and 8 years to fill the pit lake, which will extend into the post-closure period. As the pit lake is filling to determine whether batch treatment will be required to meet PWQO (or background) prior the release from the pit lake to a tributary of Blackwater Creek.
- Once the pit lake is fully flooded, it is expected that the monitoring of the water quality in the pit lake will continue for a period of time to determine whether additional batch treatment may be required to ensure the water released from the pit lake meets effluent release limits.

No residual adverse effects to surface water quality were identified during the site preparations and construction, and closure phases as there will be no effluent or runoff released to surface waters during those phase. During operations residual adverse effects were predicted for those indicator compounds where the predicted concentrations were higher than the existing conditions. In all cases, the predicted residual effects were still less than the PWQO. Residual adverse effects were also predicted during the post-closure phase, when the groundwater will transport seepage from the TSF and WRSA off site towards adjacent waterbodies. With mitigation in place, including a wet (or dry) cover over the TSF, the predicted residual adverse effects (i.e., concentrations above existing conditions) during post-closure would meet the PWQO.

6.9 Surface Water Quantity

There will be a number of aspects of the proposed Project that could affect surface water quantities and flows that have been evaluated using a single VC, namely surface water quantity.

The following three indicators have been used for evaluating the effects of the Project on the surface water quantity VC:

- Increase in surface water flows;
- Decrease in surface water flows; and
- Change in lake levels.

The effects of the Project on surface water quantity were predicted using a numerical watershed model developed using information from comparable watersheds in the region, as well as information regarding the local watercourses. As part of the Project refinements since filing the original EIS, Treasury Metals have advanced their engineering, including developing a refined water balance. A key aspect of the refinements to the Project is the construction of a perimeter ditch around the operations area, which will collect all of the runoff within this area for use in the water management system. However, the perimeter ditch will result in the withdrawal of some of the catchment areas for Little Creek and Hoffstrom's Bay Tributary, resulting in residual effects to the flows in these watercourses. During operations, the Project will periodically require fresh water for use in the process. The current plans have identified the irrigation ponds on Thunder Lake Tributaries 2 and 3 as the preferred sources for this fresh water. Calculations indicate that, with careful management, the Project will be able to meet its fresh water requirements from these watercourses without withdrawing more than 5% of the available flows, even on a dry year.

The refined water balance for the Project uses a combination of runoff collected from the operations area, water from the dewatering of the mine, and water reclaimed from the TSF to meet the needs of the process plant during operations. Calculations on average, wet and dry years show that the available water will be sufficient for the process needs, and that there will often be an excess of water that will be treated to meet PWQO (or background) before being discharged into Blackwater Creek, altering the flows downstream. Residual adverse effects were predicted during the operations and post-closure phases for Little Creek, Hoffstrom's Bay Tributary, Thunder Lake Tributaries 2 and 3, and Blackwater Creek. These effects were advanced for the determination of significance.

6.10 Groundwater Quality

Because the materials to be mined at the Project have been identified as PAG, ARD could affect the quality of the seepage from the WRSA and TSF, which could ultimately affect the quality of groundwater. A single VC, groundwater quality was used for assessing these potential effects of the Project. The following measures help avoid potential effects on groundwater quality:

- A perimeter runoff and seepage collection ditch will be constructed around what is referred to as the operations area.
- Dewatering of the open pit and underground mine workings will provide dry working conditions and a safe working environment. These dewatering activities will lower the

groundwater table around the perimeter of the open pit and mine workings, creating what is referred to as a drawdown zone. Within this drawdown zone, groundwater will migrate towards the open pit. Therefore, seepage that escapes the seepage collection systems will be captured within the drawdown zone caused by dewatering and ultimately report to the open pit during the operations and closure phases.

- As part of the closure activities, the WRSA will be covered with a low permeability cover to isolate the waste rock and reduce the potential for acidification.
- The PAG waste rock would be placed in the mined out areas of the open pit, to the extent practical, to minimize the volume of PAG material in the waste rock storage area (WRSA). At closure, the open pit will be allowed to flood, isolating the exposed mine faces, and waste rock placed in the pit will be underneath a static cover of water to prevent acidification.
- The floor of the TSF will be a low-permeability layer capable of achieving seepage rates that ensure receiving surface water quality is equivalent to baseline, or meet PWQO. The liner would be comprised of natural material, or if necessary, an HDPE liner laid over a prepared basin of sand or comparable material.
- During operations, tailings will be maintained in saturated conditions, and a water cover will be maintained over the majority of the TSF to prevent the onset of acidification.
- At closure, the process water will be withdrawn from the TSF, treated and used to help fill the open pit. The tailings within the TSF will be isolated using either a low permeability dry cover, or a wet cover of non-process water.
- The use of a wet cover as a closure option over the TSF is the preferred environmental option. A wet cover prevents acidification of the tailings, which improves the quality of seepage in the long-term. The mitigation also benefits the quality of surface water in the receiving environment.

There would be no sources of seepage at the Project that could affect groundwater quality during the site preparation and construction phase, therefore there would be no adverse effects of the Project during this phase. The mining activities will involve materials classified as PAG, therefore acid rock drainage and the associated metals leaching (ARD/ML) over time. As a result, the materials within the waste rock storage area (WRSA) and tailings storage facility (TSF) have the potential to produce seepage with elevated levels of metals. Because of the presence of the seepage collection system and the drawdown zone created by the dewatering of the open pit and underground mine, seepage from the TSF and WRSA will be contained within the operations area until the open pit floods and the groundwater levels return to near pre-development levels. Therefore, there would be no adverse effects of the Project on groundwater quality during operations or closure phases.

Once the open pit is flooded and the groundwater levels return to near pre-development conditions during the post-closure phase, seepage from the on-site structures (i.e., WRSA and TSF) that escapes the seepage collection systems will leave the site. The groundwater quantity

modelling (Appendix M-1) indicated that the seepage leaving the site will eventually report to nearby watercourses; however, seepage towards Thunder Lake could affect the quality of the groundwater in private wells along the eastern shore of Thunder Lake. Based on the small volumes of seepage, and modelled groundwater recharge rates (Appendix M-1) the seepage from the Project will be diluted by between a factor of 5 and 25 (Appendix M-3) by the time it reaches these wells. As a result, the effects of seepage on the groundwater quality in the private wells along the eastern shore of Thunder Lake are not expected to be noticeable given the levels of dilution that seepage from the WRSA will experience. Should the follow-up program identify significant degradation in the quality of groundwater (Section 6.10.5), mitigation measures would be implemented to provide a suitable replacement of private water supplies affected. Therefore, no residual adverse effects to groundwater quality would remain.

6.11 Groundwater Quantity

In order to safely operate the open pit and underground mine, Treasury Metals will need to conduct dewatering activities to lower the groundwater levels and help keep the mine working free of water. A single VC, groundwater quantity was used for assessing the effects of the Project. The following indicator was used for describing the predicted effects:

- Decreasing elevations in private water wells.

The effects of the Project on groundwater quantity were predicted using the same hydrogeological model developed for evaluating the effects on groundwater quality. Specifically, a model based on the local hydrogeological conditions using a hydrogeological model developed for the local hydrogeological conditions using the Modular Finite-Difference Groundwater Flow Model (MODFLOW) modelling platform. This model, which is detailed in Appendix M to the revised EIS, is widely accepted for modelling situations like those at the Project.

As there will be no dewatering activities during the site preparation and construction phase there will be no residual adverse effects to groundwater quantity. Once the activities start in the open pit, dewatering activities will start to lower the groundwater levels. The modelling shows that the zone of influence of the dewatering will extend out to some private wells in the region and could cause an adverse effect if the drawdown caused by the dewatering activities lowers the groundwater levels to a point where private wells are unable to provide enough water. However, the mitigation for such situations is well known. Financial assurance would be provided to the MNDM by Treasury Metals, as required and applicable as per regular permitting processes to ensure maintenance and provision of neighbouring residential wells. With this mitigation implemented, there would be no residual effects to water elevations in private wells.

The hydrogeological modelling identified a potential decrease in the groundwater discharge to the Blackwater Creek catchments and the catchment for Thunder Lake Tributaries 2 and 3. The hydrogeological investigations identified that the other watercourses within the zone of influence (Little Creek, Hoffstrom's Bay Tributary) are generally underlain with fine grained materials, do

not have a proportionately large contribution from groundwater discharge. The decrease in groundwater discharge to these waterbodies was explicitly addressed in the modelling of surface water quantities, described in Section 6.9.

6.12 Wildlife and Wildlife Habitat

Clearing, construction, mining and activities have the potential to affect wildlife, and the habitat they rely on. The potential effects of the Project on wildlife and wildlife habits were characterized using following VCs:

- Wildlife Species at Risk;
- Ungulates;
- Furbearers;
- Upland birds;
- Wetland birds;
- Small mammals;
- Reptiles and amphibians; and
- Invertebrates.

Suitable indicator species that are known to be present in the region were selected for each of the VCs. The assessment of effects on these VCs considered the measures of direct loss of habitat caused by the Project (e.g., clearing of land), the degradation of habitat as a result of Project activities (e.g., increase noise levels), and the potential for mortality (e.g., collisions with Project traffic). The results of the assessment identified residual adverse effects for all of the VCs, which were advanced for the determination of significance.

6.13 Migratory Birds

At the request of the Agency, migratory birds were added as an additional discipline, and the effects described using the uplands birds and wetlands birds VCs that were also used for characterizing the effects on wildlife and wildlife habitat. Residual adverse effects were identified for both of these VCs. Those residual effects were advanced for the determination of significance.

6.14 Fish and Fish Habitat

Project activities during the site preparation and construction phase, operations phase, closure phase and post-closure phase will all have the potential to effect fish and fish habitat. The importance of these potential effects to Aboriginal peoples and other stakeholders was highlighted through the engagement process undertaken by Treasury Metals. For the revised EIS, the effects of the Project were characterized using the following four VCs:

- **Stream-resident fish population**: Stream-resident fish populations are species that complete their entire life cycle (spawning, nursery, foraging, overwintering) in the habitats that are present within the local watercourses. In streams such as those affected by the Project these are typically small-bodied fishes.
- **Migratory fish populations**: Migratory fish populations are populations that migrate into streams to complete a portion of their life cycle, usually spawning. In some cases the streams also provide nursery habitat.
- **Lake-resident fish populations**: Lake-resident populations are populations that complete their entire life cycle in lakes (e.g., Wabigoon Lake or Thunder Lake).
- **Fish species-at-risk**: Fish species-at-risk are species that have status under the federal *Species at Risk Act* or the *Ontario Endangered Species Act*.

The predicted effects on the VC were described using the following indicators:

- **Habitat loss**: Habitat loss occurs when watercourses or waterbodies are overprinted by the construction of Project elements (e.g., the TSF will overprint portions of Blackwater Creek Tributary 2).
- **Habitat adversely affected**: When habitat is adversely affected it is considered to be degraded, which can result from factors such as changes in surface water quality, changes in surface water flow, or alteration of the habitat that makes it less suitable (e.g., changes in substrate).
- **Direct mortality**: Direct fish mortality can occur if fish cannot be relocated prior to the loss of habitat or if fish are subjected to lethal pressure changes due to blasting. Mortality could also occur should the surface quality be degraded to a point where fish can no longer survive.

Effects of the Project on fish and fish habitat are predicted based on knowledge of the existing fish habitat and fish communities present and the direct predicted effects of the Project. The predictions of direct effects are primarily qualitative, with quantitative estimates of changes in habitat made where applicable, using GIS. The prediction of effects of the Project on fish and fish habitat also relies on quantitative predictions made for physical disciplines (e.g., surface water quality and surface water). Treasury Metals have incorporated measures that help avoid or mitigate the potential effects of the Project on fish. Some of these measures include:

- As part of the refinements to the Project since the filing of the EIS (see Section 3.2), the plant site and laydown area have been relocated to west of Tree Nursery Road, eliminating the need to divert the lower reaches of Blackwater Creek Tributary 2.
- As part of the refinements to the Project since the filing of the EIS (see Section 3.2), the overburden stockpile has been modified to avoid infilling the lower reaches of Blackwater Creek Tributary 1.

- Prior to overburden removal, any beaver dams within the Project footprint will be removed and the impoundments will be allowed to draw down. This will reduce the number of fish that will remain in isolated sections of Blackwater Creek Tributary 1 and Blackwater Creek Tributary 2.
- Activities and the construction of Project components that will impact or overprint watercourses (i.e., the perimeter ditch, the effluent diffuser, water intakes) will occur during the fisheries timing window when in-stream work is permitted.
- To the extent possible, fish in the sections of Blackwater Creek Tributary 1 that will be isolated by the construction of the perimeter ditch and overprinted by the removal of overburden from the open pit will be captured and relocated to the same tributaries downstream from the operations area, or to the main branch of Blackwater Creek.
- To the extent possible, fish in the sections of Blackwater Creek Tributary 2 that will be isolated by the construction of the perimeter ditch and overprinted by the construction of the TSF will be captured and relocated to the same tributaries downstream from the operations area, or to the main branch of Blackwater Creek.
- Optimize the layout of the Project to minimize the footprint, and to the extent possible, minimizing the catchment areas diverted from Little Creek and Hoffstrom's Bay Tributary.
- A perimeter ditch around the operations area will prevent the release of runoff.
- The refined water balance for the Project looks to optimize the use of water collected within the operations area for use in the processing of ore. This limits the effects on surface water quantities by minimizing water taking and providing flexibility regarding the volumes discharged from the Project.
- The fresh water needs for the Project will be met by withdrawals from the irrigation ponds on Thunder Lake Tributary 2 and Thunder Lake Tributary 3. The withdrawals will not exceed 5% of the flows in either of the two creeks. Pump intakes will be fitted with fish screens to prevent entrainment.
- Excess water during operations will be treated to meet PWQO (or background) prior to being discharged to a single discharge point in Blackwater Creek.
- Treated effluent will be discharged to Blackwater Creek through an engineered structure designed to minimize erosion risks.
- Following operations mine dewatering activities will cease and the open pit and underground mine will be allowed to fill with water. Treasury Metals will test the water in the open pit as it is filling, and if necessary, batch treatment will be used to ensure that the water to be discharged from the pit lake meets PWQO (or background).
- Once the pit has filled during the post-closure phase, excess water will be allowed to passively discharge through a spillway into the former channel of Blackwater Creek Tributary 1, re-establishing flows in that watercourse.

- As the Project advances, detailed engineering will be completed to ensure that all downstream culverts on Blackwater Creek can support any predicted increases in flows. This would include ensuring that the downstream culverts will continue to provide adequate fish passage.

The following adverse effects were identified for fish and fish habitat:

- Habitat loss is predicted as a result of the overprinting of Blackwater Creek Tributary 2 for the construction of the perimeter ditch and TSF, as well as the overprinting of Blackwater Creek Tributary 1 by the open pit and the construction of the perimeter ditch. The direct habitat losses due to the Project would only affect the "stream-resident fish populations" VC. Habitat loss will not adversely affect the "migratory fish populations", "lake-resident fish populations" or "fish special at risk" VCs.
- The modelling of surface water quality identified residual adverse effects for some indicator compounds on nearby watercourses during the operations and post-closure phases. However, none of the predicted surface water quality adverse effects were above the PWQO (or background). Therefore, there were no adverse effects on fish predicted due to changes in water quality.
- The modelling of surface water quantities identified residual adverse effects on surface water quantities (flows) in Blackwater Creek, Thunder Creek Tributaries 2 and 3, Little Creek and Hoffstrom's Bay Tributary. These changes in flows were identified as adverse effects for the "stream-resident fish populations" and "migratory fish populations" VCs. Habitat degradation due to changes in flows will not adversely affect the "lake-resident fish populations" or "fish special at risk" VCs.
- Treasury Metals will endeavor to relocate the fish that remain within those portions of Blackwater Creek Tributaries 1 and 2, isolated and overprinted by the Project. However, the habitat conditions (soft substrates, dense riparian vegetation) will make effective fish capture difficult, resulting in mortality of fish that are isolated. This adverse effect will only occur for the "stream-resident fish populations". Fish mortality will not adversely affect the "migratory fish populations", "lake-resident fish populations" or "fish special at risk" VCs.

It is expected that the Project will require a Fisheries Act authorization, and Treasury Metals will likely be required to mitigate the losses of fish habitat that it causes as a condition of that authorization. Typically, the offsetting involves the creation of new habitat or the enhancement of existing habitat that is commensurate with the habitat losses. The Fisheries Act authorization, which is issued by DFO, details the offsetting measures to be completed. As a result, the offsetting will fully mitigate the adverse effects associated with habitat loss and degradation. The only residual adverse effect to fish would be the mortality to fish isolated in portions of Blackwater Creek Tributaries 1 and 2 by the overprinting of those watercourses. There will be no residual adverse effects for the "migratory fish populations", "lake-resident fish populations" or "fish species at risk" VCs.

A conceptual fish habitat offset plan has been developed as part of this EIS submission, and is provided Appendix II.

6.15 Wetlands and Vegetation

As part of the site preparation and construction activities, vegetation clearing and the construction of the perimeter ditch will result in the loss of wetland areas overprinted by the Project, and could result in the loss of vegetated areas that contain important plant species. These potential effects are characterized using the following VCs:

- Wetland; and
- Vegetation communities.

The assessment of wildlife and wildlife habitat effects was based on the loss of vegetated areas, so the vegetation communities VC focuses specifically on those areas of identified botanical importance. To determine the Project effects on the wetlands and vegetation VCs, a geographic information system (GIS) analysis was done using available land use data, validated through the baseline field studies completed for the Project. Adverse effects were identified for the predominantly coniferous forest, predominantly deciduous forest, successional areas, and the potential berry harvesting areas indicators as a result of land clearing within the operations area.

Adverse effects were identified for wetland extent associated with the loss of six (6) small wetlands that are overlain by the Project. Within the local study area, these represent a small percentage of the wetlands available. These adverse effects will begin in the site preparation and construction phase, and will continue through the closure phase. In addition, mine dewatering during the Operation Phase is expected to create a drawdown zone that will extend beyond the Project footprint. Most wetlands within the LSA are underlain with clay and tills; making them resistant to water table drawdown. However, WLD5 at the headwater of Blackwater Creek Tributary 4 sits above a granular deposit, and is susceptible to drawdown. For the purposes of this assessment, the whole of WLD5 (14.4 ha) will be considered as affected to some extent due to possible water level changes.

These adverse effects are expected to be reversed during post-closure including any water level changes to WLD5. While some wetland areas lost during the site preparation and construction phase, such as the wetlands overprinted by the TSF will not recover, new wetlands will be generated around the pit lake. Additionally, wetlands affected on Blackwater Creek Tributary 1 are expected to recover once the pit lake fills and flows within the watercourse are re-established.

No adverse effects were identified for Floating Marsh Marigold.

Wild rice is an important resource to Aboriginal communities near the Project. Wild rice grows in shallow lakes and wetlands, typically with water depths of 15–90 cm of water and soft substrates. Treated water released from the Project site will meet PWQO (or background), and no changes

are anticipated to the water levels of Wabigoon or Thunder Lakes, or to the mouth areas of creeks entering these lakes, as a result of the Project. Adverse effects to wild rice stands within the lake margins are therefore not anticipated.

The effects of the Project on wetlands extent (excluding wild rice) were determined to be residual adverse effects that were advanced for the determination of significance. The effects of the Project on the vegetation communities indicators were also identified as residual adverse effects that were advanced for the determination of significance.

6.16 Land Use

Considering the review of the existing information related to land and resource use in the area, review of the Round 1 information requests, and knowledge of similar land and resource assessments, the following VCs were used for determining the effects on land and resource use:

- Land Use Planning and Policies;
- Aggregate Operations;
- Forestry;
- Mineral Exploration;
- Fishing - Recreational and Commercial;
- Hunting;
- Trapping;
- Cottagers and Outfitters; and
- Other Recreational Uses.

A qualitative evaluation of potential effects of the Project identified that there would be adverse effects for all of the land and resource use VCs. These effects were also identified as being residual adverse effects and advanced for the determination of significance.

6.17 Social Factors

Considering the feedback provided in the Round 1 information requests and knowledge of similar resource projects, the following VCs were used for determining the effects on social factors:

- Population demographics;
- Education;
- Infrastructure and services;
- Housing and property values;

- Public safety; and
- Transportation and traffic.

A qualitative evaluation of potential effects of the Project identified that there would be positive or adverse effects for all of the social factors VCs. All of these effects are considered to be residual and are advanced for the determination of significance.

6.18 Economic Factors

Considering the feedback provided in the Round 1 information requests and knowledge of similar resource projects, the following VCs were used for determining the effects on economic factors:

- Labour force, labour participation and employment;
- Income levels;
- Cost of living;
- Real estate;
- Economic development;
- Existing businesses; and
- Government revenues.

A quantitative evaluation of the potential economic effects of the Project was completed using an established model, modified to reflect the local conditions in the socio-economic study area. The model used specific details regarding employment, purchasing and capital investments by Treasury Metals to numerically calculate the benefits, and possible hindrances to key economic indicators. The model identified that there would be positive or adverse effects for all of the economic factors VCs. All of these effects are considered to be residual and are advanced for the determination of significance.

6.19 Human Health

Based on the feedback in the Round 1 information requests, it was recognized that human health warranted its own discipline within the revised EIS. The potential effects of the Project on human health were evaluated in the EIS by completing a screening level risk assessment, or SLRA. The results of the SLRA were provided as Appendix W to the EIS. An SLRA is intended to be an inherently conservative approach for calculating the potential effects of the Project, therefore the SLRA focussed on the operations and post-closure phases of the Project when the potential effects to human health are expected to be highest because of activity levels and expected releases, resulting in potential higher exposures.

To ensure the assessment was done appropriately, the consultants retained by Treasury Metals (TetraTech Inc.) approached Health Canada prior to completing the SLRA to obtain their recommendation on applicable guidance and spreadsheet models for evaluating risk to human health at a screening level. At that time, Health Canada provided the current "*Spreadsheet Tool for Human Health Detailed Quantitative Risk Assessment (DQRA)*" dated December 12, 2011, which has been used in this assessment. Although the DQRA Spreadsheet tool is no longer accepted for use by Health Canada, Treasury Metals has ensured that the exposure estimates, risk calculations, and overall conclusions remain valid as per the current Health Canada Preliminary Quantitative Risk Assessment (PQRA) and DQRA guidance documents, as well as associated toxicity data.

- Part I: Guidance of Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 2.0, dated 2010 and revised 2012; and
- "Part V: Guidance on Human Health Detailed Qualitative Risk Assessment for Chemicals", dated September 2010.

The Human Health Risk Assessment (HHRA) completed as part of the SLRA, was conducted in accordance with the accepted Health Canada PQRA/DQRA procedure with additional consideration given to Schedule C of Ontario Regulation 153/04, which outlines the official regulatory requirements of a risk assessment in Ontario as defined by the Ontario Ministry of Environment and Climate Change (MOECC). For projects in Ontario, the definition of an acceptable cancer risk associated with a carcinogenic chemical is an incrementation of lifetime cancer risk (ILCR) of one in one million (1×10^{-6}), and for characterizing acceptable risks associated with non-carcinogenic chemicals, a hazard quotient (HQ) of 0.2. The procedure evaluates potential hazards, receptors, and exposure pathways to determine if the potential risk identified, exceeds Health Canada/MOECC acceptable risk benchmarks.

As part of the original EIS, the potential health effects of the Project were evaluated using a screening level risk assessment, or SLRA. The results of the health risk assessment were provided as Appendix W to the original EIS. The SLRA has been included as Appendix W to the revised EIS. The SLRA was completed using a numerical screening tool developed by Health Canada. At that time, Health Canada provided the current "Spreadsheet Tool for Human Health Detailed Quantitative Risk Assessment" dated December 12, 2011. The SLRA focussed on the potential effects of the Project on human health as a result of the exposure to compounds generated, and released, as a result of the Project. The SLRA does not explicitly look at other determinants of health, such as social and economic, as these factors are addressed separately in Sections 6.16 and 6.17, respectively.

The risk assessment considered valued components non-Indigenous and Indigenous members of the population. For each of these valued components receptor groups were identified to be Residents, Workers, and Site Visitors/Harvesters. For each of these receptor groups potential risk was assessed via number of pathways for both commercial/ industrial land use (on-site) and residential land use (off-Site) scenarios to provide an assessment for those who work on or live

near the project site (or both), respectively. The Worker exposure scenario differs for Subsurface, Outdoor, and Indoor Workers and depending on which risk assessment guidance document is being followed (i.e., Health Canada or MOECC), however is generally less than 24 hours per day and only 5 days per week. The residential land use scenario assumes that the human receptors are exposed 24 hours a day for 7 days a week for 52 weeks per year and may include a toddler. Toddlers are considered the most sensitive human receptor with respect to direct contact with soil because they eat, drink, and breathe more in proportion to body size, and exhibit behaviours (e.g., hand-to-mouth activity) that increased exposure to media such as soil. Therefore, the residential land use scenario provides a conservative amount of protection to a Site Visitor and Harvester who may also be a toddler, but who would visit the site for a shorter amount of time than a Resident. The following exposure pathways were assessed:

- Ingestion of country foods (plants, fish, wild game);
- Inhalation of indoor air impacted by subsurface vapour intrusion;
- Inhalation of outdoor air impacted by subsurface vapour intrusion;
- Inhalation of trench air impacted by subsurface vapour intrusion,
- Direct contact with groundwater;
- Direct contact (dermal contact and incidental ingestion) of soil (baseline soils, tailings, or waste rock);
- Inhalation of soil particulates (fugitive dust); and/or
- Ingestion of groundwater as drinking water.

Contaminants of concern (COCs) were selected based on their exceedance of the applicable regulatory guideline or standard. Measured or predicted concentrations in baseline soils, waste rock, and tailings were compared to the Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health. Air quality parameters were selected based on exceedances of the Ontario Ambient Air Quality Objectives. Surface water COCs were selected based on exceedances of the Provincial Water Quality Objectives (PWQO) for the protection of freshwater aquatic life, and in the absence of PWQO (nitrate and chloride), the Canadian Water Quality Guidelines (CWQG) for the protection of freshwater aquatic life. No groundwater data were available however a qualitative discussion has been provided. The following sources of potential COCs were identified as having the potential for the Project to affect human health:

- Soil (baseline soils, waste rock, and/or tailings);
- Air and Dust; and
- Water

Health Canada's DQRA model was used to estimate daily intakes (EDIs) and HQs for non-carcinogens for all human receptors within each receptor group for the operable pathways

quantitatively assessed as part of the SLRA. Although the use of the DQRA model is no longer an approved tool, the equations and assumptions outlined in Section 6.19.2.2 as part of the exposure assessment remain valid to the current Health Canada guidance on completing a PQRA and DQRA for human health.

The SLRA presented the individual hazard quotients of each food item (Appendix W, Table U). The results indicated that hazard quotients for the ingestion of country foods (wild game, plants (vegetative and root/berry, and fish) were below the Health Canada/MOECC target HQ of 0.2 for both the operations and post-closure stages of the project.

With the risk management measures incorporated into the design of the Project (e.g. tailings cover, waste rock encapsulation, restricted site access) no potential risks in exceedance of Health Canada/MOECC risk benchmarks are identified as a result of the Project, no additional risk management measures are required for the protection of human health. Therefore, the Project will result in no adverse effects to human health.

6.20 Heritage Resources

The assessment of heritage resources component focusses on those aspects of the Project regulated under the *Ontario Heritage Act*, and characterized the effects using the following VCs:

- Archaeological sites; and
- Historic heritage sites.

The prediction of potential effects was done by identifying the presence, or potential for the presence, of heritage resources within the areas to be physically disturbed by the Project. The determination of the likelihood for archaeological resources to be present within the Project footprint was done in accordance with the requirements of the Ontario Heritage Act, and included the completion of a Stage 1 and Stage 2 archaeological assessment in accordance with the methodologies developed by the Ministry of Tourism, Culture and Sport (MTCS).

Based on the findings of the archeological studies completed for the Project (Appendix U to the EIS), it was concluded that the area of the Project "…does not exhibit archaeological potential, therefore it is recommended that the location does not require further archaeological assessment." The archaeological report was submitted to MTCS for review, who expressed satisfaction at the recommendations made. The low archaeological potential evaluated for the Project is also supported by the proximity to Thunder Lake and Wabigoon Lake. These areas would have been the preferred locations for settlement, and this settlement would have been related to available food resources (e.g., fish, rice), and access (e.g., canoe routes).

There were no residual adverse effects predicted for the heritage resources component.

6.21 Aboriginal Peoples

For the purposes of the EIS, Aboriginal and Treaty Rights are defined as the historic and current uses of lands and resources for traditional purposes by members of Indigenous communities. It is Treasury Metals' understanding that Aboriginal peoples are entitled to access to their lands according to their Aboriginal and Treaty #3 (1873) Rights, and Treasury Metals is committed to working with the Indigenous communities to ensure that the effects of the Project on their traditional land and resource use, or alternatively referred to as Aboriginal and Treaty Rights, are appropriately considered and protected.

This scope of assessment is consistent with the Round 1 information requests that included questions regarding the potential impact of the Project on Aboriginal and Treaty Rights, as defined by the right for a continued ability to use lands and resources for traditional purposes, including gathering, harvesting and cultural activities. The Round 1 information requests also re-enforces the need to consider potential effects of the Project on the socio-economic and health effects on Aboriginal people.

The following valued components (VCs) were defined in Section 6.1.3.20 for focussing the evaluation of the effects of the Project on Aboriginal peoples:

- Human Health;
- Harvesting and gathering of plant materials;
- Hunting;
- Trapping;
- Fishing;
- Cultural and spiritual; and
- Socio-economic Factors.

These valued components were selected with consideration for the available traditional knowledge (presented as part of Section 5.1 through 5.12), and information regarding the current use of the land and resources for traditional purposes by members of the Indigenous communities, as described in Section 5.13.

Quantitative assessments relating to other VCs that potentially affect Aboriginal VCs are provided in Sections 6.2 through 6.15. Potential human health risks to non-Aboriginal receptors and Aboriginal human receptors are assessed in Section 6.19. In cases where quantitative data are not available, adverse effects have been assessed on the basis via qualitative analysis.

Based on the effects assessment, there will be residual adverse effects to Aboriginal peoples as a result of the Project that remain after mitigation measures have been implemented. These residual adverse effects have been summarized in Table 6.21-1.

Table 6.21-1 Summary of Residual Effects on Aboriginal Peoples

Valued Component	Indicators	Measures	Predicted Aboriginal Residual Effects			
			Site Preparation and Construction	Operations	Closure	Post-Closure
Human Health	Risk Assessment for Indigenous Human Health	Potential risk relative to Health Canada risk benchmarks	No residual effect: No potential human health risks were identified via any of the exposure pathways as a result of the Project.	No residual effect: No potential human health risks were identified via any of the exposure pathways as a result of the Project.	No residual effect: No potential human health risks were identified via any of the exposure pathways as a result of the Project.	No residual effect: No potential human health risks were identified via any of the exposure pathways as a result of the Project.
Harvesting and Gathering of Plant Material	Wild Rice	Loss of wild rice areas	No residual effect: There will be no loss in wild rice area as a result of the Project.	No residual effect: There will be no loss in wild rice area as a result of the Project.	No residual effect: There will be no loss in wild rice area as a result of the Project.	No residual effect: There will be no loss in wild rice area as a result of the Project.
		Change in water quality	No residual effect: Water quality in the receiving environment will not exceed PWQO or background concentrations as a result of the Project.	No residual effect: Water quality in the receiving environment will not exceed PWQO or background concentrations as a result of the Project.	No residual effect: Water quality in the receiving environment will not exceed PWQO or background concentrations as a result of the Project.	No residual effect: Water quality in the receiving environment will not exceed PWQO or background concentrations as a result of the Project.
		Changes in water levels	No residual effect: There will be no measurable changes to water levels in Wabigoon Lake or Thunder Lake as a result of the Project.	No residual effect: There will be no measurable changes to water levels in Wabigoon Lake or Thunder Lake as a result of the Project.	No residual effect: There will be no measurable changes to water levels in Wabigoon Lake or Thunder Lake as a result of the Project.	No residual effect: There will be no measurable changes to water levels in Wabigoon Lake or Thunder Lake as a result of the Project.
		Quality for consumption	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.

Table 6.21-1 Summary of Residual Effects on Aboriginal Peoples (continued)

Valued Component	Indicators	Measures	Predicted Aboriginal Residual Effects			
			Site Preparation and Construction	Operations	Closure	Post-Closure
Harvesting and Gathering of Plant Material (cont'd)	Berry Harvesting	Loss of potential harvest areas	Residual effect: 260 ha of berry habitat loss. Constitutes 8.7% of the available berry habitat in the terrestrial LSA.	Residual effect: 260 ha of berry habitat loss. Constitutes 8.7% of the available berry habitat in the terrestrial LSA.	Residual effect: 260 ha of berry habitat loss. Constitutes 8.7% of the available berry habitat in the terrestrial LSA.	Residual effect: 168 ha of berry habitat loss in perpetuity due to the WRSA, open pit and TSF. Constitutes 5.6% of the available berry habitat in the terrestrial LSA.
		Quality for consumption	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.
	Medicinal Plant Harvesting	Loss of forest	Residual effect: 208 ha loss for potential medicinal plant harvesting. Constitutes 7.8% of forest habitat in the LSA.	Residual effect: 208 ha loss for potential medicinal plant harvesting. Constitutes 7.8% of forest habitat in the LSA.	Residual effect: 208 ha loss for potential medicinal plant harvesting. Constitutes 7.8% of forest habitat in the LSA.	Residual effect: 168 ha loss for potential medicinal plant harvesting in perpetuity due to the open pit, WRSA and TSF. Constitutes 6.3% of forest habitat in the LSA.
		Loss of wetland	Residual effect: 32.6 ha loss for potential medicinal plant harvesting. Constitutes 2.3% of wetland habitat in the LSA.	Residual effect: 47.0 ha loss for potential medicinal plant harvesting. Constitutes 3.2% of wetland habitat in the LSA.	Residual effect: 47.0 ha loss for potential medicinal plant harvesting. Constitutes 3.2% of wetland habitat in the LSA.	Residual effect: 47.0 ha loss for potential medicinal plant harvesting. Constitutes 3.2% of forest habitat in the LSA.

Table 6.21-1 Summary of Residual Effects on Aboriginal Peoples (continued)

Valued Component	Indicators	Measures	Predicted Aboriginal Residual Effects			
			Site Preparation and Construction	Operations	Closure	Post-Closure
Harvesting and Gathering of Plant Material (cont'd)	Medicinal Plant Harvesting (cont'd)	Quality for consumption	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.
	Changes in Access	Land where access is controlled	Residual effect: 379 ha where access will require a Treasury escort for safety and security reasons	Residual effect: 379 ha where access will require a Treasury escort for safety and security reasons	Residual effect: 379 ha where access will require a Treasury escort for safety and security reasons	No residual effect: No access restrictions in the post-closure phase.
		Land removed from access	Residual effect: 364 ha where access will be removed for safety and security reasons	Residual effect: 364 ha where access will be removed for safety and security reasons	Residual effect: 364 ha where access will be removed for safety and security reasons	No residual effect: No access restrictions in the post-closure phase
	Diminished on-the-land Experience	Changed views	No residual effect: Project features will not be visible off-site	Residual effect: The WRSA will be visible from 852 ha of Thunder Lake, but likely will not be discernable	Residual effect: The WRSA will be visible from 852 ha of Thunder Lake, but likely will not be discernable	Residual effect: The WRSA will be visible from 852 ha of Thunder Lake, but likely will not be discernable
		Noticeable changes in noise	Residual effect: The Project will be audible from 171 ha around the operations area	Residual effect: The Project will be audible from 171 ha around the operations area	Residual effect: The Project will be audible from 171 ha around the operations area	No residual effect: There will be no source of noise from the Project

Table 6.21-1 Summary of Residual Effects on Aboriginal Peoples (continued)

Valued Component	Indicators	Measures	Predicted Aboriginal Residual Effects			
			Site Preparation and Construction	Operations	Closure	Post-Closure
Hunting	Ungulates	Habitat Loss	Residual effect: 141 ha of ungulate habitat will be lost to hunting. Constitutes 0.6% of the available ungulate habitat in the RSA.	Residual effect: 141 ha of ungulate habitat will be lost to hunting. Constitutes 0.6% of the available ungulate habitat in the RSA.	Residual effect: 141 ha of ungulate habitat will be lost to hunting. Constitutes 0.6% of the available ungulate habitat in the RSA.	No residual effect: Habitat in the post-closure phase will return.
		Quality for consumption	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.
	Furbearers	Habitat Loss	Residual effect: 96 ha of American martin habitat will be lost to hunting. Constitutes 7.4% of the available American martin habitat in the LSA. No residual effect: Ample beaver habitat in the LSA not a meaningful amount of habitat removed.	Residual effect: 96 ha of American martin habitat will be lost to hunting. Constitutes 7.4% of the available American martin habitat in the LSA. No residual effect: Ample beaver habitat in the LSA not a meaningful amount of habitat removed.	Residual effect: 96 ha of American martin habitat will be lost to hunting. Constitutes 7.4% of the available American martin habitat in the LSA. No residual effect: Ample beaver habitat in the LSA not a meaningful amount of habitat removed.	No residual effect: Habitat in the post-closure phase will return.
		Quality for consumption	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.

Table 6.21-1 Summary of Residual Effects on Aboriginal Peoples (continued)

Valued Component	Indicators	Measures	Predicted Aboriginal Residual Effects			
			Site Preparation and Construction	Operations	Closure	Post-Closure
Hunting (cont'd)	Waterfowl	Habitat Loss	Residual effect: 54.5 ha of waterfowl habitat will be lost to hunting. Constitutes 3.8% of the available waterfowl habitat in the LSA.	Residual effect: 54.5 ha of waterfowl habitat will be lost to hunting. Constitutes 3.8% of the available waterfowl habitat in the LSA.	Residual effect: 54.5 ha of waterfowl habitat will be lost to hunting. Constitutes 3.8% of the available waterfowl habitat in the LSA.	No residual effect: Habitat in the post-closure phase will return.
		Quality for consumption	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.
	Changes in Access	Land where access is controlled	Residual effect: 379 ha where access will require a Treasury escort for safety and security reasons	Residual effect: 379 ha where access will require a Treasury escort for safety and security reasons	Residual effect: 379 ha where access will require a Treasury escort for safety and security reasons	No residual effect: No access restrictions in the post-closure phase.
		Land removed from access	Residual effect: 364 ha where access will be removed for safety and security reasons	Residual effect: 364 ha where access will be removed for safety and security reasons	Residual effect: 364 ha where access will be removed for safety and security reasons	No residual effect: No access restrictions in the post-closure phase
	Diminished on-the-land Experience	Change views	No residual effect: Project features will not be visible off-site	Residual effect: The WRSA will be visible from 852 ha of Thunder Lake, but likely will not be discernable	Residual effect: The WRSA will be visible from 852 ha of Thunder Lake, but likely will not be discernable	Residual effect: The WRSA will be visible from 852 ha of Thunder Lake, but likely will not be discernable

Table 6.21-1 Summary of Residual Effects on Aboriginal Peoples (continued)

Valued Component	Indicators	Measures	Predicted Aboriginal Residual Effects			
			Site Preparation and Construction	Operations	Closure	Post-Closure
Hunting (cont'd)	Diminished on-the-land Experience (cont'd)	Noticeable changes in noise	Residual effect: The Project will be audible from 171 ha around the operations area	Residual effect: The Project will be audible from 171 ha around the operations area	Residual effect: The Project will be audible from 171 ha around the operations area	No residual effect: There will be no source of noise from the Project
Trapping	Furbearers	Habitat Loss	Residual effect: 96 ha of American martin habitat will be lost to hunting. Constitutes 7.4% of the available American martin habitat in the LSA. No residual effect: Ample beaver habitat in the LSA not a meaningful amount of habitat removed.	Residual effect: 96 ha of American martin habitat will be lost to hunting. Constitutes 7.4% of the available American martin habitat in the LSA. No residual effect: Ample beaver habitat in the LSA not a meaningful amount of habitat removed.	Residual effect: 96 ha of American martin habitat will be lost to hunting. Constitutes 7.4% of the available American martin habitat in the LSA. No residual effect: Ample beaver habitat in the LSA not a meaningful amount of habitat removed.	No residual effect: The operations area will be reclaimed to productive habitat available for trapping.
	Changes in Access	Land where access is controlled	Residual effect: 379 ha where access will require a Treasury escort for safety and security reasons	Residual effect: 379 ha where access will require a Treasury escort for safety and security reasons	Residual effect: 379 ha where access will require a Treasury escort for safety and security reasons	No residual effect: No access restrictions in the post-closure phase.
		Land removed from access	Residual effect: 364 ha where access will be removed for safety and security reasons	Residual effect: 364 ha where access will be removed for safety and security reasons	Residual effect: 364 ha where access will be removed for safety and security reasons	No residual effect: No access restrictions in the post-closure phase

Table 6.21-1 Summary of Residual Effects on Aboriginal Peoples (continued)

Valued Component	Indicators	Measures	Predicted Aboriginal Residual Effects			
			Site Preparation and Construction	Operations	Closure	Post-Closure
Trapping (cont'd)	Diminished on-the-land Experience	Change views	No residual effect: Project features will not be visible off-site	Residual effect: The WRSA will be visible from 852 ha of Thunder Lake, but likely will not be discernable	Residual effect: The WRSA will be visible from 852 ha of Thunder Lake, but likely will not be discernable	Residual effect: The WRSA will be visible from 852 ha of Thunder Lake, but likely will not be discernable
		Noticeable changes in noise	Residual effect: The Project will be audible from 171 ha around the operations area	Residual effect: The Project will be audible from 171 ha around the operations area	Residual effect: The Project will be audible from 171 ha around the operations area	No residual effect: There will be no source of noise from the Project
Fishing	Sport Fish	Change in abundance	No residual effect: Change in water quality and quantity as a result of the Project will not affect sport fish abundance in Thunder Lake or Wabigoon Lake.	No residual effect: Change in water quality and quantity as a result of the Project will not affect sport fish abundance in Thunder Lake or Wabigoon Lake.	No residual effect: Change in water quality and quantity as a result of the Project will not affect sport fish abundance in Thunder Lake or Wabigoon Lake.	No residual effect: Change in water quality and quantity as a result of the Project will not affect sport fish abundance in Thunder Lake or Wabigoon Lake.
		Quality for consumption	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.	No residual effect: No residual effects via ingestion of country foods identified in human health risk assessment as a result of the Project.
	Baitfish	Change in abundance	No residual effect Baitfish habitat loss as a result of the Project will be offset by constructing new fish habitat. Project	No residual effect Baitfish habitat loss as a result of the Project will be offset by constructing new fish habitat. Project	No residual effect Baitfish habitat loss as a result of the Project will be offset by constructing new fish habitat. Project	No residual effect Baitfish habitat loss as a result of the Project will be offset by constructing new fish habitat. Project

Table 6.21-1 Summary of Residual Effects on Aboriginal Peoples (continued)

Valued Component	Indicators	Measures	Predicted Aboriginal Residual Effects			
			Site Preparation and Construction	Operations	Closure	Post-Closure
Fishing (cont'd)	Baitfish (cont'd)		effects will not affect the abundance of baitfish in surrounding creeks and tributaries.	effects will not affect the abundance of baitfish in surrounding creeks and tributaries.	effects will not affect the abundance of baitfish in surrounding creeks and tributaries.	effects will not affect the abundance of baitfish in surrounding creeks and tributaries.
	Commercial Fishing	Fish for consumption (sport fish)	No residual effect: Change in water quality and quantity as a result of the Project will not affect sport fish abundance in Thunder Lake or Wabigoon Lake.	No residual effect: Change in water quality and quantity as a result of the Project will not affect sport fish abundance in Thunder Lake or Wabigoon Lake.	No residual effect: Change in water quality and quantity as a result of the Project will not affect sport fish abundance in Thunder Lake or Wabigoon Lake.	No residual effect: Change in water quality and quantity as a result of the Project will not affect sport fish abundance in Thunder Lake or Wabigoon Lake.
		Bait fishing	No residual effect Baitfish habitat loss as a result of the Project will be offset by constructing new fish habitat. Project effects will not affect the abundance of baitfish in surrounding creeks and tributaries.	No residual effect Baitfish habitat loss as a result of the Project will be offset by constructing new fish habitat. Project effects will not affect the abundance of baitfish in surrounding creeks and tributaries.	No residual effect Baitfish habitat loss as a result of the Project will be offset by constructing new fish habitat. Project effects will not affect the abundance of baitfish in surrounding creeks and tributaries.	No residual effect Baitfish habitat loss as a result of the Project will be offset by constructing new fish habitat. Project effects will not affect the abundance of baitfish in surrounding creeks and tributaries.
	Changes in Access	Land where access is controlled	Residual effect: 379 ha where access will require a Treasury escort for safety and security reasons. The irrigation ponds at the former MNRF Tree Nursery will still be accessible.	Residual effect: 379 ha where access will require a Treasury escort for safety and security reasons. The irrigation ponds at the former MNRF Tree Nursery will still be accessible.	Residual effect: 379 ha where access will require a Treasury escort for safety and security reasons. The irrigation ponds at the former MNRF Tree Nursery will still be accessible.	No residual effect: No access restrictions in the post-closure phase.

Table 6.21-1 Summary of Residual Effects on Aboriginal Peoples (continued)

Valued Component	Indicators	Measures	Predicted Aboriginal Residual Effects			
			Site Preparation and Construction	Operations	Closure	Post-Closure
Fishing (cont'd)	Changes in Access (cont'd)	Land removed from access	Residual effect: 364 ha where access will be removed for safety and security reasons	Residual effect: 364 ha where access will be removed for safety and security reasons	Residual effect: 364 ha where access will be removed for safety and security reasons	No residual effect: No access restrictions in the post-closure phase
	Diminished on-the-land Experience	Change views	No residual effect: Project features will not be visible off-site	Residual effect: The WRSA will be visible from 852 ha of Thunder Lake, but likely will not be discernable	Residual effect: The WRSA will be visible from 852 ha of Thunder Lake, but likely will not be discernable	Residual effect: The WRSA will be visible from 852 ha of Thunder Lake, but likely will not be discernable
		Noticeable changes in noise	Residual effect: The Project will be audible from 171 ha around the operations area	Residual effect: The Project will be audible from 171 ha around the operations area	Residual effect: The Project will be audible from 171 ha around the operations area	No residual effect: There will be no source of noise from the Project
Cultural and Spiritual	Cultural and Spiritual Sites	Loss or disturbance to known sites	No residual effect: No identified cultural or spiritual site will be affected by the Project	No residual effect: No identified cultural or spiritual site will be affected by the Project	No residual effect: No identified cultural or spiritual site will be affected by the Project	No residual effect: No identified cultural or spiritual site will be affected by the Project
		Restriction to access	No residual effect: There will be no restriction to access to any identified cultural or spiritual sites due to the Project	No residual effect: There will be no restriction to access to any identified cultural or spiritual sites due to the Project	No residual effect: There will be no restriction to access to any identified cultural or spiritual sites due to the Project	No residual effect: There will be no restriction to access to any identified cultural or spiritual sites due to the Project

Table 6.21-1 Summary of Residual Effects on Aboriginal Peoples (continued)

Valued Component	Indicators	Measures	Predicted Aboriginal Residual Effects			
			Site Preparation and Construction	Operations	Closure	Post-Closure
Cultural and Spiritual (cont'd)	Traditional Travel Routes	Interruption – discontinued	No residual effect: There are no known traditional travel routes through the immediate Project site.	No residual effect: There are no known traditional travel routes through the immediate Project site.	No residual effect: There are no known traditional travel routes through the immediate Project site.	No residual effect: There are no known traditional travel routes through the immediate Project site.
		Interference – close to Project	No residual effect: Traditional travel routes to Rice Lake via Thunder Lake will not be affected.	No residual effect: Traditional travel routes to Rice Lake via Thunder Lake will not be affected.	No residual effect: Traditional travel routes to Rice Lake via Thunder Lake will not be affected.	No residual effect: Traditional travel routes to Rice Lake via Thunder Lake will not be affected.
	Diminished on-the-land Experience	Change views	No residual effect: Project features will not be visible off-site	Residual effect: The WRSA will be visible from 852 ha of Thunder Lake, but likely will not be discernable	Residual effect: The WRSA will be visible from 852 ha of Thunder Lake, but likely will not be discernable	Residual effect: The WRSA will be visible from 852 ha of Thunder Lake, but likely will not be discernable
		Noticeable changes in noise	Residual effect: The Project will be audible from 171 ha around the operations area	Residual effect: The Project will be audible from 171 ha around the operations area	Residual effect: The Project will be audible from 171 ha around the operations area	No residual effect: There will be no source of noise from the Project
Socio-economic Factors	Economic Effects	Aboriginal employment opportunities	Residual positive effect: The Project will create job opportunities for Aboriginal peoples with varying levels of educational requirements (Table 6.18.4.2-1)	Residual positive effect: The Project will create job opportunities for Aboriginal peoples with varying levels of educational requirements (Table 6.18.4.2-1)	Residual positive effect: The Project will create job opportunities for Aboriginal peoples with varying levels of educational requirements (Table 6.18.4.2-1)	Residual neutral effect: Although the jobs from the Project will no longer exist in the post-closure phase, the experience and training that Aboriginal peoples received can easily transfer to jobs in industry.

Table 6.21-1 Summary of Residual Effects on Aboriginal Peoples (continued)

Valued Component	Indicators	Measures	Predicted Aboriginal Residual Effects			
			Site Preparation and Construction	Operations	Closure	Post-Closure
Socio-economic Factors (cont'd)	Economic Effects (cont'd)	Cost of living	Residual positive effect: Demand for labour, goods, and services by the Project and by workers moving into the Project area will increase the cost of living.	Residual positive effect: Demand for labour, goods, and services by the Project and by workers moving into the Project area will increase the cost of living.	Residual adverse effect: The demand for labour, goods, and services by the Project will decline and reduce the cost of living.	Residual adverse effect: The demand for labour, goods, and services by the Project will decline and reduce the cost of living.
		Project purchases from Aboriginal Businesses	Residual positive effect: Treasury Metals has committed to a local purchasing policy, which will provide business to Aboriginal people owned businesses.	Residual positive effect: Treasury Metals has committed to a local purchasing policy, which will provide business to Aboriginal people owned businesses.	Residual neutral effect: The benefits of purchases made by Treasury Metals in the local communities will cease.	Residual neutral effect: The benefits of purchases made by Treasury Metals in the local communities will cease.
	Social Effects	In- and out-migration	Residual positive effect: The Project could result in an in-migration of workers to could help reverse the pattern of out-migration in the socio-economic study area.	Residual positive effect: The Project could result in an in-migration of workers to could help reverse the pattern of out-migration in the socio-economic study area.	Residual adverse effect: The out-migration of workers leaving the area would be most prominent during this phase.	Residual adverse effect: The pattern of out-migration of the area would return to pre-project conditions.
		Capacity of education services	Residual adverse effect: Potential increased demand on education services. It is anticipated that any increase in enrollment could be accommodated within the existing education system	Residual adverse effect: Potential increased demand on education services. It is anticipated that any increase in enrollment could be accommodated within the existing education system	Residual adverse effect: Potential increased demand on education services. It is anticipated that any increase in enrollment could be accommodated within the existing education system	No residual effect: The demand on education services will return to pre-project conditions.

Table 6.21-1 Summary of Residual Effects on Aboriginal Peoples (continued)

Valued Component	Indicators	Measures	Predicted Aboriginal Residual Effects			
			Site Preparation and Construction	Operations	Closure	Post-Closure
Socio-economic Factors (cont'd)	Social Effects (cont'd)	Education attainment	Residual positive effect: The Project will provide on-the-job training for individual with limited education, and provide opportunities to encourage others to attain higher levels of education	Residual positive effect: The Project will provide on-the-job training for individual with limited education, and provide opportunities to encourage others to attain higher levels of education	Residual positive effect: The Project will provide on-the-job training for individual with limited education, and provide opportunities to encourage others to attain higher levels of education	Residual neutral effect: Although the jobs from the Project will no longer exist in the post-closure phase, the education, experience and training that Aboriginal peoples received can easily transfer to jobs in industry.
		Project-specific Training	Residual positive effect: There will be increased training and education opportunities for unemployed and under-employed residents and non-resident workers	Residual positive effect: There will be increased training and education opportunities for unemployed and under-employed residents and non-resident workers	Residual positive effect: There will be increased training and education opportunities for unemployed and under-employed residents and non-resident workers	No residual effect: There will be no training opportunities following closure from the Project
		Housing availability	Residual adverse effect: There could be additional stresses on community housing due to in-migration of workers.	Residual adverse effect: There could be additional stresses on community housing due to in-migration of workers.	Residual adverse effect: There could be additional stresses on community housing due to in-migration of workers.	No residual effect: Housing availability will return to pre-project levels.

Table 6.21-1 Summary of Residual Effects on Aboriginal Peoples (continued)

Valued Component	Indicators	Measures	Predicted Aboriginal Residual Effects			
			Site Preparation and Construction	Operations	Closure	Post-Closure
Socio-economic Factors (cont'd)	Social Effects (cont'd)	Property values (off-reserve)	Residual neutral effect: There could be an increase in property values as a result of the Project. This is a positive effect to people trying to sell their property and a negative effect to people trying to buy property.	Residual neutral effect: There could be an increase in property values as a result of the Project. This is a positive effect to people trying to sell their property and a negative effect to people trying to buy property.	Residual neutral effect: There could be an increase in property values as a result of the Project. This is a positive effect to people trying to sell their property and a negative effect to people trying to buy property.	Residual neutral effect: There could be a decrease in property values to pre-project conditions. This is a negative effect to people trying to sell their property and a positive effect to people trying to buy property.
		Capacity of emergency services	Residual adverse effect: There could be additional stresses on the emergency services in the area due to the in-migration of workers.	Residual adverse effect: There could be additional stresses on the emergency services in the area due to the in-migration of workers.	Residual adverse effect: There could be additional stresses on the emergency services in the area due to the in-migration of workers.	No residual effect: Emergency services use would return to pre-project conditions.
		Road network capacity and conditions	No residual effect: Based on the traffic study (Appendix E), the existing road network can handle the slight increase in traffic on Highway 17.	No residual effect: Based on the traffic study (Appendix E), the existing road network can handle the slight increase in traffic on Highway 17.	No residual effect: Based on the traffic study (Appendix E), the existing road network can handle the slight increase in traffic on Highway 17.	No residual effect: Traffic on Highway 17 will return to pre-project conditions.

6.22 Indigenous Communities

The environmental effects of the Project on Aboriginal Peoples were assessed in Section 6.21 of the EIS. The specific purpose of this sub-section is to address subparagraph 5(1)(c)(iii) of CEAA 2012 "with respect to aboriginal peoples, an effect occurring in Canada of any change that may be caused to the environment on the current use of lands and resources for traditional purposes". This section uses the information obtained via meaningful engagement activities with respect to current use of lands and resources for traditional purposes (Appendix DD and as summarized in Section 5.13) as per paragraph 4(1)(d) of CEAA, 2012.

The following summary of the current use of lands and resources for traditional purposes by Aboriginal peoples is specific to each Indigenous community:

- **Wabigoon Lake Ojibway Nation -** Wabigoon Lake Ojibway Nation is the Indigenous community in closest proximity to the Goliath Gold Project site. Based on the meaningful engagement activities to-date, Treasury Metals understands that traditional land and resource use activities of the Wabigoon Lake Ojibway Nation include harvesting of plants, hunting and trapping of animals, collection of potable water, fishing, and for cultural and spiritual purposes, and Indigenous members of the community are specifically concerned about the quality of aquatic based resources, large game hunting, and timber harvesting.
- **Eagle Lake First Nation:** Treasury Metals understands that traditional land and resource use activities of the Eagle Lake First Nation include harvesting of plants, hunting and trapping of animals, fishing, and for cultural and spiritual purposes.
- **Wabauskang First Nation:** Treasury Metals understands that traditional land and resource use activities of the Wabauskang First Nation include hunting and trapping of animals, fishing, and for cultural and spiritual purposes.
- **Lac Seul First Nation**: Treasury Metals understands that traditional land and resource use activities of the Lac Seul First Nation include harvesting of plants, hunting and trapping of animals, and fishing.
- **Whitefish Bay First Nation (Naotkamegwanning First Nation):** Treasury Metals understands that traditional land and resource use activities of the Whitefish Bay First Nation (Naotkamegwanning First Nation) include hunting and trapping of animals, fishing, and cultural and spiritual purposes.
- **Grassy Narrows First Nation**: To date, the only information Treasury Metals has been able to receive from Grassy Narrows First Nation, is that the community is concerned with water management, and the downstream impacts of the Project specifically with respect to mercury. From secondary sources of information, it is Treasury Metals understanding that members of the Grassy Narrows First Nation may use the land for gathering of plants, hunting and trapping, and cultural and spiritual purposes in addition to the collection of potable water and fishing.

- **Lacs des Mille Lacs First Nation:** Lac des Mille Lacs First Nation has expressed concerns regarding the overall environmental impact of the Project, impacts to economic and cultural pursuits and the practice of traditional activities. However no other information has been shared by members of the Lac des Mille Lacs First Nation. In addition, Lac des Mille Lacs First Nation did not provide any specific comments on the original EIS document provided to them by Treasury Metals.
- **Métis Nation of Ontario:** Treasury Metals highlights that a formal traditional knowledge/ traditional land and resource use study is in progress with the Métis Nation of Ontario. It is Treasury Metals' understanding that traditional land and resource use activities of the Métis Nation of Ontario include harvesting of wild food, gathering of plants for consumption and medicinal purposes, camping on the land and other spiritual and cultural purposes, hunting and trapping, and fishing.

Although the effects assessment has identified noted residual adverse effects on the ability of an Indigenous community member to practice their current use of the lands for traditional purposes, the magnitude of these effects is considered to be relatively small due to the small size of the Project. In addition, given that the Project is proposed for development on a parcel of previously disturbed and there are water quality concerns in the wider geographic area, the best practices of Treasury Metals and proposed mitigation measures for the protection of the environment associated with the Project, may lead to substantial improvements in environmental quality. Furthermore, for the communities that are located greater than 150 km from the Project, the potential changes on the ability of one of the community members to practice their current use of the land and resources for traditional purposes is anticipated to be much less. Project development will also provide positive economic opportunities for Indigenous communities in terms of employment, business, and training.

Treasury Metals is committed to continued engagement with Indigenous members of all of the communities to ensure that any potential effect of the Project on their ability to practice the current use of lands and resources for traditional purposes is sufficiently off-set. It is Treasury Metals' opinion that any residual adverse effect identified in Section 6.21 as a result of the Project will not have an overall meaningful adverse outcome for members of any of the Indigenous communities based on the relatively small footprint of the Project, the large distance between the Project and some of the communities, the identified mitigation measures, positive socio-economic effects of the project, and commitment to ongoing engagement activities.

6.23 Summary of Predicted Project Effects

A summary of the results from the above steps in the effects assessment process is provided in Table 6.23-1.

Table 6.23-1: Summary of Predicted and Residual Adverse Effects

Discipline or Component	Valued Components (VCs)	Indicators	Project Effects (Section 6)	
			Predicted Adverse Effects	Predicted Residual Adverse Effects
Terrain and soils	Natural Landscapes	Viewscapes	Yes	Yes
	Overburden	Erosion of disturbed overburden	No	— (1)
	Soil chemistry	Changes in soil chemistry	No	—
Geology and geochemistry	Pit lake water quality	Concentrations of indicator compounds	Yes	Yes
Noise	Environmental noise levels	Equivalent noise levels, LEQ	Yes	Yes
	Noise disturbance to wildlife (including SAR)	Area predicted LEQ above 50 dBA	Yes	Yes
	Blasting noise and vibration	Peak sound pressure level	Yes	Yes
		Peak particle velocity	Yes	Yes
	Noise related health effects	Absolute sound pressure, LDN	Yes	Yes
		Percent highly annoyed, %HA	Yes	Yes
Light	Light trespass	Ambient light levels	No	—
Air quality	Air quality	Concentrations of indicator compounds	Yes	Yes
Climate	Project GHG emissions	Annual equivalent carbon dioxide emissions (eCO_2)	Yes	Yes
	Changes in climate due to the Project	Changes in annual temperature	No	—
		Changes in annual precipitation	No	—
Surface water quality	Surface water quality	Concentrations of indicator compounds	Yes	Yes
Surface water quantity	Surface water quantity	Increase in surface water flows	Yes	Yes
		Decrease in surface water flows	Yes	Yes
		Change in lake levels	No	—
Groundwater quality	Groundwater quality	Concentrations of indicator compounds	Yes	—
Groundwater quantity	Groundwater quantity	Decrease in groundwater elevations in private water wells	Yes	—
Wildlife and wildlife Habitat	Wildlife Species at Risk	Common Nighthawk	Yes	Yes
		Northern Myotis/Little Brown Myotis	Yes	Yes
		Barn Swallow	Yes	Yes
	Ungulates	Moose	Yes	Yes
	Furbearers	American Marten	Yes	Yes
		American Beaver	Yes	Yes
	Upland Birds	Upland birds	Yes	Yes
	Wetland Birds	Marsh birds	Yes	Yes
	Small mammals	Small mammals	Yes	Yes

Table 6.23-1: Summary of Predicted and Residual Adverse Effects (continued)

Discipline or Component	Valued Components (VCs)	Indicators	Project Effects (Section 6)	
			Predicted Adverse Effects	Predicted Residual Adverse Effects
Wildlife and wildlife Habitat (continued)	Reptiles and amphibians	Reptiles and amphibians	Yes	Yes
	Invertebrates	Terrestrial invertebrates	Yes	Yes
Migratory Birds	Upland Birds	Upland birds	Yes	Yes
	Wetland Birds	Marsh birds	Yes	Yes
Fish and fish habitat	Stream-resident fish population	Direct loss or alteration of habitat	Yes	Yes
		Changes in flows or water levels	Yes	—
		Changes in water quality	No	—
		Blasting	No	—
	Migratory fish populations	Direct loss or alteration of habitat	Yes	—
		Changes in flows or water levels	No	—
		Changes in water quality	No	—
		Blasting	No	—
	Lake-resident fish populations	Direct loss or alteration of habitat	No	—
		Changes in flows or water levels	No	—
		Changes in water quality	No	—
		Blasting	No	—
	Fish species-at-risk	Direct loss or alteration of habitat	No	—
		Changes in flows or water levels	No	—
		Changes in water quality	No	—
		Blasting	No	—
Wetlands and vegetation	Wetlands	Wetland extent	Yes	Yes
		Wild rice	No	—
		Floating Marsh Marigold (Caltha natans)	No	—
	Vegetation communities and species	Predominantly coniferous forest	Yes	Yes
		Predominantly coniferous forest	Yes	Yes
		Successional areas	Yes	Yes
		Potential berry harvesting areas	Yes	Yes
Land use	Land use planning and policies	Conflict with accepted land uses as stipulated in approved land use plans.	No	—
		Overlap with protected areas.	No	—
	Aggregate operations	Change in access to aggregate resources.	No	—
		Change in demand of aggregate resources extraction.	No	—
	Forestry	Change in access to forestry resources.	No	—
		Loss of forestry resources.	Yes	Yes

Table 6.23-1: Summary of Predicted and Residual Adverse Effects (continued)

Discipline or Component	Valued Components (VCs)	Indicators	Project Effects (Section 6)	
			Predicted Adverse Effects	Predicted Residual Adverse Effects
Land use (continued)	Mineral exploration	Change in access to mineral claims for exploration and production.	No	—
	Fishing - recreational and commercial	Change in access to fisheries resources.	No	—
		Change in the abundance of fisheries resources.	No	—
		Change in contaminant levels in fish	No	—
		Diminished on-the-land experience.	Yes	Yes
	Hunting	Change in access to wildlife resources.	Yes	Yes
		Change in abundance of wildlife resources.	Yes	Yes
		Diminished experience of being on the land	Yes	Yes
	Trapping	Change in access to wildlife resources.	Yes	Yes
		Change in abundance of wildlife resources.	Yes	Yes
		Diminished on-the-land experience.	Yes	Yes
	Cottagers and outfitters	Diminished on-the-land experience.	Yes	Yes
		Change in access to cottage and/or outfitter areas.	No	—
		Changes in clientele for outfitters with lodges located near the Project.	Yes	Yes
	Other recreational uses	Change in access for residents and visitors to public lands for non-consumptive purposes	No	—
		Change in access for residents and visitors to public lands for consumptive purposes.	Yes	Yes
		Change in abundance of berries, mushrooms and/or other vegetation used for consumption	Yes	Yes
		Diminished on-the-land experience.	Yes	Yes
Social	Population demographics	Population change	Yes	Yes
	Education	Capacity of education services	Yes	Yes
		Education attainment	Yes	Yes
		Project-specific training	Yes	Yes
	Infrastructure and services	Municipal services	Yes	Yes
		Community services (e.g., health, social services)	Yes	Yes
	Housing and property values	Housing availability	Yes	Yes
		Property values	Yes	Yes

Table 6.23-1: Summary of Predicted and Residual Adverse Effects (continued)

Discipline or Component	Valued Components (VCs)	Indicators	Project Effects (Section 6)	
			Predicted Adverse Effects	Predicted Residual Adverse Effects
Social (continued)	Public safety	Crime rate	Yes	Yes
		Capacity of emergency services	Yes	Yes
		Requests for emergency services by Project	Yes	Yes
	Transportation and traffic	Road network capacity and conditions	Yes	Yes
Economic	Labour force, labour participation and employment	Labour income employment	Yes	Yes
	Income levels	Income levels and categories	Yes	Yes
	Cost of living	Current prevailing cost of living	Yes	Yes
	Real estate	Housing prices and affordability	Yes	Yes
	Economic development	Municipal taxes and contribution to economic development projects	Yes	Yes
	Existing businesses	Local business availability	Yes	Yes
	Government revenues	Taxes and revenues	Yes	Yes
Human health	Non-Indigenous human health	Subsurface/Construction Worker	No	—
		Outdoor Worker	No	—
		Indoor Worker	No	—
		Site Visitor, or Harvester	No	—
		Resident	No	—
	Indigenous human health	Resident	No	—
		Site Visitor, or Harvester	No	—
		Subsurface/Construction Worker	No	—
		Outdoor Worker	No	—
		Indoor Worker	No	—
Heritage resources	Archaeological sites	Archaeological sites	No	—
	Historic heritage sites	Historic heritage sites	No	—
Aboriginal peoples	Human health	Risk Assessment for Indigenous Human Health	No	—
	Harvesting and gathering of plant material	Wild rice	No	—
		Berry Harvesting	Yes	Yes
		Medicinal plant harvesting	Yes	Yes
		Changes in access	Yes	Yes
		Diminished on-the-land experience	Yes	Yes
	Hunting	Ungulates	Yes	Yes
		Furbearers	Yes	Yes

Table 6.23-1: Summary of Predicted and Residual Adverse Effects (continued)

Discipline or Component	Valued Components (VCs)	Indicators	Project Effects (Section 6)	
			Predicted Adverse Effects	Predicted Residual Adverse Effects
Aboriginal peoples	Hunting (continued)	Waterfowl	Yes	Yes
		Changes in access	Yes	Yes
		Diminished on-the-land experience	Yes	Yes
	Trapping	Furbearers	Yes	Yes
		Changes in access	Yes	Yes
		Diminished on-the-land experience	Yes	Yes
	Fishing	Sport fish	No	—
		Baitfish	No	—
		Commercial fishing	No	—
		Changes in access	Yes	Yes
		Diminished on-the-land experience	Yes	Yes
	Cultural and spiritual	Cultural or spiritual sites	—	—
		Traditional Travel routes	—	—
		Diminished on-the-land experience	Yes	Yes
	Socio-economic factors	Economic effects	Yes	Yes
		Social effects	Yes	Yes

Notes:

(1) The "—" symbol denotes where there were no effects predicted as a result of the Project for the VC and indicator.

6.24 Summary of Mitigation

A number of mitigation measures will be implemented at the Project to mitigate the potential adverse effects. A list of all these mitigation measures is provided in Table 6.24-1.

Table 6.24-1: Summary of Mitigation Measures

Mitigation Identifier	Mitigation Description
Mit_001	Reduce the overall height of the constructed features to the extent possible.
Mit_002	Construct WRSA and overburden stockpiles with an overall a 3:1 (horizontal to vertical) side slope to maintain a more natural appearance.
Mit_003	Initiate construction of the WRSA from the western edge
Mit_004	Vegetate the western facing side of the WRSA as soon as practicable.
Mit_005	Vegetate of the overburden stockpile as soon as practicable
Mit_006	Decommission the low-grade ore (LGO) stockpile at the end of operations
Mit_007	Overburden materials (clay, sand or organic material) stripped during the site preparation and construction phase will be placed in the overburden stockpiles located directly to the south of the proposed open pits.
Mit_008	Progressively construct a perimeter ditch and seepage collection system around the operations area to capture and direct all runoff from the site to the water management system.

Table 6.24-1: Summary of Mitigation Measures (continued)

Mitigation Identifier	Mitigation Description
Mit_009	Equipment will be maintained in good working order and inspected regularly
Mit_010	Re-fueling of equipment will be done in a manner to limit the potential for spills
Mit_011	Fuel will be stored in a lined, contained area.
Mit_012	Fueling vehicles will be parked in a concrete lined area when not in use.
Mit_013	Emulsion explosives will be stored and dispensed in a lined, contained area
Mit_014	Trucks used for the delivery of emulsion explosives will be parked in a concrete lined area when not in use.
Mit_015	Processing plant area will be lined and equipped with runoff and seepage collection
Mit_016	LGO stockpile will be equipped with runoff and seepage collection
Mit_017	Activities on the overburden stockpiles will be minimized and the stockpiles left undisturbed until closure activities are underway.
Mit_018	The WRSA will be capped with a low permeability cover, then a layer of overburden, then vegetated during closure.
Mit_019	Waste rock will be evaluated and segregated between PAG and NAG rock, if feasible
Mit_020	The PAG waste rock would be placed in the mined out areas of the open pit, to the extent practical.
Mit_021	During operations, tailings will be maintained in saturated conditions, and a water cover will be maintained over the majority of the TSF to prevent the onset of acidification.
Mit_022	The open pit will be allowed to flood at closure
Mit_023	Tailings within the TSF will be isolated using either a low permeability dry cover, or a wet cover of non-process water. The preferred option for limiting environmental effects is a wet cover.
Mit_024	The pit lake will be monitored as it is filling to determine whether batch treatment will be required to ensure the water meets PWQO, or background if background levels exceed the PWQO, prior to the discharge from the pit lake to a tributary of Blackwater Creek.
Mit_025	Heavy equipment activity will be conducted between the hours of 07:00 and 22:00, if feasible
Mit_026	Endeavor to schedule noise causing events, such as blasting, to reduce disruption to residents.
Mit_027	Advise nearby residents of significant noise-causing activities, such as blasting.
Mit_028	All internal combustion engines will be fitted with appropriate muffler systems
Mit_029	Implement a modern blasting program that minimizes the blast area, the overall amount of explosives required, and through detonating procedures, minimize the amount of explosives per delay.
Mit_030	Adjust blasting practices if effects of vibration to spawning shoals is identified
Mit_031	Material will be loaded into haul trucks in a manner that minimizes the drop height from the loader or excavator bucket to the bed of the truck
Mit_032	The WRSA and overburden stockpile will be situated to act as noise berms where possible
Mit_033	In the event that complaints lead to the identification of specific sources of concern, source-specific abatement such as noise walls, berms, or operational restrictions will be employed, as appropriate.
Mit_034	Activities during the site preparation and construction phase will generally occur during the daytime. If there are times when lighting is required to ensure the safety of the workers, portable lighting will be used in required areas only.
Mit_035	Portable lighting will be directed downward
Mit_036	The higher Lux illumination levels (>80) will be placed within the process plant and mine infrastructure buildings, which contains the process and electrical equipment.
Mit_037	All externally mounted luminaires and their associated lamps will be designed to meet the requirements and recommendations of the Canadian Electrical Code (CEC), and the Building Code of Ontario.
Mit_038	External light fixtures will be installed at a tilt angle of 45º
Mit_039	Cut off angles for external lightings will be designed to minimize the off-site light trespass
Mit_040	Nighttime illumination will not be provided at the tailings storage facility (TSF).
Mit_041	Nighttime illumination will only be provided in the open pit when required. Portable lighting will be used in these situations.

Table 6.24-1: Summary of Mitigation Measures (continued)

Mitigation Identifier	Mitigation Description
Mit_042	Activities during the closure phase will generally occur during the daytime. If there are times when lighting is required to ensure the safety of the workers, portable lighting will be used in required areas only.
Mit_043	Blasting will likely be restricted to once per day, and only a few days per week.
Mit_044	All internal combustion engines will be properly maintained and all emission control systems (e.g., diesel particulate filters) will be kept in good working order.
Mit_045	Water and chemical suppressants will be used for dust control on the haul roads at the mine site when temperatures are above freezing
Mit_046	Best management practices plan for dust control will be implemented on the site during site preparation and construction, operations and closure.
Mit_047	The Project will utilize the 115 kV transmission line adjacent to the Project
Mit_048	The WRSA will be located immediately to the north of the open pit
Mit_049	Placing the overburden storage area immediately to the south of the open pit to reduce the haul distances.
Mit_050	Project design incorporates a compact footprint.
Mit_051	Perimeter runoff and seepage collection systems will be constructed around the TSF.
Mit_052	The drawdown zone of the dewatering process will capture all seepage that bypasses the seepage collection systems and will report to the open pit.
Mit_053	During operations, excess water not required in the process will be treated to concentrations that meet Provincial Water Quality Objectives (PWQO) or Canadian Water Quality Guidelines (CWQG) for the protection of aquatic life, or background if background levels exceed the PWQO, prior to discharging to Blackwater Creek. In the case of mercury, effluent will be treated to meet the background concentrations in Blackwater Creek.
Mit_054	Industry standard erosion and sediment controls, such as sediment traps within ditches, will be implemented during the site preparations and construction phase.
Mit_055	There will be no discharges to surface water during the closure phase.
Mit_056	During closure, the site will be graded such that runoff from the operations area will be directed to the open pit during closure and post-closure phases.
Mit_057	Effectively manage water collected on-site using constructed storage facilities, reducing the need for fresh water withdrawals and discharges of treated water.
Mit_058	An engineered structure, designed to dissipate flows and avoid erosion, will be constructed to discharge effluent during operations into Blackwater Creek.
Mit_059	Fresh water takings from tree nursery irrigation ponds on Thunder Lake Tributaries 2 and 3 will not exceed 5% of the flow entering the ponds
Mit_060	Once the open pit has been filled, excess water from the open pit will be passively released through an engineered spillway into the existing channel of Blackwater Creek Tributary 1.
Mit_061	The process will employ a thickener to help recover cyanide solution from the tailings for reuse in processing. The resulting tailings will then be treated using the SO_2-air process to reduce cyanide in the tailings directed to the TSF so as to meet MMER requirements over a long-term basis.
Mit_062	The floor of the TSF will be a low-permeability layer capable of achieving seepage rates that ensure receiving surface water quality is equivalent to baseline, or meet PWQO. The liner would be comprised of natural material, or if necessary, an HDPE liner laid over a prepared basin of sand or comparable material.
Mit_063	Deepen those wells where the drawdown affects the wells ability to provide the required supply.
Mit_064	Financial assurance would be provided to the MNDM as required and applicable as per regular permitting processes to ensure maintenance and provision of neighbouring residential wells
Mit_065	Minimized the amount of habitat clearing required for the Project by siting Project infrastructure, to the extent practicable, in previously disturbed areas and optimizing the use of existing roadways.
Mit_066	Develop slope dependent vegetated buffers along rivers creeks and wetlands in conjunction with the MNRF. Buffers should be 120 m, wherever feasible.
Mit_067	Timber clearing will be conducted outside the breeding bird window (May 1 to August 15).

Table 6.24-1: Summary of Mitigation Measures (continued)

Mitigation Identifier	Mitigation Description
Mit_068	Closure activities should include revegetation with species suitable for the development of habitats capable of supporting a diversity of wildlife species.
Mit_069	Enforcement of speed limits within the Project area
Mit_070	Minimize disturbing areas with suitable bird breeding habitat, where practicable.
Mit_071	Wildlife awareness training for all staff will be provided including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence.
Mit_072	Disposal of food waste generated on site will be done in an appropriate manner
Mit_073	Clearing of potential terrestrial reptile and amphibian breeding habitats will be restricted to periods outside the breeding season as directed by MNRF
Mit_074	Develop a wetland clearing strategy with the local MNRF to reduce the effects to overwintering frogs (i.e. draining wetlands to discourage hibernation).
Mit_075	If habitat destruction / damage cannot be avoided, alternate nesting habitat will be provided as a provision of compensatory habitat for species protected under the ESA
Mit_076	Acceptable buffers will be provided around all raptor nests identified throughout all Project phases
Mit_077	Prior to overburden removal, any beaver dams within the Project footprint will be removed and the impoundments will be allowed to draw down.
Mit_078	Activities and the construction of Project components that will impact or overprint watercourses will occur during the fisheries timing window when in-stream work is permitted.
Mit_079	To the extent practicable, fish in the sections of Blackwater Creek Tributary 1 that will be isolated by the construction of the perimeter ditch and overprinted by the removal of overburden from the open pit will be captured and relocated to the same tributary downstream from the operations area, or to the main branch of Blackwater Creek.
Mit_080	To the extent practicable, fish in the sections of Blackwater Creek Tributary 2 that will be isolated by the construction of the perimeter ditch and overprinted by the construction of the TSF and minewater pond will be captured and relocated to the same tributaries downstream from the operations area, or to the main branch of Blackwater Creek.
Mit_081	Pump intakes in the irrigation ponds at the former MNRF tree nursery will be fitted with fish screens to prevent entrainment.
Mit_082	As the Project advances, detailed engineering will be completed to ensure that all downstream culverts can support any predicted increases in flows and maintain current levels of fish passage.
Mit_083	Provide offsetting of fisheries habitat losses as part of the authorization required under the Fisheries Act.
Mit_084	Retention of forested areas wherever feasible.
Mit_085	Identify and protect the locations of any known SAR or provincially significant plant.
Mit_086	Broadcast spraying of herbicides will be avoided
Mit_087	Revegetation of final grade slopes around the open pit to encourage the development of riparian habitats.
Mit_088	Reclamation of mining footprints to be carried out in accordance with O.Reg. 240/00.
Mit_089	Seeding or hydro-seeding of the reclaimed areas with native seed mix.
Mit_090	Minimize crown land in the Project footprint
Mit_091	Minimize activities on the eastern portion of the Project property.
Mit_092	During the operating life of the Project, no access will be permitted to the operations area for security and safety reasons. Access to the former MNRF tree nursery will be controlled. Aboriginal peoples will be able to arrange for accompanied access to these areas with Treasury Metals. Appropriate signage will be placed around areas where access is limited.
Mit_093	Implement a Communications Management Plan to address ongoing engagement with potentially affected stakeholders and Aboriginal groups throughout the life of the Project. The plan should include a framework for a transparent grievance process.
Mit_094	Treasury Metals will undertake additional land and resources use studies to ensure a pre-construction baseline of the land and resource users as supported by local communities.

Table 6.24-1: Summary of Mitigation Measures (continued)

Mitigation Identifier	Mitigation Description
Mit_095	Develop a Socio-Economic Management Plan to help ensure commitments are implemented, adverse socio-economic effects are minimized, results are monitored, and effects are adaptively managed.
Mit_096	Continue to collect additional traditional land use information for the Project area through meetings and traditional land use studies to identify areas of plant gathering, hunting, trapping, fishing, and cultural activities.
Mit_097	Contract security services to help promote a secure and safe worksite environment
Mit_098	Incorporate strategies and actions to aid residents following closure in the Socio-Economic Management Plan.
Mit_099	Treasury Metals will establish and enforce traffic safety protocols, regulatory and cautionary signage, road maintenance and emergency response plans on all Project roads to prevent collisions and accidents.
Mit_100	Ongoing engagement with potentially affected Aboriginal peoples throughout the life of the Project.
Mit_101	Ongoing engagement with potentially affected stakeholders throughout the life of the Project.
Mit_102	Treasury Metals will undertake an update of the socio-economic baseline to establish a pre-construction baseline of the affected communities prior to commencing the Project site preparation and construction
Mit_103	Employment preference will be given to local and regional labour where possible, including Aboriginal and non-Aboriginal communities. This will be dependent upon the skills and workforce being available locally.
Mit_104	Develop training and job transfer policies to support workforce development in the socio-economic study area
Mit_105	Develop training programs for unemployed and under employed residents and non-workers
Mit_106	Treasury Metals will communicate appropriate information (e.g., the timing and communities in which new residents may locate) to the school district(s) to assist with their resource planning process.
Mit_107	Treasury Metals will communicate education requirements needed for employment on the site.
Mit_108	Treasury Metals will work with specific affected homeowners to ensure that their concerns about potential Project-related effects are addressed.
Mit_109	Treasury Metals will work with local and regional governments to minimize the effects of in-migration and out-migration where possible.
Mit_110	Treasury will work with public safety services to develop safety and work policy guidelines for mine workers, including a policy of no alcohol or drugs onsite and policies and guidelines to support a respectful work environment.
Mit_111	Incorporate strategies and actions to help local agencies monitor community wellbeing and take corrective actions where appropriate.
Mit_112	Treasury Metals will engage the Local Services Board in Wabigoon to acquire Tree Nursery Road in its entirety from north of Normans Road.
Mit_113	Treasury Metals will approach MTO to discuss recommendations presented within the transportation study (Appendix E to the Revised EIS) regarding the snow plow turn-around for Anderson Rd. and Highway 17.
Mit_114	Treasury Metals will approach MTO to discuss recommendations presented within the transportation study (Appendix E to the Revised EIS) regarding the need for lighting at the Anderson Rd. and Highway 17 intersection.
Mit_115	Treasury Metals will approach MTO to discuss recommendations presented within the transportation study (Appendix E to the Revised EIS) regarding clearing of shrubbery, trees, soil mounds, etc. that could cause a visual obstruction for vehicles using the Anderson Rd. and Highway 17 intersection.
Mit_116	Treasury will maintain, where applicable, a local purchasing policy to purchase goods and services from local suppliers. This policy has the expectation that goods and services will be purchased locally assuming price, delivery and service is competitive with outside suppliers.
Mit_117	Revegetation of the WRSA and TSF will be done using species that are not traditionally used for medicinal purposes, or for consumption, and would deter these types of plants from growing.
Mit_118	Leave a 50 m buffer zone around remaining watercourses within the Project area.
Mit_119	If previously undocumented archaeological resources are discovered, the person discovering the resources will stop alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (I) of the Ontario Heritage Act.

Table 6.24-1: Summary of Mitigation Measures (continued)

Mitigation Identifier	Mitigation Description
Mit_120	If human remains are discovered, alteration of the site will stop and the person making the discovering will immediately notify the police, or coroner, and the Registrar of cemeteries, at the Ministry of Consumer Services, as required under the Cemeteries Act, R.S.O. 1990 c.C.4 and the Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 (when proclaimed in force).
Mit_121	Restrict activities and development within 300 m of major water sources and within 300 m of historical travel routes, to only those areas where an archeological assessment has been completed.
Mit_122	Do not allow new ground altering activities to occur in areas where an archaeological assessment has not been completed. Once an archaeological assessments has been completed ground altering activities.
Mit_123	At closure, continue training opportunities to help residents to increase their competitiveness and chances to get employment elsewhere
Mit_124	Once the pit lake is fully flooded, it is expected that the monitoring of the water quality in the pit lake will continue for a period of time to determine whether additional batch treatment may be required to ensure the water released from the pit lake meets effluent release limits.
Mit_125	Spills will be contained and the soil remediated in accordance with the Emergency and Spills Response Management Plan.
Mit_126	Prior to construction activities, Treasury Metals will engage with the local trapping council, Indigenous communities and the MNRF to prepare a plan for the removal of nuisance wildlife (i.e., beaver) within the Blackwater Creek watershed.
Mit_127	There will be no drinking water wells installed on the Project during the operations, closure, or during the portion of the post-closure phase when monitoring is required to confirm performance of the reclamation landscape..
Mit_128	MOECC Fish consumption advisories for Thunder Lake and Wabigoon Lake will be adhered to.
Mit_129	Project workers and site visitors will receive sufficient risk protection from direct contact with soil and water and/or dust inhalation via the implementation of PPE and requirement for suitable clothing.
Mit_130	Access to the waste rock storage area (WRSA) and the tailings storage facility (TSF) during operations and closure will be restricted to those workers with the required health and safety training and personal protective equipment (PPE).

7.0 CUMULATIVE EFFECTS

7.1 Approach and Methodology

The approach used for assessing the potential cumulative effects of the Project are consistent with the requirements of CEAA 2012, and follow the procedures set out by the Agency in the document entitled “Technical Guidance for Assessing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act*, 2012” (CEAA, 2014). Additional information is set out in the operational policy statement entitled “Assessing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act*, 2012” (CEAA, 2015).

The procedures and guidance from the Agency (CEAA, 2014) are such that some of the valued components (VCs) will be eliminated in the initial scoping step, while others will be carried through to the determination of significance and the identification of follow-up measures. In accordance with Section 13 of the EIS Guidelines (Appendix Y), the determination of significance (presented in Section 8) has been completed on the residual adverse effects, including the cumulative effects.

7.2 Activities Considered for Assessing Cumulative Effects

7.2.1 Past and Present Activities Considered

In evaluating the potential effects of the Project, consideration was given to the existing conditions onto which the Project effects would be added. As set out in the operational policy statement (CEAA, 2015) and the technical guidance from the Agency (CEAA, 2014), the use of the present day conditions is an appropriate means for capturing the cumulative effect from past activities.

The present day conditions used for describing existing conditions inherently includes the effects of ongoing harvesting activities in the region (fishing, hunting and trapping). These activities are considered to be sustainable, and are thus reflective of the existing, present day conditions. Additionally, the existence, footprint and effects of the existing infrastructure, including Highway 17 and the Canadian Pacific Railway are implicitly included as part of the existing conditions.

7.2.2 Present and Future Activities Considered

The following present and future activities were explicitly considered as part of the cumulative effects assessment for the Project. These project were identified by the Agency as part of the Round 1 information requests as having to be explicitly considered as part of the cumulative effects assessment (TMI_252-CE(1)-02):

- Treasury Metals Inc. exploration program;
- Highway 17;
- Canadian Pacific rail line;

- Forestry operations by Dryden Forest Management Company;
- Domtar Corp.'s Dryden Pulp Mill;
- Josephine Cone Mine Project;
- Aggregate pits or quarries;
- The 230kV transmission line proposed by Wataynikaneyap Power; and
- The development of local infrastructure and minor road upgrades in Dryden and Wabigoon.

These projects are discussed briefly below and are show in Figure 7.2.2-1:

- **Treasury Metals Exploration Program**: During all phases associated with the Project, Treasury Metals may conduct mineral exploration within its property boundary to further delineate its deposit or to identify new deposits. Mineral exploration activities could include, but are not limited to; prospecting, surveys and exploration drilling. To the extent possible, these activities would not require the removal of forest cover. Nor would the exploratory drilling work be conducted within wetland areas. Mineral exploration programs could result in effects to the environment which are cumulative with effects from the Project. Accordingly, mineral exploration activities within the Project property boundary have been included through this cumulative effects assessment.
- **Highway 17**: King's Highway 17 is part of the Trans-Canada Highway system and is the main Trans-Canada highway through the province of Ontario. It begins at the Ontario/Manitoba boarder approximately 50 km west of Kenora, Ontario, and traverses west until it becomes Highway 417 west of Arnprior, Ontario. Highway 17 passes through the town of Dryden, Ontario and is a major transportation route between Dryden and the proposed Goliath Gold Project. The MNDM publishes a list of northern highway projects, including projects along Highway 17 (MNDM, 2016), Upcoming work being done to Highway 17 near the Project includes: resurfacing, culvert replacements at McKenzie Creek and Moose Creek near Dryden, and replacement of a Canadian Pacific Railways overpass near Dinorwic. These projects have been included in the cumulative effects assessment.
- **Canadian Pacific Railway**: The Canadian Pacific Railway is a publicly traded company on the Toronto and New York stock exchanges. It has over 14,000 miles of rail network from Vancouver to Montreal along with rail to a few major industrial centers in the US (Canadian Pacific, 2017). Canadian Pacific Railway has tracks that run proximal to the Project, and generally parallel to Highway 17. An annual vegetation control program is implemented along the tracks to decrease vegetation growth adjacent to the rails.

500000 520000 540000 560000

5560000 5540000 5520000 5500000 5480000 5460000

Thaddeus Lake
Moose Lake
Cedar Lake
Ord Lake
Whitefish Lake
LAC SEUL 28
Cherry Lake
Lynx Lake
Lost Lake
664
Jackfish Lake
Route Lake
Bailey Lake
Good Lake
Big Vermilion Lake
Little Vermilion Lake
OJIBWAY PROVINCIAL PARK
Rosamond Lake
Rugby Lake
Bluett Lake
Tot Lake
Lateral Lake
Muskie Lake
Kathlyn Lake
Gullwing Lake
Minnitaki Lake
Kabikwabik Lake
665
605
601
72
Rice Lake
Ghost Lake
Mavis Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
Big Sandy Lake
Domtar Corp Dryden Pulp Mill
M
DRYDEN
Thunder Lake
594
EAGLE LAKE 27
Wabigoon Lake
AARON PROVINCIAL PARK
Hartman Lake
Mickle Lake
DD Contracting Aggregate Pit
WABIGOON
17
DINORWIC
BUTLER LAKE PROVINCIAL NATURE RESERVE
Mile Lake
Avery Lake
Eagle Lake
Trap Lake
Doré Lake
Melgund Lake
Pickerel Lake
WABIGOON LAKE 27
603
Dinorwic Lake
Ukik Lake
502
Rock Lake
Peak Lake
Mennin Lake
Bunyan Lake
Boyer Lake
Long Lake
Spruce Lake
Upper Manitou Lake
Sunshine Lake
Uphill Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- Transmission Line
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provinical Parks
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Highway
- Local Road

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

NOTES:
- Topographic data extracted from Land Information Ontario, MNRF.
- MNDM proposed road works extracted from Northern Highways Program 2017-2021.
- Planned harvest areas were digized from Dryden Forest Management Units Operational Planning Maps.
- Wataynikaneyap Power routes extracted from 'Phase 1 Draft ES', Golder Associates, 2016.

TREASURY METALS Inc.

amec foster wheeler

GOLIATH GOLD PROJECT

Projects Considered in Cumulative Effects Assessment

Datum: NAD83
Projection: UTM Zone 15N

N W E S

0 2.5 5 10 15 20 Kilometres

PROJECT N°: TC160516	**FIGURE: 7.2.2-1**
SCALE: 1:300,000	DATE: April 2018

- **Dryden Forest Management Company Limited**: The Dryden Forest Management Company Limited (DFMC) has managed the Dryden Forest area since it was issued a Sustainable Forest License from the Ontario Minister of Natural Resources and Forestry in 1998. The DFMC has identified through its Ten-year Forest Management Plan, that it plans on logging in areas located between Thunder Lake and Hartman Lake located within the Treasury Metals' property boundary between 2016 and 2021 (Dryden Forest Management Company, 2016). The current 10-year Forest Management Plans 2011-2021 (FMP) show a planned harvest of approximately 11,952 ha. The forest management plans are not yet available for the period after 2021.
- **Domtar Corporations Dryden Pulp Mill**: Domtar Corporation's Dryden Pulp Mill is located along the Wabigoon Chain of Lakes within Dryden, Ontario and produces cellulose fibers including paper grade and bleached softwood kraft market pulp. It has an annual pulp production capacity of 327,000 tonnes and is the largest employer in Dryden supporting over 350 employees with a regional economic impact of $603.4 million (Domtar, 2017). The pulp mill has been in operation in Dryden since 1913, and was acquired by Domtar in 2007. The pulp mill is located on the west side of Dryden, approximately 15 km from the Project, adjacent to the Wabigoon River.
- **Josephine Cone Mine Project:** The Josephine Cone Mine Project is a proposed iron ore mine owned by Bending Lake Iron Group Limited. The proposed mine would be located 49 km southwest of Ignace, Ontario, 80 km north of Atikokan, Ontario and approximately 50 km southwest of the Project property boundary. This project would be an open pit mine with an ore throughput of approximately 56,000 tonnes per day. This project is currently undergoing a Federal Environmental Assessment, which commenced in mid-2012. The EIS Guidelines were issued in June of 2012, and have since been extended to June of 2018, although no EIS had been filed at the time of Treasury Metals revised EIS preparation. This project, if constructed, has an anticipated life span greater than 25 years.
- **Aggregate Pits and Quarries**: D&D Contracting holds an aggregate permit (Permit 46764) for an aggregate pit within the property boundary of Treasury Metals (MNRF, 2017). This aggregate pit has been included in the cumulative effects assessment.
- **Wataynikaneyap Power**: Wataynikaneyap Power is a transmission company owned by 22 First Nations communities and provides power to remote First Nations communities in Northwestern Ontario by means of diesel generation. The Wataynikaneyap Transmission Project plans to bring reliable power to 16 of these remote communities with 1,800 km of new transmission lines with a potential construction start date in December of 2018 (Wataynikaneyap Power, 2012). A segment of the transmission line will run from the Hydro One 230 kV line southeast of Dinorwic to Pickle Lake. The segment of this project within the cumulative effects study area is expected to be completed in 2020.
- **Local infrastructure:** The development of local infrastructure and minor road upgrades are expected in communities within the cumulative effects study area (i.e., Dryden and Wabigoon). No large scale projects (>$500,000) are anticipated (Meridian Planning Consultants, 2007)

Of the list of projects identified by the Agency in the Round 1 information requests for consideration, two projects were excluded from the cumulative effects assessment either because they were never a planned project, or have been cancelled as a project since the Round 1 information requests were prepared. These are described below:

- **Proposed 1-5 MW power generation facility**: This was never a proposed project, but was in fact one of the possible options that were considered for providing power to the Project, as described in Section 2 (alternatives assessment). As detailed in the Section 3, power for the Project will be provided from the 115 kV Hydro One transmission line that runs through the Project, adjacent to the processing plant. There are no longer plans to use diesel to generate electricity on site. This activity, which is not a project, is only discussed as part of the cumulative effects assessment as its inclusion was explicitly required by the Agency (TMI_252-CA(1)-02).
- **Energy East Pipeline**: TransCanada's Energy East Pipeline is a 4,500 km pipeline that was planned to transport 1.1 million barrels of oil per day from Alberta and Saskatchewan to refineries and a marine terminal in Eastern Canada (TransCanada, 2017). The pipeline, which would have run through northern Ontario along the existing natural gas pipeline corridor, was terminated by TransCanada Corporation in the fall of 2017. This activity, which is no longer a project, has been included as part of the cumulative effects assessment as it was explicitly required by the Agency (TMI_252-CA(1)-02).

7.3 Scoping for Potential Cumulative Effects

Within the scoping step, the following needs to be determined in order to establish whether a VC needs to advance to the next step:

- Identify the VCs for which residual adverse effects were predicted;
- Determine the spatial boundaries for the cumulative effects;
- Determine the temporal scope for the cumulative effects;
- Examine past and present and future activities to identify whether they overlap both spatially and temporally with the residual adverse effects of the Project.

7.3.1 Valued Components (VCs) for Assessing Cumulative Effects

The guidance from the Agency states that the assessment of cumulative effects should be done for those valued components (VCs) for which residual environmental effects are predicted. Residual environmental effects are those effects that remain after consideration of technically and economically feasible mitigation. As detailed in Section 6.1.3, the predicted effects of the Project were described using a series of 65 valued components (VCs) that were selected based the likelihood of being affected by the Project, their importance to the Agency, their interest to stakeholders, or their value and importance to understanding the potential effects of the Project on members of the Indigenous communities. For each of the VCs, indicators were selected to

help focus the evaluation. In total the EIS considered 65 VCs, using a total of 136 indicators. The VCs and indicators were grouped into the following 20 disciplines:

- Terrain and soils;
- Geology and geochemistry;
- Noise;
- Light;
- Air quality;
- Climate;
- Surface water quality;
- Surface water quantity;
- Groundwater quality;
- Groundwater quantity;
- Wildlife and wildlife habitat;
- Migratory Birds;
- Fish and fish habitat;
- Wetlands and vegetation;
- Land use;
- Social;
- Economic;
- Human health;
- Heritage resources; and
- Aboriginal Peoples.

The effects of the Project on each of the above disciplines were described in Sections 6.2 through 6.21. In total, residual adverse effects were identified for 15 of the 20 disciplines, for 48 of the 65 VCs, and for 81 of the 136 indicators. Table 7.3.1-1 provides a listing of the disciplines, VCs and indicators used to describe the potential effects of the Project along with an indication as to which of the disciplines, VCs and indicators were identified as having residual adverse effects.

Table 7.3.1-1: Valued Components (VCs) and Residual Adverse Effects

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects
Terrain and soils	Natural landscapes	Viewscapes	Yes
	Overburden	Erosion of disturbed overburden	—
	Soil chemistry	Changes in soil chemistry	—
Geology and Geochemistry	Pit lake water quality	Concentrations of indicator compounds	Yes
Noise	Environmental noise levels	Equivalent noise levels, L_{EQ}	Yes
	Noise disturbance to wildlife (including SAR)	Area predicted L_{EQ} above 50 dBA	Yes
	Blasting noise and vibration	Peak sound pressure level	Yes
		Peak particle velocity	Yes
Noise (continued)	Noise related health effects	Absolute sound pressure, L_{DN}	Yes
		Percent highly annoyed, %HA	Yes
Light	Light trespass	Ambient light levels	—
Air quality	Air quality	Concentrations of indicator compounds	Yes

Table 7.3.1-1: Valued Components (VCs) and Residual Adverse Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects
Climate	Project GHG emissions	Annual equivalent carbon dioxide emissions (eCO_2)	Yes
	Changes in climate due to the Project	Changes in annual temperature	—
		Changes in annual precipitation	—
Surface water quality	Surface water quality	Concentrations of indicator compounds	Yes
Surface water quantity	Surface water quantity	Increase in surface water flows	Yes
		Decrease in surface water flows	Yes
		Change in lake levels	—
Groundwater quality	Groundwater quality	Concentrations of indicator compounds	—
Groundwater quantity	Groundwater quantity	Decrease in groundwater elevations in private water wells	—
Wildlife and wildlife habitat	Wildlife Species at Risk	Common Nighthawk	Yes
		Northern Myotis/Little Brown Myotis	Yes
		Barn Swallow	Yes
	Ungulates	Moose	Yes
	Furbearers	American Marten	Yes
		American Beaver	Yes
	Upland birds	Upland birds	Yes
	Wetland birds	Marsh birds	Yes
	Small mammals	Small mammals	Yes
	Reptiles and amphibians	Reptiles and amphibians	Yes
	Invertebrates	Terrestrial invertebrates	Yes
Migratory Birds	Upland birds	Upland birds	Yes
	Wetland birds	Marsh birds	Yes
Fish and fish habitat	Stream-resident fish populations	Direct loss or alteration of habitat	Yes
		Changes in flows or water levels	—
		Changes in water quality	—
		Blasting	—
	Migratory fish populations	Direct loss or alteration of habitat	—
		Changes in flows or water levels	—
		Changes in water quality	—
		Blasting	—
Fish and fish habitat (continued)	Lake-resident fish populations	Direct loss or alteration of habitat	—
		Changes in flows or water levels	—
		Changes in water quality	—
		Blasting	—

Table 7.3.1-1: Valued Components (VCs) and Residual Adverse Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects
	Fish species-at-risk	Direct loss or alteration of habitat	—
		Changes in flows or water levels	—
		Changes in water quality	—
		Blasting	—
Wetlands and vegetation	Wetlands	Wetland extent	Yes
		Wild rice	—
		Floating Marsh Marigold (*Caltha natans*)	—
	Vegetation communities	Predominantly coniferous forest	Yes
		Predominantly deciduous forest	Yes
		Successional areas	Yes
		Potential berry harvesting areas	Yes
Land use	Land Use Planning and Policies	Conflict with accepted land uses as stipulated in approved land use plans.	—
		Overlap with protected areas.	—
	Aggregate Operations	Change in access to aggregate resources.	—
		Change in demand of aggregate resources extraction.	—
	Forestry	Change in access to forestry resources.	—
		Loss of forestry resources.	Yes
	Mineral Exploration	Change in access to mineral claims for exploration and production.	—
	Fishing - Recreational and Commercial	Change in access to fisheries resources.	—
		Change in the abundance of fisheries resources.	—
		Change in contaminant levels in fish	—
		Diminished experience of being on the land.	Yes
	Hunting	Change in access to wildlife resources.	Yes
		Change in abundance of wildlife resources.	Yes
		Diminished experience of being on the land	Yes
	Trapping	Change in access to wildlife resources.	Yes
		Change in abundance of wildlife resources.	Yes
		Diminished experience of being on the land	Yes
	Cottagers and Outfitters	Diminished experience of being on the land.	Yes
Land use (continued)	Cottagers and Outfitters (continued)	Change in access to cottage and/or outfitter areas.	—
		Changes in clientele for outfitters with lodges located near the Project.	Yes
	Other Recreational Uses	Change in access for residents and visitors to public lands for non-consumptive purposes	—

Table 7.3.1-1: Valued Components (VCs) and Residual Adverse Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects
		Change in access for residents and visitors to public lands for consumptive purposes.	Yes
		Change in abundance of berries, mushrooms and/or other vegetation used for consumption	Yes
		Diminished experience of being on the land.	Yes
Social	Population demographics	Population change	Yes
	Education	Capacity of education services	Yes
		Education attainment	Yes
		Project-specific Training	Yes
	Infrastructure and services	Municipal Services	Yes
		Community services (e.g., health, social services)	Yes
	Housing and property values	Housing availability	Yes
		Property values	Yes
	Public safety	Crime rate	Yes
		Capacity of emergency services	Yes
		Requests for emergency services by Project	Yes
	Transportation and traffic	Road network capacity and conditions	Yes
Economic	Labour force, labour participation and employment	Labour income employment	Yes
	Income levels	Income levels and categories	Yes
	Cost of living	Current prevailing cost of living	Yes
	Real estate	Housing prices and affordability	Yes
	Economic development	Municipal taxes and contribution to economic development projects	Yes
	Existing businesses	Local business availability	Yes
	Government revenues	Taxes and revenues	Yes
Human health	Non-Indigenous Human Health	Subsurface/Construction Worker	—
		Outdoor Worker	—
		Indoor Worker	—
		Site Visitor, or Harvester	—
		Resident	—
Human health (continued)	Indigenous Human Health	Resident	—
		Site Visitor, or Harvester	—
		Subsurface/Construction Worker	—
		Outdoor Worker	—
		Indoor Worker	—

Table 7.3.1-1: Valued Components (VCs) and Residual Adverse Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects
Heritage resources	Archaeological sites	Archaeological sites	—
	Historic heritage sites	Historic heritage sites	—
Aboriginal Peoples	Human Health	Risk Assessment for Indigenous Human Health	—
	Harvesting and gathering of plant material	Wild rice	—
		Berry Harvesting	Yes
		Medicinal plant harvesting	Yes
		Changes in access	Yes
		Diminished on-the-land experience	Yes
	Hunting	Ungulates	Yes
		Furbearers	Yes
		Waterfowl	Yes
		Changes in access	Yes
		Diminished on-the-land experience	Yes
	Trapping	Furbearers	Yes
		Changes in access	Yes
		Diminished on-the-land experience	Yes
	Fishing	Sport fish	—
		Baitfish	—
		Commercial fishing	—
		Changes in access	—
		Diminished on-the-land experience	Yes
	Cultural and spiritual	Cultural or spiritual sites	—
		Traditional Travel routes	—
		Diminished on-the-land experience	Yes
	Socio-economic factors	Economic effects	Yes
		Social effects	Yes

Note: The "—" symbol denotes where no residual adverse effects were predicted for the discipline, VC and indicator. This could represent situations where no adverse effects were predicted, or where predicted adverse effects were fully mitigated, as detailed in Sections 6.2 through 6.21.

7.3.2 Spatial Boundaries for Assessing Cumulative Effects

Spatial extents for assessing cumulative effects were identified for each of the VCs identified in Table 7.3.1-1 as having residual adverse effects. These spatial extents were identified giving considerations on the nature of the VC and the characteristic of the residual Project effects. It should be noted that for a cumulative effect to occur with the effects of the Project, the physical activity does not need to be located within the identified spatial extent. Rather, the effects of the

physical activity need to overlap with the spatial extents identified. The spatial extents to be used in this cumulative effects assessment are provided in Table 7.3.2-1.

Table 7.3.2-1: Spatial Extents for Assessing Cumulative Effects

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
Terrain and Soils	Natural landscapes	The residual adverse effect for natural landscapes is associated with the waste rock storage area (WRSA) that will be visible in some viewscapes from Thunder Lake. For there to be a cumulative effect, the physical activity would need to appear in the same general viewscape. Therefore, the cumulative effects spatial boundaries for the "natural landscapes" VC would be the terrain and soils LSA, on Figure 7.3.2-1.
Geology and Geochemistry	Pit lake water quality	The residual adverse effect for pit lake water quality is restricted to the footprint of the pit lake. The effects associated with discharges from the pit lake are captured as part of the surface water quality VC. For there to be a cumulative effect, the physical activity would need to affect the pit lake directly. Therefore, the cumulative effects spatial boundaries for the "pit lake quality" VC is the operations area for the Project (see Figure 7.3.2-1), which represents the catchment for the pit lake.
Noise	Environmental noise levels Noise disturbance to wildlife (including SAR) Blasting noise and vibration Noise related health effects	The spatial extent for the various noise VCs has been characterized collectively. The predicted noise levels from the Project at sensitive receptor locations provide an indication that noise will be a localized effect, with collective noise levels dropping to a low level with 5 km of individual sources. For there to be a cumulative effect, the physical activity would need to affect the noise levels within 3 km of the Project. Therefore, the spatial boundary for effects on the noise VCs is the noise RSA shown on Figure 7.3.2-2.
Air Quality	Air quality	The spatial extent of the air effects of the Project were shown to be about the same as the 20×20 km modelling domain. At the limits of the modelling domain (e.g., Dryden in the west, Village of Wabigoon in the southeast), the modelled concentrations would be indistinguishable from background at those distances. For there to be a cumulative effect, the physical activity would need to affect air quality parameter concentrations within the modelling domain. Therefore, the spatial boundary for effects on air quality is the 20×20 km air quality RSA shown on Figure 7.3.2-2.
Climate	Project GHG emissions	The only residual adverse effects are those associated with the quantity of emissions from the Project in terms of Treasury Metals' reporting requirements under either the Ontario Cap and Trade Program (O. Reg. 144/16), or Section 46 of Canadian Environmental Protection Act. Therefore, there would be no cumulative effects associated with the Project GHG emissions VC, and no spatial boundary is defined.
Surface Water Quality	Surface water quality	Surface water quality modelling completed to support the Project identified that resulting water quality in the receiving environment would be equivalent to background, or would meet the Provincial Water Quality Objectives (PWQO). Measurable changes in water quality as a result of the Project would be restricted to Blackwater Creek and Hoffstrom's Bay Tributary. The water quality modelling predicted changes in surface

Table 7.3.2-1: Spatial Extents for Assessing Cumulative Effects (continued)

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
		water quality that would not be measurable downstream in either Thunder Lake or Wabigoon Lake. For a cumulative effect on surface water quality to occur, the physical activity would need to affect the quality of water in the waterbodies measurably affected by the Project. Therefore, the spatial boundaries for cumulative effects would be the surface water quality LSA shown on Figure 7.3.2-3.
Surface Water Quantity	Surface water quantity	The predicted residual adverse effects of the Project on surface water quantity were shown to be restricted to those watersheds affected by the Project (i.e., Blackwater Creek and its tributaries, Thunder Lake Tributary 2 and 3, Little Creek and Hoffstrom's Bay Tributary). There were no residual adverse effects predicted on the levels in either Thunder Lake or Wabigoon Lake. For there to be a cumulative effect, the physical activity would need to affect the flows in these catchments, either upstream or downstream of the Project. Therefore, the spatial boundaries for the cumulative effects would be the surface water quantity LSA, as shown on Figure 7.3.2-3.
Wildlife and Wildlife Habitat	Wildlife Species at Risk	The residual adverse effects on wildlife are associated with the loss of habitat due to the construction of the Project, the alteration of habitat due to the operation of the Project (e.g., noise levels) and mortality wildlife. For most of the VCs, these effects are described on the scale of the wildlife and wildlife LSA as the effects would not be measurable on a regional scale. For cumulative effects to occur, the physical activity would need to have effects that overlap with the LSA used. Therefore, the spatial boundaries for the effects on most wildlife VCs is the LSA, which is shown on Figure 7.3.2-4. This selection is in keeping with CEAA guidance (CEAA, 2014).
	Furbearers	
	Upland birds	
	Wetland birds	
	Small mammals	
	Reptiles and amphibians	
	Invertebrates	
	Ungulates	The ungulate VC uses moose as the indicator. As a result, cumulative effects for ungulates were evaluated using the RSA, given the large and diverse areas required to support moose throughout its life. For cumulative effects to occur, the physical activity would need to have effects that overlap with the RSA used. Therefore, the spatial boundaries for the effects on the ungulate VC is the RSA, which is shown on Figure 7.3.2-4.
Migratory Birds	Upland birds	The residual adverse effects on migratory birds are associated with the loss of habitat due to the construction of the Project, the alteration of habitat due to the operation of the Project (e.g., noise levels) and mortality. These effects are described on the scale of the LSA) as the

Table 7.3.2-1: Spatial Extents for Assessing Cumulative Effects (continued)

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
	Wetland birds	effects would not be measurable on a regional scale. For cumulative effects to occur, the physical activity would need to have effects that overlap with the migratory birds LSA. Therefore, the spatial boundaries for the effects on migratory birds is the LSA, which is shown on Figure 7.3.2-4. This selection is in keeping with CEAA guidance (CEAA, 2014).
Fish and Fish Habitat	Stream-resident fish population	For fish and fish habitat, the only residual adverse effects were those on the stream-resident fish living in those watercourses that would be directly affected by the Project (i.e., Blackwater Creek Tributary 1 and Blackwater Creek Tributary 2). For there to be a cumulative effect, the physical activity would need to affect the same fish population. Therefore, the spatial boundary for the effects on stream resident fish populations is the LSA for fish and fish habitat, shown on Figure 7.3.2-5.
Wetlands and Vegetation	Wetlands	The residual adverse effect predicted for wetlands was for the wetland extent indicator. No residual adverse effects were predicted for either the wild rice or Floating Marsh Marigold indicators. For wetland extent, the effects are associated with the physical loss of or draining of wetlands as a result of the construction of the Project, the removal of upstream catchments areas, and the potential loss of waters in wetlands underlain by granular materials as a result of dewatering. The effects are localized and for there to be a cumulative effect, the physical activity would need to directly affect and wetlands within the wetlands and vegetation LSA. Therefore, the spatial boundaries for the effects on the wetlands is the wetlands and vegetation LSA, which is shown in Figure 7.3.2-6. This selection is in keeping with CEAA guidance (CEAA, 2014).
	Vegetation communities	The residual adverse effects predicted for vegetation communities are associated with the physical loss of vegetation due to clearing for the Project. These effects are localized, and for there to be a cumulative effect, the physical activity would need to directly affect the vegetation within the wetlands and vegetation LSA. Therefore, the spatial boundaries for the effects on the wetlands and vegetation VCs extent is the LSA, which is shown in Figure 7.3.2-6. This selection is in keeping with CEAA guidance (CEAA, 2014).
Land Use	Forestry	A residual adverse effect was predicted for “loss of forestry resources” in the long-term. A portion of the forest management area corresponding with open pit, WRSA and TSF the will be permanently lost. This effects is on a local scale. For there to be a cumulative effects, the physical activity would need to have effects that overlap with the study areas. Therefore, the spatial boundaries for the effects on the forestry VC is the wetlands and terrestrial vegetation LSA (Figure 7.3.2-7).
Land Use	Fishing - recreational and commercial	The only residual adverse effect identified for fishing (see Section 6.16) was the for the “diminished experience of being on the land” indicator. Specifically, the WRSA will be visible in some viewscapes from Thunder Lake. For there to be a cumulative effect, the physical activity would need to appear in the same general viewscape.

Table 7.3.2-1: Spatial Extents for Assessing Cumulative Effects (continued)

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
		Therefore, the cumulative effects spatial boundaries for the "natural landscapes" VC would be the terrain and soils LSA, on Figure 7.3.2-7.
	Hunting	For hunting, residual adverse effects were identified for both the "change in access to wildlife resources" and "change in abundance for wildlife resources" indicators. These indicators are local scale. For there to be a cumulative effect, the physical activity would need to overlap with the wildlife LSA. Additionally, there was also adverse effect identified for the "diminished experience of being on the land" indicator. This related to the areas where noise levels associated with the Project would be noticeable (i.e., over 40 dBA). For there to be a cumulative effect, the physical activity would need to have effects that overlap with the noise RSA. Therefore, the cumulative effects spatial boundaries for the "hunting" VC would be a combination of the wildlife LSA and the noise RSA, as shown on Figure 7.3.2-7.
	Trapping	For trapping, residual adverse effects were identified for same indicators as were identified for hunting. Therefore, the cumulative effects spatial boundaries for the "trapping" VC would be a combination of the wildlife LSA and the noise RSA, as shown on Figure 7.3.2-7.
	Cottagers and outfitters	The residual adverse effect identified for the "diminished experience of being on the land" indicator would relate both the WRSA being visible in some viewscapes from Thunder Lake, and the areas where noise levels associated with the Project would be noticeable (i.e., over 40 dBA). For there to be a cumulative effect, the physical activity would need to have effects that overlap with the terrain and soil LSA or with the noise RSA. In addition, residual adverse effects with "change in clientele for outfitters with lodges located near the Project" indicator. For the purposes of determining cumulative effects, located near the Project has been interpreted to be within 25 km of the Project. Therefore, the cumulative effects spatial boundaries for the "cottagers and outfitters" VC would be a combination of the terrain and soils LSA and noise RSA, along with 50 km diameter catchment area, as shown on Figure 7.3.2-7.
	Other recreational uses	The residual adverse effect identified for the "change in access for consumptive purposes" and change in abundance of berries and mushrooms" indicators are both local scale. For there to be a cumulative effect, the physical activity would need to overlap with the terrestrial vegetation LSA. In additional, residual adverse effects were identified for the "diminished experience of being on the land" indicator, related to both the visibility of the WRSA in some viewscapes from Thunder Lake, and the areas where noise levels associated with the Project would be noticeable (i.e., over 40 dBA). For there to be a cumulative effect, the physical activity would need to have effects that overlap with the terrain and soil LSA or with the noise RSA. Therefore, the cumulative effects spatial boundaries for the "other recreational users" VC would be a combination of the terrestrial

Table 7.3.2-1: Spatial Extents for Assessing Cumulative Effects (continued)

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
		vegetation LSA, the terrain and soils LSA, and noise RSA, as shown on Figure 7.3.2-7.
Social	Population demographics	The social residual effects of the Project were characterized on the scale of the social study area. This study area also includes the Indigenous communities identified by the Agency. For there to be a cumulative effect, the physical activity would need to have effects similar social effects that overlap with this study area. Therefore, the spatial boundaries for the cumulative social effects is the social study area, as shown on Figure 7.3.2-8.
	Education	
	Infrastructure and services	
	Housing and property values	
	Public safety	
	Transportation and traffic	
Economic	Labour force, participation and employment	The same logic and reasoning used for social VCs applies for the economic VCs. The economic residual effects of the Project were characterized on the scale of the economics study area, which is the same study areas used for the social VCs. This study area includes the Indigenous communities identified by the Agency. For there to be a cumulative effect, the physical activity would need to have effects that overlap with the study area. Therefore, the spatial boundaries for economic cumulative effects is the economics study area (Figure 7.3.2-8).
	Income levels	
	Cost of living	
	Real estate	
	Economic Development	
	Existing businesses	
	Government revenues	
Aboriginal Peoples	Harvesting and gathering of plant Material	The Project will result in the removal of forest, successional areas and areas potentially supporting berry harvesting. Additionally, access to the cleared areas will be restricted for safety and security reasons. These effects are localized and for t there to be a cumulative effect, the physical activity would need to directly affect the vegetation within the terrestrial vegetation LSA. Additionally, there was also adverse effect identified for the “diminished experience of being on the land” indicator related to the areas where noise levels associated with the Project would be noticeable (i.e., over 40 dBA). For there to be a cumulative effect, the physical activity would need to have effects that overlap with the noise RSA. Therefore, the cumulative effects spatial boundaries for the “harvesting and gathering of plant materials” VC would be a combination of the terrestrial vegetation LSA and the noise RSA, as shown on Figure 7.3.2-9.
	Hunting	For hunting, residual adverse effects were identified for the “furbearer”, “waterfowl” and “change in access” indicators, the effects of which are on a local scale. For there to be a cumulative effect, the physical activity would need to overlap with the wildlife LSA. In contrast, the ungulate indicator is considered on a regional scale given the large and diverse areas required to support moose throughout its life. For cumulative effects to occur for ungulates, the physical activity would need to have effects that overlap with the wildlife RSA. Additionally, there was also

Table 7.3.2-1: Spatial Extents for Assessing Cumulative Effects (continued)

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
		adverse effect identified for the "diminished experience of being on the land" indicator, associated with areas where Project noise levels would be noticeable (i.e., over 40 dBA). For there to be a cumulative effect, the physical activity would need to have effects that overlap with the noise RSA. Therefore, the cumulative effects spatial boundaries for the "hunting" VC would be a combination of the wildlife LSA, the wildlife RSA (for ungulates) and the noise RSA, as shown on Figure 7.3.2-9.
Aboriginal Peoples (continued)	Trapping	For trapping, residual adverse effects were identified for the "furbearer", and "change in access" indicators, the effects of which are on a local scale. For there to be a cumulative effect, the physical activity would need to overlap with the wildlife LSA. Additionally, there was also adverse effect identified for the "diminished experience of being on the land" indicator, associated with areas where Project noise levels would be noticeable (i.e., over 40 dBA). For there to be a cumulative effect, the physical activity would need to have effects that overlap with the noise RSA. Therefore, the cumulative effects spatial boundaries for the "trapping" VC would be a combination of the wildlife LSA and the noise RSA, as shown on Figure 7.3.2-9.
	Fishing	For fishing, the only residual adverse effects were identified for the "change in access" and "diminished experience of being on the land" indicator indicators. The change in access is on a local scale. For there to be a cumulative effect, the physical activity would need to overlap with the LSA for fish and fish habitat. The residual adverse effects for "diminished experience of being on the land" are related to both those areas where Project noise levels would be noticeable (i.e., over 40 dBA) and the visibility of the WRSA in some viewscapes from Thunder Lake. For there to be a cumulative effect, the physical activity would need to have effects that overlap with the noise RSA and the terrain and soil LSA. Therefore, the cumulative effects spatial boundaries for the "fishing" VC would be a combination of the fish and fish habitat LSA, the noise RSA, and the terrain and soils LSA, as shown on Figure 7.3.2-9.
	Socio-economic effects	The spatial boundaries for socio-economic cumulative effects to Aboriginal peoples are the study area used for the social and economic VCs (see Figure 7.3.2-10).

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5560000 5540000 5520000 5500000 5480000 5460000

Cedar Lake
Moose Lake
Thaddeus Lake
Ord Lake
Whitefish Lake
LAC SEUL 28
Cherry Lake
Lynx Lake
Lost Lake
664
Jackfish Lake
Route Lake
Bailey Lake
Good Lake
Big Vermilion Lake
Little Vermilion Lake
OJIBWAY PROVINCIAL PARK
Rosamond Lake
Rugby Lake
Bluett Lake
Tot Lake
Lateral Lake
Muskie Lake
Kathlyn Lake
Gullwing Lake
Minnitaki Lake
Kabikwabik Lake
665
605
601
72
Rice Lake
Ghost Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
Big Sandy Lake
Domtar Corp Dryden Pulp Mill
M
DRYDEN
Thunder Lake
EAGLE LAKE 27
594
Wabigoon Lake
AARON PROVINCIAL PARK
DD Contracting Aggregate Pit
WABIGOON
Hartman Lake
Mickle Lake
BUTLER LAKE PROVINCIAL NATURE RESERVE
DINORWIC
Avery Lake
Mile Lake
Trap Lake
Eagle Lake
Doré Lake
Melgund Lake
17
603
WABIGOON LAKE 27
Pickerel Lake
Dinorwic Lake
Ukik Lake
502
Rock Lake
Peak Lake
Mennin Lake
Bunyan Lake
Boyer Lake
Long Lake
Spruce Lake
Upper Manitou Lake
Sunshine Lake
Uphill Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Spatial Extent for Natural Landscapes
- Spatial Extent for Pit Lake Quality
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- Transmission Line
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provinical Parks
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Highway
- Local Road

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

NOTES:
- Topographic data extracted from Land Information Ontario, MNRF.
- MNDM proposed road works extracted from Northern Highways Program 2017-2021.
- Planned harvest areas were digized from Dryden Forest Management Units Operational Planning Maps.
- Wataynikaneyap Power routes extracted from 'Phase 1 Draft ES', Golder Associates, 2016.

TREASURY METALS Inc.

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GOLIATH GOLD PROJECT

Spatial Extent of Cumulative Effects for Natural Landscape and Pit Lake Quality

Datum: NAD83
Projection: UTM Zone 15N

N W E S

0 2.5 5 10 15 20 Kilometres

PROJECT N°: TC160516	**FIGURE: 7.3.2-1**
SCALE: 1:300,000	DATE: April 2018

500000 520000 540000 560000

5560000 5540000 5520000 5500000 5480000 5460000

Cedar Lake
Moose Lake
Thaddeus Lake
Ord Lake
Whitefish Lake
LAC SEUL 28
Cherry Lake
Lynx Lake
Lost Lake
664
Jackfish Lake
Route Lake
Bailey Lake
Good Lake
Big Vermilion Lake
Little Vermilion Lake
OJIBWAY PROVINCIAL PARK
Rosamond Lake
Rugby Lake
Bluett Lake
Tot Lake
Lateral Lake
Muskie Lake
Kathlyn Lake
Gullwing Lake
Minnitaki Lake
Kabikwabik Lake
665
605
601
72
Rice Lake
Ghost Lake
Mavis Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
Big Sandy Lake
Domtar Corp Dryden Pulp Mill
M
DRYDEN
Thunder Lake
594
EAGLE LAKE 27
AARON PROVINCIAL PARK
Wabigoon Lake
Hartman Lake
Mickle Lake
DD Contracting Aggregate Pit
WABIGOON
BUTLER LAKE PROVINCIAL NATURE RESERVE
DINORWIC
Mile Lake
Trap Lake
Avery Lake
Eagle Lake
Doré Lake
Melgund Lake
17
603
WABIGOON LAKE 27
Pickerel Lake
Dinorwic Lake
Ukik Lake
502
Rock Lake
Peak Lake
Mennin Lake
Bunyan Lake
Boyer Lake
Long Lake
Spruce Lake
Upper Manitou Lake
Uphill Lake
Sunshine Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Spatial Extent for Air Quality
- Spatial Extent for Noise VCs
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- Transmission Line
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provinical Parks
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Highway
- Local Road

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

NOTES:
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0 2.5 5 10 15 20 Kilometres

Datum: NAD83
Projection: UTM Zone 15N

N W E S

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GOLIATH GOLD PROJECT

Spatial Extent of Cumulative Effects for Noise VCs and Air Quality

PROJECT N°: TC160516	**FIGURE: 7.3.2-2**
SCALE: 1:300,000	DATE: April 2018

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Cedar Lake
Moose Lake
Thaddeus Lake
Ord Lake
Whitefish Lake
LAC SEUL 28
Cherry Lake
Lynx Lake
Lost Lake
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Jackfish Lake
Route Lake
Bailey Lake
Good Lake
Big Vermilion Lake
Little Vermilion Lake
OJIBWAY PROVINCIAL PARK
Rosamond Lake
Rugby Lake
Bluett Lake
Tot Lake
Lateral Lake
Muskie Lake
Kathlyn Lake
Gullwing Lake
Minnitaki Lake
Kabikwabik Lake
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Rice Lake
Ghost Lake
Mavis Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
Big Sandy Lake
Domtar Corp Dryden Pulp Mill
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Thunder Lake
EAGLE LAKE 27
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AARON PROVINCIAL PARK
Hartman Lake
Mickle Lake
Wabigoon Lake
DD Contracting Aggregate Pit
WABIGOON
BUTLER LAKE PROVINCIAL NATURE RESERVE
DINORWIC
Avery Lake
Mile Lake
Trap Lake
Eagle Lake
Doré Lake
Melgund Lake
17
603
WABIGOON LAKE 27
Pickerel Lake
Dinorwic Lake
Ukik Lake
502
Rock Lake
Peak Lake
Mennin Lake
Bunyan Lake
Boyer Lake
Long Lake
Spruce Lake
Upper Manitou Lake
Uphill Lake
Sunshine Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Spatial Extent for Surface Water Quality and Surface Water Quanity
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- Transmission Line
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provinical Parks
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TREASURY METALS Inc.

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GOLIATH GOLD PROJECT

Spatial Extent of Cumulative Effects for Surface Water Quality and Surface Water Quanity

Datum: NAD83
Projection: UTM Zone 15N

N W E S

0 2.5 5 10 15 20 Kilometres

PROJECT N°: TC160516	**FIGURE: 7.3.2-3**
SCALE: 1:300,000	DATE: April 2018

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Cedar Lake
Moose Lake
Thaddeus Lake
Ord Lake
Whitefish Lake
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Cherry Lake
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Little Vermilion Lake
OJIBWAY PROVINCIAL PARK
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Bluett Lake
Rugby Lake
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Muskie Lake
Kathlyn Lake
Gullwing Lake
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Minnitaki Lake
Kabikwabik Lake
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Rice Lake
Ghost Lake
Mavis Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
Big Sandy Lake
Domtar Corp Dryden Pulp Mill
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EAGLE LAKE 27
AARON PROVINCIAL PARK
Hartman Lake
Mickle Lake
Wabigoon Lake
DD Contracting Aggregate Pit
WABIGOON
BUTLER LAKE PROVINCIAL NATURE RESERVE
DINORWIC
Mile Lake
Avery Lake
Eagle Lake
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Spruce Lake
Upper Manitou Lake
Uphill Lake
Sunshine Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Spatial Extent for Wildlife VCs (Except Ungulates) and Migratory Bird VCs
- Spatial Extent for Ungulates
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
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TREASURY METALS Inc.

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GOLIATH GOLD PROJECT

Spatial Extent of Cumulative Effects for Wildlife VCs and Migratory Bird VCs

Datum: NAD83
Projection: UTM Zone 15N

N W E S

0 2.5 5 10 15 20 Kilometres

PROJECT N°: TC160516	**FIGURE: 7.3.2-4**
SCALE: 1:300,000	DATE: April 2018

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Cedar Lake
Moose Lake
Thaddeus Lake
Ord Lake
Whitefish Lake
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Cherry Lake
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Little Vermilion Lake
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Rugby Lake
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Minnitaki Lake
Kabikwabik Lake
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Rice Lake
Ghost Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
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Big Sandy Lake
Domtar Corp Dryden Pulp Mill
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EAGLE LAKE 27
AARON PROVINCIAL PARK
Hartman Lake
Mickle Lake
Wabigoon Lake
DD Contracting Aggregate Pit
WABIGOON
BUTLER LAKE PROVINCIAL NATURE RESERVE
DINORWIC
Avery Lake
Mile Lake
Eagle Lake
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Rock Lake
Peak Lake
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Spruce Lake
Upper Manitou Lake
Sunshine Lake
Uphill Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Spatial Extent for Stream - Resident Fish Populations
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- Transmission Line
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provinical Parks
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Highway
- Local Road

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

NOTES:
- Topographic data extracted from Land Information Ontario, MNRF.
- MNDM proposed road works extracted from Northern Highways Program 2017-2021.
- Planned harvest areas were digized from Dryden Forest Management Units Operational Planning Maps.
- Wataynikaneyap Power routes extracted from 'Phase 1 Draft ES', Golder Associates, 2016.

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GOLIATH GOLD PROJECT

Spatial Extent of Cumulative Effects for Stream - Resident Fish Populations

Datum: NAD83
Projection: UTM Zone 15N

N W E S

0 2.5 5 10 15 20 Kilometres

PROJECT N°: TC160516	**FIGURE: 7.3.2-5**
SCALE: 1:300,000	DATE: April 2018

500000 520000 540000 560000

5560000 5540000 5520000 5500000 5480000 5460000

Cedar Lake
Moose Lake
Thaddeus Lake
Ord Lake
Whitefish Lake
LAC SEUL 28
Cherry Lake
Lynx Lake
Lost Lake
664
Jackfish Lake
Route Lake
Bailey Lake
Good Lake
Big Vermilion Lake
Little Vermilion Lake
OJIBWAY PROVINCIAL PARK
Rosamond Lake
Bluett Lake
Lateral Lake
Tot Lake
Muskie Lake
Kathlyn Lake
Rugby Lake
665
Gullwing Lake
Minnitaki Lake
Kabikwabik Lake
605
601
72
Rice Lake
Ghost Lake
Mavis Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
Big Sandy Lake
Domtar Corp Dryden Pulp Mill
M
DRYDEN
Thunder Lake
594
EAGLE LAKE 27
AARON PROVINCIAL PARK
Hartman Lake
Mickle Lake
Wabigoon Lake
DD Contracting Aggregate Pit
WABIGOON
BUTLER LAKE PROVINCIAL NATURE RESERVE
DINORWIC
Avery Lake
Mile Lake
Eagle Lake
Trap Lake
Doré Lake
Melgund Lake
17
WABIGOON LAKE 27
603
Pickerel Lake
Dinorwic Lake
Ukik Lake
502
Rock Lake
Peak Lake
Mennin Lake
Bunyan Lake
Boyer Lake
Long Lake
Spruce Lake
Upper Manitou Lake
Sunshine Lake
Uphill Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Spatial Extent for Wetland and Terrestrial Vegetation Communities
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- Transmission Line
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provinical Parks
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Highway
- Local Road

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

NOTES:
- Topographic data extracted from Land Information Ontario, MNRF.
- MNDM proposed road works extracted from Northern Highways Program 2017-2021.
- Planned harvest areas were digized from Dryden Forest Management Units Operational Planning Maps.
- Wataynikaneyap Power routes extracted from 'Phase 1 Draft ES', Golder Associates, 2016.

Datum: NAD83
Projection: UTM Zone 15N

0 2.5 5 10 15 20 Kilometres

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GOLIATH GOLD PROJECT

Spatial Extent of Cumulative Effects for Wetland and Vegetation Communities

PROJECT N°: TC160516	**FIGURE: 7.3.2-6**
SCALE: 1:300,000	DATE: April 2018

500000 520000 540000 560000

5560000 5540000 5520000 5500000 5480000 5460000

Cedar Lake
Moose Lake
Thaddeus Lake
Ord Lake
Whitefish Lake
LAC SEUL 28
Cherry Lake
Lynx Lake
Lost Lake
664
Jackfish Lake
Route Lake
Bailey Lake
Good Lake
Big Vermilion Lake
Little Vermilion Lake
OJIBWAY PROVINCIAL PARK
Rosamond Lake
Rugby Lake
Bluett Lake
Tot Lake
Lateral Lake
Muskie Lake
Kathlyn Lake
Gullwing Lake
Minnitaki Lake
Kabikwabik Lake
665
605
601
72
Rice Lake
Ghost Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
Big Sandy Lake
Domtar Corp Dryden Pulp Mill
DRYDEN
Thunder Lake
EAGLE LAKE 27
594
AARON PROVINCIAL PARK
Hartman Lake
Mickle Lake
Wabigoon Lake
DD Contracting Aggregate Pit
WABIGOON
BUTLER LAKE PROVINCIAL NATURE RESERVE
DINORWIC
Mile Lake
Avery Lake
Trap Lake
Eagle Lake
Doré Lake
Melgund Lake
17
603
Pickerel Lake
WABIGOON LAKE 27
Dinorwic Lake
Ukik Lake
Rock Lake
502
Peak Lake
Mennin Lake
Bunyan Lake
Boyer Lake
Long Lake
Spruce Lake
Upper Manitou Lake
Uphill Lake
Sunshine Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Spatial Extent for Forestry, Access and Abundance for Hunting, Access and Abundance for Trapping, and Access and Abundance for Consumptive Use by Other Recreational Users
- Spatial Extent for Diminished Experience of Being on the Land for Hunting, Fishing, and Consumptive Land Use by Other Recreational Users
- Spatial Extent for Diminished Experience of Being on the Land for Fishing and for Cottagers and Outfitters
- Spatial Extent for Changes in Clientelle for Cottagers and Outfitters
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- Transmission Line
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provinical Parks
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Highway
- Local Road

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

0 2.5 5 10 15 20 Kilometres

NOTES:
- Topographic data extracted from Land Information Ontario, MNRF.
- MNDM proposed road works extracted from Northern Highways Program 2017-2021.
- Planned harvest areas were digized from Dryden Forest Management Units Operational Planning Maps.
- Wataynikaneyap Power routes extracted from 'Phase 1 Draft ES', Golder Associates, 2016.

Datum: NAD83
Projection: UTM Zone 15N

N W E S

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GOLIATH GOLD PROJECT

Spatial Extent of Cumulative Effects for the Land and Resource Use VCs

PROJECT N°: TC160516	**FIGURE: 7.3.2-7**
SCALE: 1:300,000	DATE: April 2018

400000 450000 500000 550000 600000

5550000

5500000

MAP OVERVIEW

ENLARGED AREA

500 km

WEST ENGLISH RIVER
MAYNARD LAKE
TIDE LAKE
WABAUSKANG FIRST NATION
WINDIGO POINT
LAC SEUL FIRST NATION
GRASSY NARROWS FIRST NATION
105
516
MUNICIPALITY OF SIOUX LOOKOUT
664
OJIBWAY
609
658
642
72
BLUE LAKE
647
665
605
601
MINNITAKI KAMES
CITY OF KENORA
596
641
17
17a
Domtar Corp Dryden Pulp Mill
CITY OF DRYDEN
LOLA LAKE
EAST ENGLISH RIVER
WINNANGE LAKE
TOWNSHIP OF MACHIN
594
AARON
DD Contracting Aggregate Pit
RUSHING RIVER
VILLAGE OF WABIGOON
BUTLER LAKE
EAGLE LAKE FIRST NATION
EAGLE-DOCTOOTH
17
WABIGOON LAKE OJIBWAY NATION
599
502
SANDBAR LAKE
NAOTKAMEGWANNING (WHITEFISH BAY) FIRST NATION
LAKE OF THE WOODS
71
622
TOWNSHIP OF IGNACE
DD Contracting Aggregate Pit
TURTLE RIVER-WHITE OTTER LAKE

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LEGEND

- Operations Area
- Socio-economic Study Area
- First Nation Reserves*
- Communities*
- Treasury Metals Exploration Program
- Provinical Parks
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- DD Contracting Aggregate Pit
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Extent of Culumative Effects shown in Fig 7.2.2-1
- Railway
- Highway

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

0 10 20 40 60 80 100 Kilometres

NOTES:
- Topographic data extracted from Land Information Ontario, MNRF.

* Only communities and reserves located within the study area are shown.

Datum: NAD83
Projection: UTM Zone 15N

N W E S

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GOLIATH GOLD PROJECT

Spatial Extents of Cumulative Effects for the Social VCs and Economic Factor VCs

PROJECT N°: TC160516	**FIGURE: 7.3.2-8**
SCALE: 1:650,000	DATE: April 2018

500000 520000 540000 560000

5560000 5540000 5520000 5500000 5480000 5460000

Cedar Lake
Moose Lake
Thaddeus Lake
Ord Lake
Whitefish Lake
LAC SEUL 28
Cherry Lake
Lynx Lake
Lost Lake
664
Jackfish Lake
Route Lake
Bailey Lake
Good Lake
Big Vermilion Lake
Little Vermilion Lake
OJIBWAY PROVINCIAL PARK
Rosamond Lake
Rugby Lake
Bluett Lake
Tot Lake
Lateral Lake
Muskie Lake
Kathlyn Lake
Gullwing Lake
665
605
601
Rice Lake
Ghost Lake
LOLA LAKE PROVINCIAL NATURE RESERVE
Minnitaki Lake
Kabikwabik Lake
72
Big Sandy Lake
Domtar Corp Dryden Pulp Mill
M
DRYDEN
Thunder Lake
594
EAGLE LAKE 27
AARON PROVINCIAL PARK
Wabigoon Lake
DD Contracting Aggregate Pit
WABIGOON
Hartman Lake
Mickle Lake
BUTLER LAKE PROVINCIAL NATURE RESERVE
Mile Lake
DINORWIC
Avery Lake
Eagle Lake
Doré Lake
Melgund Lake
17
603
Pickerel Lake
WABIGOON LAKE 27
Dinorwic Lake
Ukik Lake
Rock Lake
502
Peak Lake
Mennin Lake
Bunyan Lake
Boyer Lake
Long Lake
Spruce Lake
Upper Manitou Lake
Uphill Lake
Sunshine Lake
Stormy Lake
622
Josephine Cone Mine Project
Bending Lake
Trout River
Wapageisi Lake
Meggisi Lake
Beak Lake
Lower Manitou Lake
TURTLE RIVER-WHITE OTTER LAKE PROVINCIAL PARK (WATERWAY CLASS)

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LEGEND

- Operations Area
- Spatial Extent for Ungulates Indictor for the Hunting VC
- Spatial Extent for Change in Access for Fishing, Hunting, Trapping, and Harvesting and Gathering Plant Materials
- Spatial Extent for Diminished Experience of Being on the Land for Hunting, Trapping and Harvesting and Gathering of Plant Materials
- Spatial Extent for Diminished Experience of Being on the Land for Fishing
- Treasury Metals Exploration Program
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power Transmission Line
- DD Contracting Aggregate Pit
- Canadian Pacific Railway
- First Nation Reserves
- Provinical Parks
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Highway
- Local Road

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

0 2.5 5 10 15 20 Kilometres

NOTES:
- Topographic data extracted from Land Information Ontario, MNRF.
- MNDM proposed road works extracted from Northern Highways Program 2017-2021.
- Planned harvest areas were digized from Dryden Forest Management Units Operational Planning Maps.
- Wataynikaneyap Power routes extracted from 'Phase 1 Draft ES', Golder Associates, 2016.

Datum: NAD83
Projection: UTM Zone 15N

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GOLIATH GOLD PROJECT

Spatial Extent of Cumulative Effects for the Aborginal Peoples VCs Related to Traditional Land and Resource Use

PROJECT N°: TC160516	**FIGURE: 7.3.2-9**
SCALE: 1:300,000	DATE: April 2018

400000 450000 500000 550000 600000

5500000

MAP OVERVIEW

ENLARGED AREA

500 km

WEST ENGLISH RIVER
MAYNARD LAKE
TIDE LAKE
WABAUSKANG FIRST NATION
WINDIGO POINT
LAC SEUL FIRST NATION
GRASSY NARROWS FIRST NATION
105
516
MUNICIPALITY OF SIOUX LOOKOUT
664
OJIBWAY
609
658
642
72
BLUE LAKE
647
665
MINNITAKI KAMES
605
601
CITY OF KENORA
596
Domtar Corp Dryden Pulp Mill
CITY OF DRYDEN
LOLA LAKE
641
17
17a
WINNANGE LAKE
TOWNSHIP OF MACHIN
594
AARON
DD Contracting Aggregate Pit
EAST ENGLISH RIVER
RUSHING RIVER
VILLAGE OF WABIGOON
BUTLER LAKE
EAGLE LAKE FIRST NATION
EAGLE-DOCTOOTH
17
WABIGOON LAKE OJIBWAY NATION
599
502
SANDBAR LAKE
NAOTKAMEGWANNING (WHITEFISH BAY) FIRST NATION
LAKE OF THE WOODS
71
TOWNSHIP OF IGNACE
622
DD Contracting Aggregate Pit
TURTLE RIVER-WHITE OTTER LAKE

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LEGEND

- Operations Area
- Socio-economic Study Area
- First Nation Reserves*
- Communities*
- Treasury Metals Exploration Program
- Provinical Parks
- Josephine Cone Mine Project
- Domtar Corp Dryden Pulp Mill
- Proposed Wataynikaneyap Power
- DD Contracting Aggregate Pit
- Dryden Forest Management Unit
- Planned Harvest Areas (2016 - 2021)
- Extent of Culumative Effects shown in Fig 7.2.2-1
- Railway
- Highway

MNDM Proposed Road Works (2017-2021)

- Bridge Rehabilitation
- Culvert Replacement
- Resurfacing

0 10 20 40 60 80 100 Kilometres

NOTES:
- Topographic data extracted from Land Information Ontario, MNRF.

* Only communities and reserves located within the study area are shown.

Datum: NAD83
Projection: UTM Zone 15N

N W E S

TREASURY METALS Inc.

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GOLIATH GOLD PROJECT

Spatial Extents of Cumulative Effects for Aboriginal Peoples Scio-economic Factors

PROJECT N°: TC160516	**FIGURE: 7.3.2-10**
SCALE: 1:650,000	DATE: April 2018

7.3.3 Temporal Boundaries for Assessing Cumulative Effects

The temporal boundaries used for assessing cumulative effects were selected to be consistent with those used in evaluating the effects of the Project, namely:

- Site preparation and construction phase (2 years);
- Operations (11 to 12 years);
- Closure (3 years); and
- Post-closure (beyond year 17).

Table 7.3.3-1 provides the temporal boundaries for each of the VCs for which residual adverse effects were predicted.

Table 7.3.3-1: Temporal Boundaries for Assessing Cumulative Effects

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
Terrain and Soils	Natural landscapes	The residual adverse effect is associated with the presence of the WRSA. This feature will be constructed during the first few years of operations, and will remain a permanent feature on the landscape. A physical activity would need to have effects that overlapped with the operations, closure and post-closure phases of the Project for there to be a cumulative effects. However, it is not reasonable to foresee future activities into the far future. Therefore, the temporal boundary for this effect will be set from year 3 to year 37 (20 years following closure).
Geology and Geochemistry	Pit lake water quality	The residual adverse effect associated with the pit lake quality VC is tied to the presence of the pit lake. At the end of mining, the dewatering activities will cease and the open pit will be allowed to fill with water. The filing of the pit lake will take between 5 to 8 years, at which time the pit lake will become a permanent feature on the landscape. A physical activity would need to have effects that overlapped with the post-closure phases of the Project for there to be a cumulative effects. However, it is not reasonable to foresee future activities into the far future. Therefore the temporal boundary for this effect will be set from year 19 (5 years after the end of operations) to year 37 (20 years after closure).
Noise	Environmental noise levels	Activities at the Project associated with the residual adverse effects on the noise VCs are restricted to the site preparation and construction, operations and closure phases of the Project (blasting would not occur during closure). There would be no residual adverse effects on the noise VCs during the post-closure phase. For there to be a cumulative effect on noise, the physical activity would have to occur during the active period of the Project life, from year 1 through year 17 (the end of the closure activities).
	Noise disturbance to wildlife (including SAR)	
	Blasting noise and vibration	
	Noise related health effects	
Air Quality	Air quality	Activities at the Project associated with the residual adverse effects on the air quality VC are restricted to the site preparation and construction, operations and closure phases of the Project. There would be no

Table 7.3.3-1: Temporal Boundaries for Assessing Cumulative Effects (continued)

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
		residual adverse effects on the air quality VC during the post-closure phase. For there to be a cumulative effect on air quality, the physical activity would have to occur during the active period of the Project life, from year 1 through year 17 (the end of the closure activities).
Climate	Project GHG emissions	This VC relates to Treasury Metals own requirements under the Ontario Cap and Trade Program (O. Reg. 144/16) for the reporting and management of their emissions. Although GHG emissions are identified as contributing to climate change, there were no residual adverse effects predicted for changes in climate due to the Project VC.
Surface Water Quality	Surface water quality	The residual adverse effects of the Project on surface water quality occur during the operations phase, when excess water at the Project will be treated to meet the PWQO before discharge to Blackwater Creek, and the post-closure phase when excess water from the pit lake is passively discharged into a Tributary of Blackwater Creek. During the post-closure phase, seepage from the TSF and WRSA will leave the site and interact with adjacent waterbodies. Releases from the pit lake and seepage from the WRSA and TSF will effectively be permanent. However, it is not reasonable to foresee future activities into the far future. Therefore, the temporal boundary for this effect will be set from year 2 (the start of operations) to year 37 (20 years after closure).
Surface Water Quantity	Surface water quantity	The residual adverse effects of the Project on surface water quantity will vary by phase of the Project. At the start of the site preparation and construction phase, a perimeter ditch will be constructed around the operations area to prevent runoff leaving the site. This will permanently alter the size of the catchment areas for Little Creek, Hoffstrom's Bay Tributary and Blackwater Creek. During operations, fresh water requirements will be provided from the irrigation ponds on Thunder Lake Tributary 2 and 3. Additionally, excess water at the Project will be treated to meet the PWQO before discharge to Blackwater Creek. At closure, the site will be graded and all runoff directed towards the open pit. The reclaimed site will have different runoff characteristics from the baseline conditions for the catchment. Changes to the flows in Little Creek, Hoffstrom's Bay Tributary and Blackwater Creek will be permanent. However, it is not reasonable to foresee future activities into the far future. Therefore, the temporal boundaries for this effect will be set from year 2 (the start of operations) to year 37 (20 years after closure).
Wildlife and Wildlife Habitat	Wildlife Species at Risk	The predicted residual adverse effects of the Project on the wildlife VCs will continue throughout the active life of the Project, and are expected to recover following the closure and reclamation activities. The temporal boundaries for the residual adverse effects on the wildlife VCs extends from year 1 to year 27 (10 years after closure).
	Ungulates	
	Furbearers	
	Upland Birds	
	Wetland Birds	
	Small mammals	

Table 7.3.3-1: Temporal Boundaries for Assessing Cumulative Effects (continued)

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
	Reptiles and amphibians	
	Invertebrates	
Migratory Birds	Upland Birds	The predicted residual adverse effects of the Project on the migratory bird VCs will continue throughout the active life of the Project, and are expected to recover following the closure and reclamation activities. The temporal boundaries for the residual adverse effects on the migratory VCs extends from year 1 to year 27 (10 years after closure).
	Wetland Birds	
Fish and Fish Habitat	Stream-resident fish population	For fish and fish habitat VCs, the only residual adverse effects were those on the stream-resident fish living in those watercourses that would be directly affected by the Project (i.e., Blackwater Creek Tributary 1 and Blackwater Creek Tributary 2). These effects would be restricted to the site preparation and construction phase. It is expected that Treasury Metals will be required to implement a plan to offset the effects of overprinting portions of Blackwater Creek Tributary 1 and 2. The temporal boundaries for the residual adverse effects on the stream-based fish populations extends from year 1 to 2 (the end of the site preparation and construction phase).
Wetlands and Vegetation	Wetlands	The predicted residual adverse effects of the Project on the wetland extent will continue throughout the active life of the Project. The effects are expected to recover following the closure and reclamation activities. The temporal boundaries for the residual adverse effects on wetlands and vegetation valued components extent last from year 1 to year 27 (10 years after closure).
	Vegetation communities	
Land Use	Forestry	The predicted residual adverse effects of the Project on the land use VCs are predicted to begin at the start of the site preparation and continue through into post-closure. Most of the effects will dissipate with time, therefore, the temporal boundaries for the residual adverse effects on land use valued components extent last from year 1 to year 22 (5 years after the end of the closure phase).
	Hunting	
	Trapping	
	Cottagers and outfitters	
	Other recreational uses	
Social	Population demographics	The predicted residual adverse effects of the Project on the social VCs are predicted to begin at the start of the site preparation and continue through into post-closure. Most of the effects will dissipate with time, therefore, the temporal boundaries for the residual adverse effects on social valued components extent last from year 1 to year 22 (5 years after the end of the closure phase).
	Education	
	Infrastructure and services	
	Housing and property values	
	Public safety	
	Transportation and traffic	
Economic	Labour force, participation and employment	The predicted residual adverse effects of the Project on the economic VCs are predicted to begin at the start of the site preparation and continue through into post-closure. Most of the effects will dissipate with

Table 7.3.3-1: Temporal Boundaries for Assessing Cumulative Effects (continued)

Discipline or Component	Valued Components (VCs)	Predicted Residual Adverse Effects
	Income levels	time, therefore, the temporal boundaries for the residual adverse effects on economic valued components extent last from year 1 to year 22 (5 years after the end of the closure phase).
	Cost of living	
	Real estate	
	Economic development	
	Existing businesses	
	Government revenues	
Aboriginal Peoples	Harvesting and gathering of plant material	The predicted residual adverse effects of the Project on the Aboriginal peoples VCs are predicted to begin at the start of the site preparation and continue through into post-closure. Most of the effects will dissipate with time, therefore, the temporal boundaries for the residual adverse effects on aboriginal peoples including current use of the land and resources for traditional purposes and socio-economic valued components last from year 1 to year 22 (5 years after the end of the closure phase).
	Hunting	
	Trapping	
	Fishing	
	Socio-economic effects	

7.4 Identification of Potential Cumulative Effects

For each valued component in each discipline with a residual adverse effect as a result for the Project identified, identification of potential cumulative effects was performed via a screening process. This was performed by screening for spatial and temporal overlap with the Project as described above. Where the potential for a cumulative effect was identified due to spatial or temporal overlap, it was carried forward for further analysis of cumulative effects.

7.4.1 Analysis of Cumulative Effects

Following the results of the screening process for spatial and temporal overlap where potential cumulative effects were assessed, a detailed analysis of what the cumulative effect would be was performed on each value component for each discipline. The results of predicted cumulative effects are provided in Table 7.6-1.

7.5 Overall Summary of Predicted Cumulative Effects

Table 7.6-1 provides an overall summary of the predicted residual and cumulative effects of the Project. In the table, those disciplines, VCs, and indicators for which no residual adverse effects were predicted are indicated with the "—" symbol. The absence of adverse effects could indicate either that no adverse effects were predicted, or where predicted adverse effects were predicted they were fully mitigated. Sections 6.2 through 6.21 of the EIS describe the predicted effects, mitigation and residual adverse effects for each of the disciplines, respectively. Those disciplines, VCs, and indicators with predicted residual adverse effects, but no predicted cumulative are

indicated with the "†" symbol in the table. The absence of cumulative effects could represent situations where there was no spatial and temporal overlap with the residual adverse effects of the Project (see Section 7.4.1), or where there was overlap but no cumulative effects were predicted, as detailed in Section 7.5.1 through 7.5.13. Those disciplines, VCs, and indicators for which cumulative effects were predicted but the analysis determined there would be no numeric or material change in magnitude of the residual adverse effects predicted for the Project (see Section 7.5.1 through 7.5.13) are indicated with a "‡ " symbol in the table. The table has been shaded to clearly indicate those disciplines, VCs, and indicators where residual, and cumulative effects were predicted. Details regarding the assessment of cumulative effects are provided in Section 7 of the EIS. As set out in Section 13 of the EIS Guidelines (Appendix Y), the determination of significance (presented in Section 8 of the EIS) has been completed on the residual adverse effects, including the cumulative effects.

Table 7.6-1: Residual Adverse Effects and Predicted Cumulative Effects

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects	Analysis of Cumulative Effects		
				Spatial and Temporal Overlap	Cumulative Effects	Can Cumulative Effects be Quantified?
Terrain and soils	Natural landscapes	Viewscapes	Yes	Yes	† (2)	†
	Overburden	Erosion of disturbed overburden	—	—	—	—
	Soil chemistry	Changes in soil chemistry	—	—	—	—
Geology and Geochemistry	Pit lake water quality	Concentrations of indicator compounds	Yes	†	†	†
Noise	Environmental noise levels	Equivalent noise levels, L_{EQ}	Yes	Yes	Yes	‡ (3)
	Noise disturbance to wildlife (including SAR)	Area predicted L_{EQ} above 50 dBA	Yes	Yes	Yes	‡
	Blasting noise and vibration	Peak sound pressure level	Yes	Yes	Yes	‡
		Peak particle velocity	Yes	Yes	Yes	‡
	Noise related health effects	Absolute sound pressure, L_{DN}	Yes	Yes	Yes	‡
		Percent highly annoyed, %HA	Yes	Yes	Yes	‡
Light	Light trespass	Ambient light levels	—	—	—	—
Air quality	Air quality	Concentrations of indicator compounds	Yes	Yes	Yes	‡
Climate	Project GHG emissions	Annual equivalent carbon dioxide emissions (eCO_2)	Yes	†	†	†
		Changes in annual temperature	—	—	—	—

Table 7.6-1: Residual Adverse Effects and Predicted Cumulative Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects	Analysis of Cumulative Effects		
				Spatial and Temporal Overlap	Cumulative Effects	Can Cumulative Effects be Quantified?
	Changes in climate due to the Project	Changes in annual precipitation	—	—	—	—
Surface water quality	Surface water quality	Concentrations of indicator compounds	Yes	Yes	†	†
Surface water quantity	Surface water quantity	Increase in surface water flows	Yes	Yes	Yes	—
		Decrease in surface water flows	Yes	Yes	Yes	—
		Change in lake levels	—	—	—	—
Groundwater quality	Groundwater quality	Concentrations of indicator compounds	—	—	—	—
Groundwater quantity	Groundwater quantity	Decrease in groundwater elevations in private water wells	—	—	—	—
Wildlife and wildlife habitat	Wildlife Species at Risk	Common Nighthawk	Yes	Yes	Yes	Yes
		Northern Myotis/Little Brown Myotis	Yes	Yes	Yes	Yes
		Barn Swallow	Yes	Yes	Yes	Yes
	Ungulates	Moose	Yes	Yes	Yes	Yes
	Furbearers	American Marten	Yes	Yes	Yes	Yes
		American Beaver	Yes	Yes	Yes	Yes
	Upland birds	Upland birds	Yes	Yes	Yes	Yes
	Wetland birds	Marsh birds	Yes	Yes	Yes	Yes
	Small mammals	Small mammals	Yes	Yes	Yes	Yes
	Reptiles and amphibians	Reptiles and amphibians	Yes	Yes	Yes	Yes
	Invertebrates	Terrestrial invertebrates	Yes	Yes	Yes	Yes
Migratory Birds	Upland birds	Upland birds	Yes	Yes	Yes	Yes
	Wetland birds	Marsh birds	Yes	Yes	Yes	Yes

Table 7.6-1: Residual Adverse Effects and Predicted Cumulative Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects	Analysis of Cumulative Effects		
				Spatial and Temporal Overlap	Cumulative Effects	Can Cumulative Effects be Quantified?
Fish and fish habitat	Stream-resident fish population	Direct loss or alteration of habitat	Yes	Yes	†	†
		Changes in flows or water levels	—	—	—	—
		Changes in water quality	—	—	—	—
		Blasting	—	—	—	—
Fish and fish habitat (continued)	Migratory fish populations	Direct loss or alteration of habitat	—	—	—	—
		Changes in flows or water levels	—	—	—	—
		Changes in water quality	—	—	—	—
		Blasting	—	—	—	—
	Lake-resident fish populations	Direct loss or alteration of habitat	—	—	—	—
		Changes in flows or water levels	—	—	—	—
		Changes in water quality	—	—	—	—
		Blasting	—	—	—	—
	Fish species-at-risk	Direct loss or alteration of habitat	—	—	—	—
		Changes in flows or water levels	—	—	—	—
		Changes in water quality	—	—	—	—
		Blasting	—	—	—	—
Wetlands and vegetation	Wetlands	Wetland extent	Yes	Yes	Yes	Yes
		Wild rice	—	—	—	—
		Floating Marsh Marigold (*Caltha natans*)	—	—	—	—
Wetlands and vegetation (continued)	Vegetation communities	Predominantly coniferous forest	Yes	Yes	Yes	Yes
		Predominantly deciduous forest	Yes	Yes	Yes	Yes
		Successional areas	Yes	Yes	Yes	Yes
		Potential berry harvesting areas	Yes	Yes	Yes	Yes

Table 7.6-1: Residual Adverse Effects and Predicted Cumulative Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects	Analysis of Cumulative Effects		
				Spatial and Temporal Overlap	Cumulative Effects	Can Cumulative Effects be Quantified?
Land use	Land Use Planning and Policies	Conflict with accepted land uses as stipulated in approved land use plans.	—	—	—	—
		Overlap with protected areas.	—	—	—	—
	Aggregate Operations	Change in access to aggregate resources.	—	—	—	—
		Change in demand of aggregate resources extraction.	—	—	—	—
Land use (continued)	Forestry	Change in access to forestry resources.	—	—	—	—
		Loss of forestry resources.	Yes	Yes	†	†
	Mineral Exploration	Change in access to mineral claims for exploration and production.	—	—	—	—
	Fishing - Recreational and Commercial	Change in access to fisheries resources.	—	—	—	—
		Change in the abundance of fisheries resources.	—	—	—	—
		Change in contaminant levels in fish	—	—	—	—
		Diminished experience of being on the land.	Yes	Yes	†	†
	Hunting	Change in access to wildlife resources.	Yes	Yes	†	†
		Change in abundance of wildlife resources.	Yes	Yes	Yes	Yes
		Diminished experience of being on the land	Yes	Yes	†	†
	Trapping	Change in access to wildlife resources.	Yes	Yes	†	†
		Change in abundance of wildlife resources.	Yes	Yes	Yes	Yes
		Diminished experience of being on the land	Yes	Yes	†	†

Table 7.6-1: Residual Adverse Effects and Predicted Cumulative Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects	Analysis of Cumulative Effects		
				Spatial and Temporal Overlap	Cumulative Effects	Can Cumulative Effects be Quantified?
Land use (continued)	Cottagers and Outfitters	Diminished experience of being on the land.	Yes	Yes	†	†
		Change in access to cottage and/or outfitter areas.	—	—	—	—
		Changes in clientele for outfitters with lodges located near the Project.	Yes	Yes	Yes	‡
	Other Recreational Uses	Change in access for residents and visitors to public lands for non-consumptive purposes	—	—	—	—
	Other Recreational Uses (continued)	Change in access for residents and visitors to public lands for consumptive purposes.	Yes	Yes	†	†
		Change in abundance of berries, mushrooms and/or other vegetation used for consumption	Yes	Yes	Yes	Yes
		Diminished experience of being on the land.	Yes	Yes	†	†
Social	Population demographics	Population change	Yes	Yes	Yes	‡
	Education	Capacity of education services	Yes	Yes	Yes	‡
		Education attainment	Yes	Yes	Yes	‡
		Project-specific Training	Yes	Yes	†	†
	Infrastructure and services	Municipal Services	Yes	Yes	Yes	‡
		Community services (e.g., health, social services)	Yes	Yes	Yes	‡
	Housing and property values	Housing availability	Yes	Yes	Yes	‡
		Property values	Yes	Yes	Yes	‡
	Public safety	Crime rate	Yes	Yes	Yes	‡
		Capacity of emergency services	Yes	Yes	Yes	‡
		Requests for emergency services by Project	Yes	Yes	†	†
Social (continued)	Transportation and traffic	Road network capacity and conditions	Yes	Yes	Yes	‡
Economic	Labour force, labour participation	Labour income employment	Yes	Yes	Yes	‡

Table 7.6-1: Residual Adverse Effects and Predicted Cumulative Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects	Analysis of Cumulative Effects		
				Spatial and Temporal Overlap	Cumulative Effects	Can Cumulative Effects be Quantified?
	and employment					
	Income levels	Income levels and categories	Yes	Yes	Yes	‡
	Cost of living	Current prevailing cost of living	Yes	Yes	Yes	‡
	Real estate	Housing prices and affordability	Yes	Yes	Yes	‡
Economic (continued)	Economic development	Municipal taxes and contribution to economic development projects	Yes	Yes	Yes	‡
	Existing businesses	Local business availability	Yes	Yes	Yes	‡
	Government revenues	Taxes and revenues	Yes	Yes	Yes	‡
Human health	Non-Indigenous Human Health	Subsurface/Construction Worker	—	—	—	—
		Outdoor Worker	—	—	—	—
		Indoor Worker	—	—	—	—
		Site Visitor, or Harvester	—	—	—	—
		Resident	—	—	—	—
	Indigenous Human Health	Resident	—	—	—	—
		Site Visitor, or Harvester	—	—	—	—
		Subsurface/Construction Worker	—	—	—	—
		Outdoor Worker	—	—	—	—
		Indoor Worker	—	—	—	—
Heritage resources	Archaeological sites	Archaeological sites	—	—	—	—
	Historic heritage sites	Historic heritage sites	—	—	—	—

Table 7.6-1: Residual Adverse Effects and Predicted Cumulative Effects (continued)

Discipline	Valued Components (VCs)	Indicators	Residual Adverse Effects	Analysis of Cumulative Effects		
				Spatial and Temporal Overlap	Cumulative Effects	Can Cumulative Effects be Quantified?
Aboriginal Peoples	Human Health	Risk Assessment for Indigenous Human Health	—	—	—	—
	Harvesting and gathering of plant material	Wild rice	—	—	—	—
		Berry Harvesting	Yes	Yes	Yes	Yes
		Medicinal plant harvesting	Yes	Yes	Yes	Yes
	Harvesting and gathering of plant material (continued)	Changes in access	Yes	Yes	†	†
		Diminished on-the-land experience	Yes	Yes	†	†
	Hunting	Ungulates	Yes	Yes	Yes	Yes
		Furbearers	Yes	Yes	Yes	Yes
		Waterfowl	Yes	Yes	Yes	Yes
		Changes in access	Yes	Yes	†	†
		Diminished on-the-land experience	Yes	Yes	†	†
Aboriginal Peoples (continued)	Trapping	Furbearers	Yes	Yes	Yes	Yes
		Changes in access	Yes	Yes	†	†
		Diminished on-the-land experience	Yes	Yes	†	†
	Fishing	Sport fish	—	—	—	—
		Baitfish	—	—	—	—
		Commercial fishing	—	—	—	—
		Changes in access	—	—	—	—
		Diminished on-the-land experience	Yes	Yes	†	†
	Cultural and spiritual	Cultural or spiritual sites	—	—	—	—
		Traditional Travel routes	—	—	—	—
Aboriginal Peoples (continued)	Cultural and spiritual (continued)	Diminished on-the-land experience	Yes	Yes	†	†
	Socio-economic factors	Economic effects	Yes	Yes	Yes	‡
		Social effects	Yes	Yes	Yes	‡

Note:

(1) The "—" symbol indicates where no residual adverse effects were predicted for the discipline, VC and indicator. This could represent situations where no adverse effects were predicted, or where predicted adverse effects were fully mitigated, as detailed in Sections 6.2 through 6.21.

(2) The "†" symbol indicates where residual adverse effects were predicted for the discipline, VC and indicator, but the analysis determined there would be no cumulative effects. This could represent situations where there was no spatial and temporal overlap with the residual adverse effects of the Project (see Section 7.4.1), or where there was overlap but no cumulative effects were predicted, as detailed in Section 7.5.1 through 7.5.13.

(3) The "‡ " symbol indicates where cumulative effects were predicted for the discipline, VC and indicator, but the analysis determined there would be no numeric or material change in magnitude of the residual adverse effects predicted for the Project, as described in Section 7.5.1 through 7.5.13.

8.0 DETERMINATION OF SIGNIFICANCE

8.1 Methodology for Assigning Significance for Residual Effects

Section 13.1 of the EIS Guidelines (CEAA, 2013) indicates that a determination of significance needs to be completed for the predicted residual effects (including cumulative effects). The EIS Guidelines go on to describe the elements that should be considered when determining environmental significance under CEAA 2012. These include the following:

- Magnitude;
- Geographic extent;
- Timing and duration;
- Frequency;
- Reversibility;
- Ecological and social context; and
- Existence of environmental standards, guidelines or objectives for assessing the impact.

The guideline indicates that for those where a significant effect is identified, "…the EIS will set out the probability (likelihood) that they will occur". This is consistent with general environmental assessment practice that conservatively assumes that all potential effects, except those related to accidents, will occur (i.e., they have a likelihood of 1).

8.1.1 Magnitude

The three general levels of magnitude used in assessing residual effects are:

- Level I – No measurable residual effect;
- Level II – Residual effect is measurable but within range of natural variation;
- Level III – Residual effect is outside range of natural variation.

Although these levels of magnitude represent reasonable descriptions of the levels of magnitude, they are not specific to a particular component, VC or indicators. In response to the Round 1 information requests, specific levels of magnitude were developed for individual disciplines, indicators, and in some cases measures. The specific levels of magnitude are described in Section 8.1.1.1 through 8.1.1.20 of the EIS.

8.1.2 Geographic Extent

The three general levels of geographic extent used in assessing residual effects are:

- Level I – Residual effects are restricted to Project Site;
- Level II – Residual effect are restricted to the LSA for the component or VC; and
- Level III – Residual effect extends into the RSA for the component or VC.

The geographic extents refer to individual study areas that may vary by component or VC. A description of the individual study areas is provided in Sections 6.1.4.1 through 6.4.1.20 of the EIS.

8.1.3 Timing

According to the Agency (CEAA, 2015b) timing should be considered "…*when it is important in the evaluation of the environmental effect (e.g., when the environmental effect could occur during breeding season, or during a period of species migration through the area). It may also be relevant to discuss variation in timing of project activities, such as reservoir level fluctuations, and how that may cause varying environmental effects."* How timing has been established for the various components is described in detail in Sections 8.1.3.1 through 8.1.3.20 of the EIS.

8.1.4 Duration

The following common levels of duration were used when evaluating the residual effects for all components:

- Level I – Residual effect is temporary or not measurable beyond given Project phase (e.g., site preparation and construction);
- Level II – Residual effect would persist through the majority of the Project life (i.e., the effects would persist through the operations phase, up to 10 years after Project initiation; and
- Level III – Residual effect would persist beyond the life of the Project (i.e., the effects would remain into the post- closure phase).

8.1.5 Frequency

The following three general levels of frequency were used in developing discipline specific frequencies detailed in Sections 8.1.5.1 through 8.1.5.20:

- Level I – Residual effect is expected to occur infrequently;
- Level II – Residual effect is expected to occur intermittently; and
- Level III – Residual effects occurs frequently or continuously.

The definitions for frequency vary by component, as described in the following sections.

8.1.6 Reversibility

According to the Agency (CEAA, 2015b), a reversible effect is defined as follows:

> *A reversible environmental effect is one where the VC is expected to recover from the environmental effects caused by the project. This would correspond to a return to baseline conditions or other target (e.g., a population management objective, remediation target), through mitigation or natural recovery within a reasonable timescale.*

For evaluating the levels of reversibility, the following common definitions were used:

- Level I – Residual effect is readily reversible once the activity causing the effect ends;
- Level II – Residual effect is expected to recover (i.e., to baseline conditions or a remediation target) within a reasonable timescale; and
- Level III – Residual effect is not reversible.

8.1.7 Likelihood

The determination of likelihood will be done in accordance with the guidance from the Agency (CEAA, 2015b), which provides the following guidance for likelihood above:

> *The determination of likelihood is based on consideration of probability and uncertainty, and is considered only when it is established through stage 2 that one or more predicted residual adverse effects are significant.*
>
> *The probability of an environmental effect occurring may be based on knowledge and experience with similar past environmental effects. The full life cycle of a project, including its various stages and lifespan, should also be considered in determining the probability of occurrence of an effect.*

In the event a residual adverse effect was identified, the following common definitions would have been used for defining the level of likelihood:

- Level I – Residual effect is unlikely to occur;
- Level II – Residual effect could reasonably be expected to occur; and
- Level III – Residual effect will occur.

8.1.8 Determination of Significance

A common decision tree was applied to the predicted residual adverse effects (including cumulative effects) for all of the VCs. Once the levels for the various elements described in Section 8.1 were established for each of the residual effects, the significance could be determined by tracing the effects along the branches of the decision tree. The "timing" element was not explicitly considered in the decision tree. The decision tree, presented in Figure 8.1.8-1, uses the following logic:

- If the magnitude of the effect is assigned as Level I (i.e., the effect of the Project will be comparable to baseline conditions or would not be noticeable) then irrespective of spatial extent or reversibility, the effect would be classified as "**not significant**".
- If the magnitude of the effect is clearly distinguishable but meets guidelines or is within the environment's adaptive capabilities (magnitude = Level II), then:
    - If the spatial extent of the effect is limited to the Project site or local study area (extent = Level I or II), then:
    - If the effect is reversible, the effect would be classified as "**not significant**".
    - If the effect is not reversible, the effect would be classified as "**significant**".
    - If the effect extends far beyond the Project site into the RSA (extent = Level III), then:
    - If the duration of the effects is relatively short-term (duration = Level I) and the effects are infrequent or intermittent (frequency = Level I or II), the effect would be classified as "**not significant**".
    - If the duration of the effects is relatively short-term (duration = Level I) and the effects are continuous (frequency = Level III), the effect would be classified as "**significant**".
    - If the duration of the effects extent through the life of the Project (duration = Level II) and the effects are infrequent (frequency = Level I), the effect would be classified as "**not significant**".
    - If the duration of the effects extent through the life of the Project (duration = Level II) and the effects are intermittent or continuous (frequency = Level II or III), the effect would be classified as "**significant**".
    - If the duration of the effect extends more than 10 years beyond the life of the Project, the effect would be classified as "**significant**".
- If the magnitude of the effect exceeds guidelines or is beyond the environment's adaptive capability (magnitude = Level III), then:
    - If the spatial extent of the effect is limited to the Project site (extent = Level I), and the duration of the effects would not persist more than 10 years beyond the life of the Project (duration = Level I or II), the effect would be classified as "**not significant**".

Figure 8.1.8-1: Decision Tree for Determining Significance

- If the spatial extent of the effect is limited to the Project site (extent = Level I), and the duration of the effects extend more than 10 years beyond the Project life (duration = Level III), the effect would be classified as "**significant**".
- If the spatial extent of the effect extends into the local study area (extent = Level II), and the effects are reversible, the effect would be classified as "**not significant**".
- If the spatial extent of the effect extends into the local study area (extent = Level II), and the effects are not reversible, the effect would be classified as "**significant**".
- If the spatial extent of the effect extends into the regional study area (extent = Level III), the effect would be classified as "**significant**".

While the use of a decision tree for determining significance has been used on other assessments completed in Ontario in recent years (IAMGOLD, 2014; OPG 2011), it is not the only approach available for determining significance. Lawrence (2005) described a range of approaches used, including technical, collaborative, and reasoned argument approaches. All of the approaches would include some aspect of professional judgement (Sippe, 1999), and make use of the concepts of valued ecosystem components (VEC). The VEC are referred to by the Agency as valued components (VC) in their publications (CEAA, 2015a), and in the EIS Guidelines. There is, however, currently no legislative direction on what constitutes a significant adverse environmental effect provided in CEAA 2012, nor in there any specific guidance provided by the Agency (CEAA, 2015b).

For the revised EIS, the significance of residual adverse effects will be determined two ways. The first approach will a methodical re-application of the decision tree used in the original EIS (Figure 8.1.8-1), using magnitude, geographic extent, duration, frequency and reversibility. The second approach will be the adoptions of a "reasoned argument" approach, where a hypothesis of what would constitute significant effects is put forward, and used to test the predicted residual adverse effects of the Project. This approach will vary between components, and will make use of as many of the assessment measures (magnitude, geographic extent, duration, frequency and reversibility) as are appropriate for each component.

8.2 Summary of the Determination of Significance

For all of the VCs and indicators for which residual adverse effects due to the Project were identified (see Table 6.23-1), a determination of significance was completed in accordance with the methods set out in Section 8.1. The full determination of significance has been provided in Sections 8.2 through 8.21 of the EIS, and the results summarized below in Table 8.2-1. As indicated in Section 13 of the EIS Guidelines (Appendix Y), the determination of significance was completed for the residual adverse effects, including cumulative effects. The cumulative effects of the Project are detailed in Section 7 of the EIS, and are summarized in Table 7.5-1.

Table 8.2-1: Summary of the Determination of Significance in Revised EIS

Discipline or Component	Valued Components (VCs)	Indicators	Residual Adverse Effects	Significant Effects			
				Site Preparation and Construction	Operations	Closure	Post-closure
Terrain and soils	Natural Landscapes	Viewscapes	Yes	—	Not Significant	Not Significant	Not Significant
	Overburden	Erosion of disturbed overburden	—(1)	—	—	—	—
	Soil chemistry	Changes in soil chemistry	—	—	—	—	—
Geology and geochemistry	Pit lake water quality	Concentrations of indicator compounds	Yes	—	—	—	Not Significant
Noise	Environmental noise levels	Equivalent noise levels, LEQ	Yes	Not Significant	Not Significant	Not Significant	—
	Noise disturbance to wildlife (including SAR)	Area predicted LEQ above 50 dBA	Yes	Not Significant	Not Significant	Not Significant	—
	Blasting noise and vibration	Peak sound pressure level	Yes	Not Significant	Not Significant	Not Significant	—
		Peak particle velocity	Yes	Not Significant	Not Significant	Not Significant	—
	Noise related health effects	Absolute sound pressure, LDN	Yes	Not Significant	Not Significant	Not Significant	—
		Percent highly annoyed, %HA	Yes	Not Significant	Not Significant	Not Significant	—
Light	Light trespass	Ambient light levels	—	—	—	—	—
Air quality	Air quality	Concentrations of indicator compounds	Yes	Not Significant	Not Significant	Not Significant	—
Climate	Project GHG emissions	Annual equivalent carbon dioxide emissions (eCO_2)	Yes	Not Significant	Not Significant	Not Significant	—
	Changes in climate due to the Project	Changes in annual temperature	—	—	—	—	—
		Changes in annual precipitation	—	—	—	—	—
Surface water quality	Surface water quality	Concentrations of indicator compounds	Yes	—	Not Significant	—	Not Significant
Surface water quantity	Surface water quantity	Increase in surface water flows	Yes	—	—	—	Not Significant
		Decrease in surface water flows	Yes	—	Not Significant	—	Not Significant
		Change in lake levels	—	—	—	—	—

Table 8.0-1: Summary of the Determination of Significance in Revised EIS (continued)

Discipline or Component	Valued Components (VCs)	Indicators	Residual Adverse Effects	Significant Effects			
				Site Preparation and Construction	Operations	Closure	Post-closure
Groundwater quality	Groundwater quality	Concentrations of indicator compounds	—	—	—	—	—
Groundwater quantity	Groundwater quantity	Decrease in groundwater elevations in private water wells	—	—	—	—	—
Wildlife and wildlife Habitat	Wildlife Species at Risk	Common Nighthawk	Yes	Not Significant	Not Significant	Not Significant	—
		Northern Myotis/Little Brown Myotis	Yes	Not Significant	Not Significant	Not Significant	—
		Barn Swallow	Yes	Not Significant	Not Significant	Not Significant	—
	Ungulates	Moose	Yes	Not Significant	Not Significant	Not Significant	—
	Furbearers	American Marten	Yes	Not Significant	Not Significant	Not Significant	—
		American Beaver	Yes	Not Significant	Not Significant	Not Significant	—
	Upland Birds	Upland birds	Yes	Not Significant	Not Significant	Not Significant	—
	Wetland Birds	Marsh birds	Yes	Not Significant	Not Significant	Not Significant	—
	Small mammals	Small mammals	Yes	Not Significant	Not Significant	Not Significant	—
	Reptiles and amphibians	Reptiles and amphibians	Yes	Not Significant	Not Significant	Not Significant	—
	Invertebrates	Terrestrial invertebrates	Yes	Not Significant	Not Significant	Not Significant	—
Migratory Birds	Upland Birds	Upland birds	Yes	Not Significant	Not Significant	Not Significant	—
	Wetland Birds	Marsh birds	Yes	Not Significant	Not Significant	Not Significant	—
Fish and fish habitat	Stream-resident fish population	Direct loss or alteration of habitat	Yes	Not Significant	—	—	—
		Changes in flows or water levels	—	—	—	—	—
		Changes in water quality	—	—	—	—	—
		Blasting	—	—	—	—	—
	Migratory fish populations	Direct loss or alteration of habitat	—	—	—	—	—
		Changes in flows or water levels	—	—	—	—	—
		Changes in water quality	—	—	—	—	—
		Blasting	—	—	—	—	—

Table 8.0-1: Summary of the Determination of Significance in Revised EIS (continued)

Discipline or Component	Valued Components (VCs)	Indicators	Residual Adverse Effects	Significant Effects			
				Site Preparation and Construction	Operations	Closure	Post-closure
Fish and fish habitat (continued)	Lake-resident fish populations	Direct loss or alteration of habitat	—	—	—	—	—
		Changes in flows or water levels	—	—	—	—	—
		Changes in water quality	—	—	—	—	—
		Blasting	—	—	—	—	—
	Fish species-at-risk	Direct loss or alteration of habitat	—	—	—	—	—
		Changes in flows or water levels	—	—	—	—	—
		Changes in water quality	—	—	—	—	—
		Blasting	—	—	—	—	—
Wetlands and vegetation	Wetlands	Wetland extent	Yes	Not Significant	Not Significant	Not Significant	—
		Wild rice	—	—	—	—	—
		Floating Marsh Marigold (Caltha natans)	—	—	—	—	—
	Vegetation communities and species	Predominantly coniferous forest	Yes	Not Significant	Not Significant	Not Significant	—
		Predominantly coniferous forest	Yes	Not Significant	Not Significant	Not Significant	—
		Successional areas	Yes	Not Significant	Not Significant	Not Significant	—
		Potential berry harvesting areas	Yes	Not Significant	Not Significant	Not Significant	—
Land use	Land use planning and policies	Conflict with accepted land uses as stipulated in approved land use plans.	—	—	—	—	—
		Overlap with protected areas.	—	—	—	—	—
	Aggregate operations	Change in access to aggregate resources.	—	—	—	—	—
		Change in demand of aggregate resources extraction.	—	—	—	—	—
	Forestry	Change in access to forestry resources.	—	—	—	—	—
		Loss of forestry resources.	Yes	Not Significant	Not Significant	Not Significant	Not Significant

Table 8.0-1: Summary of the Determination of Significance in Revised EIS (continued)

Discipline or Component	Valued Components (VCs)	Indicators	Residual Adverse Effects	Significant Effects			
				Site Preparation and Construction	Operations	Closure	Post-closure
Land use (continued)	Mineral exploration	Change in access to mineral claims for exploration and production.	—	—	—	—	—
	Fishing - recreational and commercial	Change in access to fisheries resources.	—	—	—	—	—
		Change in the abundance of fisheries resources.	—	—	—	—	—
		Change in contaminant levels in fish	—	—	—	—	—
		Diminished experience of being on the land.	Yes	Not Significant	Not Significant	Not Significant	Not Significant
	Hunting	Change in access to wildlife resources.	Yes	Not Significant	Not Significant	Not Significant	—
		Change in abundance of wildlife resources.	Yes	Not Significant	Not Significant	Not Significant	—
		Diminished experience of being on the land	Yes	Not Significant	Not Significant	Not Significant	—
	Trapping	Change in access to wildlife resources.	Yes	Not Significant	Not Significant	Not Significant	—
		Change in abundance of wildlife resources.	Yes	Not Significant	Not Significant	Not Significant	—
		Diminished experience of being on the land	Yes	Not Significant	Not Significant	Not Significant	—
	Cottagers and outfitters	Diminished experience of being on the land.	Yes	Not Significant	Not Significant	Not Significant	—
		Change in access to cottage and/or outfitter areas.	—	—	—	—	—
		Changes in clientele for outfitters with lodges located near the Project.	Yes	Not Significant	Not Significant	Not Significant	—

Table 8.0-1: Summary of the Determination of Significance in Revised EIS (continued)

Discipline or Component	Valued Components (VCs)	Indicators	Residual Adverse Effects	Significant Effects			
				Site Preparation and Construction	Operations	Closure	Post-closure
Land use (continued)	Other recreational uses	Change in access for residents and visitors to public lands for non-consumptive purposes	—	—	—	—	—
		Change in access for residents and visitors to public lands for consumptive purposes.	Yes	Not Significant	Not Significant	Not Significant	—
		Change in abundance of berries, mushrooms and/or other vegetation used for consumption	Yes	Not Significant	Not Significant	Not Significant	—
		Diminished experience of being on the land.	Yes	Not Significant	Not Significant	Not Significant	—
Social	Population demographics	Population change	Yes	Not Significant	Not Significant	—	—
	Education	Capacity of education services	Yes	Not Significant	Not Significant	—	—
		Education attainment	Yes	Not Significant	Not Significant	—	—
		Project-specific training	Yes	—	—	Not Significant	Not Significant
	Infrastructure and services	Municipal services	Yes	Not Significant	Not Significant	—	—
		Community services (e.g., health, social services)	Yes	Not Significant	Not Significant	—	—
	Housing and property values	Housing availability	Yes	Not Significant	—	—	—
		Property values	Yes	Not Significant	Not Significant	Not Significant	Not Significant
	Public safety	Crime rate	Yes	Not Significant	Not Significant	Not Significant	Not Significant
		Capacity of emergency services	Yes	Not Significant	Not Significant	Not Significant	—
		Requests for emergency services by Project	Yes	Not Significant	Not Significant	Not Significant	—

Table 8.0-1: Summary of the Determination of Significance in Revised EIS (continued)

Discipline or Component	Valued Components (VCs)	Indicators	Residual Adverse Effects	Significant Effects			
				Site Preparation and Construction	Operations	Closure	Post-closure
Social (continued)	Transportation and traffic	Road network capacity and conditions	Yes	Not Significant	Not Significant	—	—
Economic	Labour force, labour participation and employment	Labour income employment	Yes	—	—	Not Significant	Not Significant
	Income levels	Income levels and categories	Yes	—	—	Not Significant	Not Significant
	Cost of living	Current prevailing cost of living	Yes	—	—	Not Significant	—
	Real estate	Housing prices and affordability	Yes	—	—	Not Significant	—
	Economic development	Municipal taxes and contribution to economic development projects	Yes	—	—	Not Significant	Not Significant
	Existing businesses	Local business availability	Yes	—	—	Not Significant	Not Significant
	Government revenues	Taxes and revenues	Yes	—	—	Not Significant	Not Significant
Human health	Non-Indigenous human health	Subsurface/Construction Worker	—	—	—	—	—
		Outdoor Worker	—	—	—	—	—
		Indoor Worker	—	—	—	—	—
		Site Visitor, or Harvester	—	—	—	—	—
		Resident	—	—	—	—	—
	Indigenous human health	Resident	—	—	—	—	—
		Site Visitor, or Harvester	—	—	—	—	—
		Subsurface/Construction Worker	—	—	—	—	—
		Outdoor Worker	—	—	—	—	—
		Indoor Worker	—	—	—	—	—
Heritage resources	Archaeological sites	Archaeological sites	—	—	—	—	—
	Historic heritage sites	Historic heritage sites	—	—	—	—	—

Table 8.0-1: Summary of the Determination of Significance in Revised EIS (continued)

Discipline or Component	Valued Components (VCs)	Indicators	Residual Adverse Effects	Significant Effects			
				Site Preparation and Construction	Operations	Closure	Post-closure
Aboriginal peoples	Human health	Risk Assessment for Indigenous Human Health	—	—	—	—	—
	Harvesting and gathering of plant material	Wild rice	—	—	—	—	—
		Berry Harvesting	Yes	Not Significant	Not Significant	Not Significant	—
		Medicinal plant harvesting	Yes	Not Significant	Not Significant	Not Significant	—
		Changes in access	Yes	Not Significant	Not Significant	Not Significant	—
		Diminished on-the-land experience	Yes	Not Significant	Not Significant	Not Significant	Not Significant
	Hunting	Ungulates	Yes	Not Significant	Not Significant	Not Significant	—
		Furbearers	Yes	Not Significant	Not Significant	Not Significant	—
		Waterfowl	Yes	Not Significant	Not Significant	Not Significant	—
		Changes in access	Yes	Not Significant	Not Significant	Not Significant	—
		Diminished on-the-land experience	Yes	Not Significant	Not Significant	Not Significant	—
	Trapping	Furbearers	Yes	Not Significant	Not Significant	Not Significant	—
		Changes in access	Yes	Not Significant	Not Significant	Not Significant	—
		Diminished on-the-land experience	Yes	Not Significant	Not Significant	Not Significant	—
	Fishing	Sport fish	—	—	—	—	—
		Baitfish	—	—	—	—	—
		Commercial fishing	—	—	—	—	—
		Changes in access	Yes	Not Significant	Not Significant	Not Significant	—
		Diminished on-the-land experience	Yes	—	Not Significant	Not Significant	Not Significant

Table 8.0-1: Summary of the Determination of Significance in Revised EIS (continued)

Discipline or Component	Valued Components (VCs)	Indicators	Residual Adverse Effects	Significant Effects			
				Site Preparation and Construction	Operations	Closure	Post-closure
Aboriginal peoples (continued)	Cultural and spiritual	Cultural or spiritual sites	—	—	—	—	—
		Traditional Travel routes	—	—	—	—	—
		Diminished on-the-land experience	Yes	Not Significant	Not Significant	Not Significant	Not Significant
	Socio-economic factors	Economic effects	Yes	—	—	Not Significant	Not Significant
		Social effects	Yes	Not Significant	Not Significant	Not Significant	Not Significant

Notes:

(1) The "—" symbol denotes where there were no residual adverse effects predicted as a result of the Project for the VC and indicator

9.0 INDIGENOUS AND PUBLIC ENGAGEMENT

9.1 Interested Parties

Treasury Metals has been in communication with a number of parties, both general public and Indigenous communities, as they relate to the Project. The communities that are in close proximity to the Project site, and the Indigenous communities as designated by the Crown include:

- General Public; and
  - Residents living on Anderson Road / Tree Nursery Road;
  - Residents living on East Thunder Lake Road / Thunder Lake Road;
  - Residents living proximal to Wabigoon Lake / Thunder Lake;
  - Village of Wabigoon; and
  - City of Dryden.
- Indigenous Communities.
  - Wabigoon Lake Ojibway Nation;
  - Eagle Lake First Nation;
  - Naotkamegwanning (Whitefish Bay) First Nation
  - Lac Seul First Nation;
  - Wabauskang First Nation;
  - Grassy Narrows First Nation;
  - Lac des Mille Lacs First Nation;
  - Métis Nation of Ontario;
  - Aboriginal People of Wabigoon; and
  - Grand Council Treaty 3.

9.1.1 General Public

General public concerns and comments have been received by concerned parties making direct contact with Treasury Metals to state their concerns or raise questions about the Project, at public meetings during presentations and question and answer periods, or via concerns presented to government agencies (primarily the CEA Agency) and relayed by the Agency to Treasury Metals. General public inquiries were also addressed by a local Information Center opened by Treasury Metals to inform the public regarding the Project. This center was staffed by Treasury personnel familiar with aspects of the Project; this information center is now closed due to lack of interest within the community.

9.1.1.1 Local Residents

The residents of Anderson Road, Tree Nursery Road, East Thunder Lake Road, Thunder Lake Road, Highway 11/17, those proximal to Wabigoon Lake, and those proximal to Thunder Lake are the parties in closest proximity to the Project. Residents from these locations have interests in the potential for Project related effects and impacts to their health, lifestyle, and economic conditions.

9.1.1.2 Wabigoon/Dryden

The Project site is situated just to the east of the boundary of the City of Dryden and just to the north of the Community of Wabigoon. Given the proximity of the Project to these communities, they have been identified as interested parties in the Project.

9.1.1.2.1 Village of Wabigoon

The Village of Wabigoon has a long history associated with gold mining. Many Wabigoon area families have historical ties to the Goldrock mining activities. Since the closure of the Gold Rock Mines, Wabigoon's employment and economic base has been tied primarily to forestry and tourism.

9.1.1.2.2 City of Dryden

The City of Dryden also has some early ties to gold mining with mines operating just south of the City of Dryden and Wabigoon Lake in the Larson Bay / Contact Bay area during the early part of the 20th Century. However, the mainstay of Dryden's economy has been the forest industry. Until recently, the mill complex in Dryden included pulp and paper operations, paper converting and a sawmill; along with the associated woodlands operations. Recent closures of the sawmill, followed by the paper machines and converting facility have left the complex with a pulp mill only and significantly reduced employment in the Dryden area. Reduced employment opportunity has resulted in numerous people having to relocate away from the Wabigoon / Dryden area. This, in turn, has adversely affected the retail sector as well as real estate values in the area.

9.1.1.3 Participation of Government Agencies

Treasury Metals has received guidance in the development of the Project from both the Federal and Provincial governments. The primary source of direction from the Government of Canada has been the CEA Agency. In addition to the EA guidelines for the Project being provided by the Agency, the Agency has provided ongoing direction to Treasury Metals throughout the EIS process. The CEA Agency also coordinates aspects of the EIS process with other Federal agencies and facilitates interaction between Treasury Metals and other Federal agencies as may be required.

On a Provincial level, the MNDM have provided a "one window" approach to the Project on behalf of Ontario. MNDM also facilitates interactions between Treasury Metals and other Provincial ministries as necessary. In order to keep all relevant government agencies abreast of the Project two "Interagency" meetings have occurred.

Interagency meetings took place on October 25, 2012 and March 25, 2014 with participants joining by video link from the MNDM offices in Thunder Bay and the MNRF offices in Dryden. Others who could not participate from these locations joined via teleconference. An interagency site visit was conducted on September 24, 2014, wherein Federal and Provincial representatives were provided an overview and update of the Goliath Gold Project as well as a tour of the site with an emphasis on where specific infrastructure is proposed to be placed.

9.1.2 Indigenous Communities

Treasury Metals, as part of this revised EIS, has made further efforts to elicit and engage all the Indigenous communities as designated by the Crown. The Indigenous communities have been disaggregated to provide clear and concise documentation surrounding concerns and comments associated with each community. Treasury Metals' efforts to engage and how it has addressed concerns are fully documented within Section 9 of the revised EIS, and within Appendix DD – Indigenous Engagement Report.

9.1.2.1 Wabigoon Lake Ojibway Nation

Wabigoon Lake Ojibway Nation is the First Nation in closest proximity to the Goliath Gold Project site. It is located on the shores of Dinorwic Lake approximately 45 km east of Dryden, Ontario and approximately 25 km from the Goliath Gold Project site, via Highway 17 and Wabigoon Lake Ojibway Nation Road. There is unrestricted access between Dinorwic Lake and Wabigoon Lake allowing the residents of Wabigoon Lake Ojibway Nation unrestricted access into Wabigoon Lake for fishing and other traditional Indigenous activities.

Treasury Metals has history of communications with Wabigoon Lake Ojibway Nation beginning in 2008. Contacts have included telephone conversations, emails, letters, and in-person meetings. Topics discussed have included information about the Project, commercial discussions, Traditional Knowledge Study, training, potential impacts and effects of the Project, and potential employment and business opportunities associated with the Project. As of writing Treasury has provided a significant amount of documentation to Wabigoon Lake Ojibway Nation regarding Project effects and development. Further to this Treasury Metals has taken part in cultural training provided by the Wabigoon Lake Ojibway Nation and a community open house to present the Project and speak directly to effects, environmental aspects, and mitigation strategies related to the Project. These aspects are part of Treasury Metals' continuing efforts to determine traditional land use practices, and gather concerns regarding the development from Wabigoon Lake Ojibway Nation.

Wabigoon Lake Ojibway Nation received Project information and EIS-related materials, and has received additional material as it relates to the revised EIS and engagement activities to date.

9.1.2.2 Eagle Lake First Nation

Eagle Lake First Nation is located on the northeast shore of Eagle Lake, approximately 25 km west southwest of Dryden. Travelling by road (Highway 17/Highway 594/Highway 502) ELFN is located approximately 50 km from the site of the Project.

Treasury Metals has had ongoing contact with ELFN since 2009. Treasury has shared information about Treasury Metals and the Project with ELFN Chief and Council, lands and resource staff and with community elders. Topics discussed have included information about the Project, Traditional Knowledge Study, training, potential impacts and effects of the Project, and potential employment and business opportunities associated with the Project. Treasury Metals has been in ongoing communications with ELFN in regards to presenting the revised material supporting the EIS including recent community meetings directly related to the impacts and effects of the Project.

9.1.2.3 Whitefish Bay First Nation

Whitefish Bay First Nation is located on the east side of Lake of the Woods close to the community of Sioux Narrows. By road (Highway 17 / Highway 71), Whitefish Bay First Nation is located slightly more than 200 km from the proposed Project site. Treasury Metals is aware that Whitefish Bay First Nation holds commercial fishing licenses on Thunder Lake and Wabigoon Lake.

Treasury has been in contact with WBFN since November of 2012. Communication with WBFN has included sharing Project-related information, meeting scheduling, employment opportunities, business opportunities, and presentation of information regarding environmental impacts and effects due to the Project. Further to this Treasury Metals attended the Natural Resource Career and Education Fair to support Whitefish Bay First Nation educational opportunities and jobs within natural resource fields. Treasury Metals has been in ongoing communications with WBFN in regards to presenting material related to the environmental impacts and effects of the Project to Chief and Council and a community open house.

9.1.2.4 Lac Seul First Nation

Lac Seul First Nation lies on the shores of Lac Seul approximately 40 km from the community of Sioux Lookout and over 100 km by road from the Project site. By road (Highway 17/Highway 72/Highway 664), it is approximately 105 km from the community of Frenchman's Head on Lac Seul Reserve to the Project site.

Treasury Metals has been in contact with LSFN since June of 2012. Treasury has participated in Career Fairs at Lac Seul First Nation, most recently in April 2017. Topics have included Career Fair participation, contracting opportunities, and initial discussion regarding Project impact and effects. Treasury Metals has been in ongoing communications with LSFN in regards to presenting

the revised material supporting the EIS, and speaking to the environmental impacts and effects of the Project. In conjunction to this Treasury has provided a significant amount of documentation to LSFN regarding Project effects and development.

9.1.2.5 Wabauskang First Nation

Wabauskang First Nation lies on the shores of Wabauskang Lake, approximately 38 km south of Ear Falls, Ontario. By road (Highway 17 - Highway 105), Wabauskang First Nation is located approximately 135 km from the Goliath Gold site. Wabauskang First Nation noted that some Wabauskang First Nation members live in the Wabigoon Dryden area. Further to this, Wabauskang First Nation historically held traditional lands located on the Wabigoon River system, proximal to the community of Quibell.

Although Wabauskang First Nation is located some distance from the Project site, Treasury has been in contact with WFN with respect to the Project since November of 2012. Topics of the discussion during meetings have included details about the Project, employment opportunities, training, financial opportunities, and environmental impact and effects of the Project. In conjunction to this Treasury has provided a significant amount of documentation to WFN regarding Project effects and development.

As part of the development of the Project a WFN based contractor (Makoose Forest Products) has been a supplier of the wooden core boxes required for the storage of drill core samples associated with Treasury's Goliath Project. Treasury Metals as part of current drill activities has reengaged Makoose Forest Products.

9.1.2.6 Grassy Narrows First Nation

Grassy Narrows First Nation is located 80 km to the northeast of Kenora. By road (Highway 17 and Highway 671) Grassy Narrows is approximately 240 km from the Project site. This community is downstream from the Project site. During the 1960’s and 1970’s, Grassy Narrows First Nation was adversely impacted by mercury contamination of the Wabigoon River that has been attributed to discharges from the pulp and paper mill in Dryden. Engagement with Grassy Narrows First Nation began in 2012. Treasury Metals has provided a significant amount of documentation to Grassy Narrows First Nation regarding Project effects and development.

9.1.2.7 Lac des Mille Lacs First Nation

Lac des Mille Lacs First Nation is comprised of two separate reserve lands located 185 kilometers and 145 kilometers to the southeast of the Project.

Engagement with Lac des Mille Lacs First Nation was initiated in 2017 following a request for information by Lac des Mille Lacs First Nation on April 5, 2016 and the formal listing of engagement needs with Lac des Mille Lacs First Nation on Dec 7, 2016. Lac des Mille Lacs First Nation has expressed concerns regarding the overall environmental impact of the Goliath Gold

Project, impacts to economic and cultural pursuits and the practice of traditional activities. Treasury Metals has been in ongoing communications with Lac des Mille Lacs First Nation in regards to presenting the revised material supporting the EIS. In conjunction to this, Treasury Metals has provided a significant amount of documentation to Lac des Mille Lacs First Nation regarding Project effects and development.

9.1.2.8 Métis Nation of Ontario

The members of the Métis Nation of Ontario do not live in a specific community but reside in various locations throughout the region. The closest regional office of the Northwest Métis Council is located in Dryden.

Treasury Metals has been in contact with the MNO with respect to the Project since June of 2009. Topics of discussion with Métis Nation of Ontario include meeting scheduling, Memorandum of Understanding (MOU), Traditional Knowledge study, consultation scope and budget, employment opportunities, event funding requests, and environmental impacts and effects of the Project. As of December 2017, the MNO and Treasury Metals have signed an MOU together and the MNO in response to these discussions and in accordance with the MOU document is currently undertaking a Traditional Knowledge Study for the Project site. Preliminary information from this study has been shared with Treasury Metals.

Further to this Treasury Metals have had continued discussions as it relates to communication protocols in addition to ongoing communications with the MNO in regards to presenting the revised material supporting the EIS and Project development. In conjunction to these efforts Treasury Metals has provided a significant amount of documentation to the MNO regarding Project environmental effects and development.

9.1.2.9 Aboriginal People of Wabigoon

Engagement with the Aboriginal People of Wabigoon began in March 2013. In response to a request from Treasury Metals, the Aboriginal People of Wabigoon provided information about their organization and of the Aboriginal People of Wabigoon in May and June of 2013. Treasury Metals has continued to provide the Aboriginal People of Wabigoon with documentation supporting the development of the Goliath Project. Treasury Metals has been in ongoing communications with the Aboriginal People of Wabigoon in regards to presenting the revised material supporting the EIS and Project development. In conjunction to this, Treasury Metals has provided a significant amount of documentation to the Aboriginal People of Wabigoon regarding Project effects and development.

9.1.2.10 Grand Council Treaty #3

The Grand Council Treaty #3 represents 28 First Nation communities, including those identified for engagement on the Project. Contact between Treasury Metals and Grand Council Treaty #3 began in 2009.

In July 2015, the Agency responded to a letter from Grand Council Treaty #3 that acknowledged a Grand Council Treaty #3 comment that Treaty #3 First Nations could potentially be impacted by the Project. The Agency went on to say that the CEA Agency would continue to consult directly with Treaty #3 First Nations, and if Grand Council Treaty #3 desired to act on behalf of all of the First Nations, formal written communications to that effect would be required from each of the First Nations. Subsequent to the above noted communications, Treasury has included Grand Council Treaty #3 in communications. Treasury Metals is working cooperatively with Grand Council Treaty #3 to support discussions regarding the Project's technical merit and associated traditional land use practices with all designated communities.

9.1.2.11 Other Indigenous Organizations

Treasury Metals has also been in contact with other Indigenous community organizations regarding the Project including:

- Sioux Lookout Area Aboriginal Management Board;
- Dryden Native Friendship Centre;
- Fort William First Nation;
- Seven Generations Education Institute;
- Ontario Coalition of Aboriginal People; and
- Kwayaciiwin Education Resource Centre.

9.2 General Public Engagement

Owing to the proximity of the Project site to residents and the communities of Wabigoon and Dryden, the mine site and vicinity are well known to local residents. The mine site is located within a few kilometers of the Trans-Canada Highway and is accessed by existing gravel roads. Much of the proposed mine site consists of old homesteads and private residences that have been purchased by Treasury Metals. A number of other privately owned properties including vacant land, homes and small hobby farms are located nearby.

Additionally, many people in the local area are familiar with the site due to the presence of the former tree nursery operated by the Ministry of Natural Resources and Forestry, which is located to the north of the proposed mine site. This tree nursery was operated by the Ontario government from the early 1960's until the late 1990's and provided employment to many local residents. Following closure of the tree nursery by the MNRF, the facility was sold to a private consortium of tree seedling producers. This consortium operated the facility for a very short period and the tree nursery then sat empty and idle for a number of years prior to its purchase by Treasury Metals in 2010. Treasury Metals is currently using this facility for office and warehousing and anticipates continued use of the facility during construction and operation of the Project.

The local residents and communities of Wabigoon and Dryden have provided significant input towards the Project and the prominent design features associated with the development. The local community has provided support to the Project, noting the potential economic benefit. However, the community has also expressed concerns associated with risks to human health, and to the physical and biological environment. These concerns have been brought forward to Treasury Metals through verbal and written communication with those residents located closest to the Project (Anderson Road, Tree Nursery Road, East Thunder Lake Road, Thunder Lake Road etc.) and as communicated to Treasury Metals though meetings and presentation opportunities within the local communities of Wabigoon and Dryden. In addition to concerns brought forward directly to Treasury Metals, comments have been presented to government representatives (CEA Agency) as part of the EIS review process. These comments have been captured within the information request process, and have been responded to in full.

9.2.1 Measures to Address General Public Concerns

Details as to how public concerns are to be address is included throughout the EIS as referenced below:

- Water Management
  - Treasury has made alterations (Section 3.15, Section 3.16) to the overall water management strategy at the Goliath Gold Project. Water has been defined as key valued components by both public and Indigenous stakeholders.
  - The general approach to water management for the Project will be to conserve the maximum amount in order to limit the volume of water taken and subsequently returned to the environment. To the extent practicable, the water management program is designed to
    - Minimize effluent discharge volumes by way of maximizing recycling of process water.
    - Create a reliable source for any required makeup water.
    - Provide appropriate effluent discharge characteristics for release into the natural environment.
    - Ensure the long-term safety of area resources through all phases of development.
- Surface Water Quality
  - Treasury Metals has committed to discharging to PWQO guidelines for the protection of aquatic life (or background).
  - Treasury Metals is proposing the use of in-plant cyanide destruction prior to discharge to the TSF, and the use of reverse osmosis (or equivalent) for final effluent treatment prior to discharge to Blackwater Creek.
  - Treasury is committed to working with local water users including the City of Dryden to ensure surface water quality viability.

- Surface water quality will be monitored as per regulatory needs and commitments made in Section 13.8.3.

- Surface Water Quantity
  - Treasury Metals will implement additional adaptive measures to reduce the risk of erosion, in addition to mitigation measures identified in Section 13.9.4.
  - The Project will employ best practices that will assist in a reduction and mitigate surface water quantity effects, which are outlined in Section 13.9.4.
  - Treasury Metals intends to provide the surface water quantity monitoring results as part of the annual follow-up program report provided to government agencies, Indigenous peoples and stakeholders.
- Groundwater Quality
  - The monitoring program for groundwater quality is described in the EIS and is designed to confirm if actual drawdown and changes in groundwater quality follow the predicted pattern, and provide sufficient time for corrective action if necessary. The results of the groundwater follow-up monitoring program will be reviewed and reported to the MOECC on an annual basis
  - Groundwater quality will be monitored as per regulatory needs, and follow-up monitoring commitments made in Section 13.10.3.3
- Groundwater Quantity
  - Treasury Metals will continue to collect baseline information as it relates to private wells, and water supply characteristics of local users, this information will be incorporated as part of the monitoring program
  - In the event that groundwater drawdown affects the ability of existing wells to supply the required volumes of water Treasury Metals will develop suitable replacement of private water supply (e.g., deepening of existing water wells, drilling of new water wells, installation of cistern and supply of potable water)
  - Financial assurance will be provided to MNDM to deepen neighbouring residential wells, if required, as part of Project start-up approvals.
- Fish and Fish Habitat
  - The Project will require a Fisheries Act authorization and will likely require Treasury Metals to mitigate the losses of fish habitat that it causes as a condition of that authorization. Typically, the offsetting involves the creation of new habitat or the enhancement of existing habitat that is commensurate with the habitat losses. The Fisheries Act authorization, which is issued by DFO,will detail the offsetting measures to be completed and, typically will also specify follow-up monitoring to be conducted. DFO uses a letter of credit to provide a financial assurance mechanism in the event that an offsetting plan is not completed. It should be noted that the completion of the offsetting plan is accompanied by consultation with both Indigenous and public

stakeholders to ensure that the communities concerns are mitigated to the best manner possible.

- Management plans associated with fish and fish habitat are provided in Section 12.10, further to the management plan, follow-up monitoring aspects associated with fish and fish habitat can be referenced in Section 13.14.3.
- Treasury Metals intends to provide the fish and fish habitat Follow-up program results as part of the annual follow-up program report provided to government agencies, Indigenous peoples and stakeholders.

- Wildlife
  - Follow-up monitoring requirements for wildlife from a regulatory perspective will be required under the SARA and ESA and will only assess SAR species and habitat. Additionally, Treasury Metals will implement a wildlife and wildlife habitat Follow-up program to verify the accuracy of the EIS, as well as to verify that the mitigation measures outlined in Section 6.12.5 are effective. This follow-up program will include all VCs presented in Table 6.12.9-1.
  - Treasury Metals will initiate identified mitigation measures noted in Section 13.12.4.
  - Treasury Metals intends to provide the wildlife and wildlife habitat monitoring results, including for SAR, as part of the Annual Follow-up program report provided to government agencies, Indigenous peoples and stakeholders.
- Noise
  - The Project will employ best practices that will help reduce and mitigate noise effects including:
    - Blasting conducted in phased manner that optimizes the amount of explosives needed for a given area to be blasted, the amount of explosives detonated for a given time delay within the detonating procedure and that minimizes the area being blasted.
    - Where potential effects of vibration to spawning shoals is identified, blasting practices will be adjusted to mitigate the effects.
    - Advise nearby residents of significant noise-causing activities, such as blasting, and endeavour to schedule those events to reduce disruption to residents.
    - Conduct heavy equipment activity between the hours of 07:00 and 22:00, if possible, to reduce the noise effects to neighbouring residents.
    - Material will be loaded into haul trucks in a manner that minimizes the drop height from the loader or excavator to the bed of the truck.
    - Ensure that all internal combustion engines are fitted with appropriate muffler systems.
  - Current design incorporate waste rock storage area and overburden piles as noise berms to Project. In addition to this reclamation efforts will be progressive on waste

rock pile though operation leading to additional noise barriers to potential receptors of noise.

- Noise management is described in Section 12.6, and follow-up monitoring is described in Section 13.4.3.

- Air Quality
  - The Project will employ best practices that will help reduce and mitigate air quality effects including:
    - Blasting will be conducted in a phased manner that optimizes the amount of explosives needed for a given area to be blasted, and that minimizes the area being blasted. Modern blasting methods used in mining are designed to direct the energy from the blasts into the rock. This reduces the amount of blasting agents required to achieve the desired blast objectives, and ultimately reduces the amount of dust generated. The dust generated from modern blasting result primarily from the physical impact of the displaced rock. The proposed blasting at the Project will likely be restricted to once per day, and only a few days during each week [Mit_029, Mit_043].
    - Material will be loaded into haul trucks in a manner that minimizes the drop height from the loader or excavator bucket to the bed of the truck (or equivalent bed height as material is loaded into the truck) [Mit_031].
    - Ensure that all internal combustion engines are properly maintained and all emission control systems (e.g., diesel particulate filters) are in good working order [Mit_044].
    - Best management practices plan for dust will be implemented on the site to provide specific directions for operators. A draft Best Practices Plan for Dust was included as part of Appendix J to the EIS. Water and chemical suppressants will be used for dust control on the haul roads is used at the mine site, when temperatures are above freezing [Mit_046].
  - Air emissions from mining operations are regulated through the ECA for air and noise, issued by the MOECC. Treasury Metals intends to provide a summary of the air quality follow-up monitoring results for all the measured parameters as part of the annual follow-up program report provided to government agencies, Indigenous peoples and stakeholders on an annual basis.

- Blasting Impacts
  - Blasting will be conducted in a phased manner that optimizes the amount of explosives needed for a given area to be blasted, and that minimizes the area being blasted. Modern blasting methods used in mining are designed to direct the energy from the blasts into the rock. This reduces the amount of blasting agents required to achieve the desired blast objectives, and ultimately reduces the amount of dust generated. The dust generated from modern blasting result primarily from the physical impact of the displaced rock. The proposed blasting at the Project will likely be restricted to once per day, and only a few days during each week [Mit_029, Mit_043].

- Access
  - Treasury Metals has noted continued access to resources is a primary concern of Indigenous communities. Treasury Metals is committed to working with Indigenous communities to define traditional land use aspects within the Project area, and define a suitable procedure for safe access to these resources;
  - Treasury Metals will establish and enforce traffic safety protocols, regulatory and cautionary signage, road maintenance and emergency response plans on all Project roads to prevent collisions and accidents.
  - Management plans associated with traffic are described in Section 12.15.
- Closure, Reclamation, and Post-Closure
  - Closure aspects are discussed in Section 3.14, and 3.16.9.
  - Closure of the Project will be governed by the *Ontario Mining Act* (the Act) and its associated regulations and codes. The Act requires that a detailed Closure Plan be filed for any mining Project before the Project is initiated. Financial assurance is required before any substantive development takes place to ensure that funds are in place to carry out the closure plan.
- Acid Rock Drainage and Acid Generation
  - Mitigation measures associated with acid rock drainage and the geochemical environment are presented in Section 13.3.4; and
  - Follow-up monitoring components associated with the geochemical condition of the Project and are presented in Section 13.3.3 inclusive of pit lake monitoring, and further geochemical analysis of the Project.
- Cyanide
  - Cyanide use and the management of cyanide in an operational capacity are captured within Section 3.6.1, Section 3.6.5, and Section 3.6.6.
  - Proper use and handling within the cyanide management plan is described in Section 12.5.
- Human Health
  - As part of the development of the Project a more detailed risk assessment may be completed using site-specific receptors based on communication with Indigenous and public stakeholders, exposure parameters including bioavailability assessments, and revised toxicity data will be incorporated into this assessment.
  - As described in Section 12.0 and Section 13.0, the mitigation measures put in place to avoid effects to geology and geochemistry, air quality, surface water quality and groundwater quality all have a benefit to avoiding adverse effects to human health noting that no potential risk in exceedance of Health Canada and MOECC risk benchmarks are anticipated as a result of the Project.

- Training and Education
  - Treasury is committed to develop and implement employment practices that give preference to local and regional labour where possible, including Indigenous communities;
  - Treasury Metals as part of development of the Project will engage local educational institutions to build local capacity in support of the Project; and
  - Treasury will promote the participation of local Indigenous and public residents in the economic activities of the Project, multiple skill category/level training including on the job training will be provided.
- Commercial, Employment/Job Opportunities
  - Current mitigation measures relating employment opportunities include that of:
    - Local hiring (employment and business practices that give preference to local and regional labour to the extent possible, including to Indigenous communities);
    - Workforce and education needs development (development of training policies and programs).
- Social Implications, Socio-economic Impact
  - Treasury Metals will develop follow-up programs with input from government agencies, Indigenous peoples and local stakeholders, to verify the effectiveness of the mitigation measures presented in Section 6.17.5, and monitor the extent of the positive and negative residual effects presented in Section 6.17.6.
  - Treasury Metals intends to provide the social follow-up monitoring results as part of the Annual Follow-up program report provided to government agencies, Indigenous peoples and stakeholders on an annual basis.

9.3 Indigenous Community Engagement

Within the EIS Guidelines, it is stated that “proponent will ensure that it engages with Aboriginal people and groups that may be affected by the Project or that have potential to impact established Aboriginal and Treaty rights and related interests in the project area”. The Guidelines also direct the proponent to document public and Indigenous concerns in the EIS and identify and explain, as part of its analysis of the Project, all unresolved questions or concerns of the public or Indigenous communities. The CEA Agency and the MNDM provided direction to Treasury Metals to which specific Indigenous communities that the company was to engage with. Treasury Metals has been in contact with all of the Indigenous communities identified by MNDM and the Agency.

Throughout engagement with the Indigenous communities listed in Section 9.1.2 of the EIS Executive Summary, a number of concerns have been identified by each community that Treasury Metals has strived to address.

9.3.1 Measures to Address Concerns

Details as to how Indigenous concerns are to be addressed is included throughout the EIS. Further to this, specific responses, as captured within engagement, are presented within Section 9 of the revised EIS and within Appendix DD – Indigenous Engagement Report. Mitigation and measures to address concerns, as noted, are referenced below. Further aspects of management plans are described in Section 12, and follow-up program requirements are described in Section 13.

- Aboriginal and Treaty Rights
  - Aboriginal and Treaty Rights has been defined within this assessment as the ability to harvest traditional resources through activities including hunting, trapping, fishing and gathering. In addition, Aboriginal rights may also entail a range of cultural, social, political, and economic rights including the right to practice one's own culture and to establish treaties. Treasury Metals has acknowledged that the Project may infringe upon Indigenous communities' ability to practice Aboriginal and Treaty Right activities, and has proposed mitigation measures, including design improvements to limit these effects.
- Engagement Process
  - Treasury Metals is committed to continued engagement with Indigenous and public stakeholders. Treasury Metals continues to solicit input for the Project and this document is not intended to reflect an end-point to engagement efforts associated with the Goliath Gold Project. Treasury Metals is committed to working with Indigenous communities to echo the values of the communities within the design parameters of the Project and their incorporation on the federal and provincial environmental assessments, and subsequent engineering studies.
- Traditional Land Use Impacts and Incorporation
  - TKLU aspects have been captured as part of the document noting primary information collection, and current secondary sources that have been used to supplement information as seen in Section 5.1 to 5.13 of the EIS, and in turn reflected within Sections 6.21 and 6.22 of the document which speak to effects to Indigenous peoples. Treasury Metals as stated is working to continue to validate these TKLU aspects, and it is of Treasury Metals opinion TKLU aspects have been captured and reflected within the documentation.
  - Treasury continues to reach out to all communities to provide further validation of the current documented information regarding traditional land use practices by the communities. Treasury continues to log and note concerns from all community members, Elders, and leaderships to ensure the capture of values in proximity to the Project.
- Cultural, Ceremonial, and Spiritual Land Use;

- Avoidance and mitigation measures will be put in place, as part of the Archaeological and Cultural Heritage Resource Management Plan (Section 12.11) to respond to archaeological and cultural resources that may be encountered in the execution of the Project.
- These would include the following:
  - If previously undocumented archaeological resources should be discovered, the person discovering the resources must stop alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (I) of the Ontario Heritage Act. Further to this Treasury Metals will inform all Indigenous communities of the newly discovered resources.
  - If human remains are discovered, alteration of the site must stop and the person making the discovery must immediately notify the police, or coroner, and the Registrar of cemeteries, at the Ministry of Consumer Services, as required under the Cemeteries Act, R.S.O. 1990 c.C.4 and the Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 (when proclaimed in force).
- Project-specific traditional knowledge as it relates to cultural, spiritual, and ceremonial sites will be reflected as part of continuing Project development. Treasury Metals is committed to continue to engage with Indigenous communities to define suitable procedures as it relates to respecting and protecting these values. Treasury Metals as noted in Section 9.10 gathered Project-specific traditional knowledge and land use information for the Project.

- Water Management
  - Treasury has made alterations (Section 3.15, Section 3.16) to the overall water management strategy at the Goliath Gold Project. Water has been defined as key valued component by both public and Indigenous stakeholders.
  - The general approach to water management for the Project will be to conserve the maximum amount in order to limit the volume of water taken and subsequently returned to the environment. To the extent practicable, the water management program is designed to:
    - Minimize effluent discharge volumes by way of maximizing recycling of process water.
    - Create a reliable source for any required makeup water.
    - Provide appropriate effluent discharge characteristics for release into the natural environment.
    - Ensure the long-term safety of area resources through all phases of development.

- Surface Water Quality
  - Treasury Metals has committed to discharging to PWQO guidelines for the protection of aquatic life (or background).
  - Treasury Metals is proposing the use of in-plant cyanide destruction prior to discharge to the TSF, and the use of reverse osmosis (or equivalent) for final effluent treatment prior to discharge to Blackwater Creek.
  - Treasury is committed to working with local water users including the City of Dryden to ensure surface water quality viability.
  - Surface water quality will be monitored as per regulatory needs, and commitments made in Section 13.8.3.
- Surface Water Quantity;
  - Treasury Metals will implement additional adaptive measures to reduce the risk of erosion, in addition to mitigation measures identified in Section 13.9.4.
  - The Project will employ best practices that will assist in a reduction and mitigate surface water quantity effects, which are outlined in Section 13.9.4.
  - Treasury Metals intends to provide the surface water quantity monitoring results as part of the annual follow-up program report provided to government agencies, Indigenous peoples and stakeholders.
- Groundwater Quality
  - The monitoring program for groundwater quality is described in the EIS and is designed to confirm if actual drawdown and changes in groundwater quality follow the predicted pattern, and provide sufficient time for corrective action if necessary. The results of the groundwater follow-up monitoring program will be reviewed and reported to the MOECC on an annual basis.
  - Groundwater quality will be monitored as per regulatory needs, and follow-up monitoring commitments made in Section 13.10.3.
- Groundwater Quantity
  - Treasury Metals will continue to collect baseline information as it relates to private wells, and water supply characteristics of local users, this information will be incorporated as part of the monitoring program.
  - In the event that groundwater drawdown affects the ability of existing wells to supply the required volumes of water Treasury Metals will develop suitable replacement of private water supply (e.g., deepening of existing water wells, drilling of new water wells, installation of cistern and supply of potable water).
  - Financial assurance will be provided to MNDM to deepen neighbouring residential wells, if required, as part of Project start-up approvals.

- Fish and Fish Habitat
  - The Project will require a Fisheries Act authorization and will likely require Treasury Metals to mitigate the losses of fish habitat that it causes as a condition of that authorization. Typically, the offsetting involves the creation of new habitat or the enhancement of existing habitat that is commensurate with the habitat losses. The Fisheries Act authorization, which is issued by DFO, will detail the offsetting measures to be completed and, typically will also specify follow-up monitoring to be conducted. DFO uses a letter of credit to provide a financial assurance mechanism in the event that an offsetting plan is not completed. It should be noted that the completion of the offsetting plan is accompanied by consultation with both Indigenous and public stakeholders to ensure that the communities concerns are mitigated to the best manner possible.
  - Management plans associated with fish and fish habitat are provided in Section 12.10, further to the management plan, follow-up monitoring aspects associated with fish and fish habitat can be referenced in Section 13.14.3.
  - Treasury Metals intends to provide the fish and fish habitat follow-up program results as part of the annual follow-up program report provided to government agencies, Indigenous peoples and stakeholders.
- Wildlife
  - Follow-up monitoring requirements for wildlife from a regulatory perspective will be required under the SARA and ESA, and will only assess SAR species and habitat. Additionally, Treasury Metals will implement a wildlife and wildlife habitat follow-up program to verify the accuracy of the EIS, as well as to verify that the mitigation measures outlined in Section 6.12.5 are effective. This follow-up program will include all VCs presented in Table 6.12.9-1.
  - Treasury Metals will initiate identified mitigation measures noted in Section 13.12.4.
  - Treasury Metals intends to provide the wildlife and wildlife habitat follow-up monitoring results, including for SAR, as part of the Annual Follow-up program report provided to government agencies, Indigenous peoples and stakeholders.
- Noise
  - The Project will employ best practices that will help reduce and mitigate noise effects including:
    - Blasting conducted in phased manner that optimizes the amount of explosives needed for a given area to be blasted, the amount of explosives detonated for a given time delay within the detonating procedure and that minimizes the area being blasted.
    - Where potential effects of vibration to spawning shoals is identified, blasting practices will be adjusted to mitigate the effects.

- Advise nearby residents of significant noise-causing activities, such as blasting, and endeavour to schedule those events to reduce disruption to residents.
- Conduct heavy equipment activity between the hours of 07:00 and 22:00, if possible, to reduce the noise effects to neighbouring residents.
- Material will be loaded into haul trucks in a manner that minimizes the drop height from the loader or excavator to the bed of the truck.
- Ensure that all internal combustion engines are fitted with appropriate muffler systems.

o Current designs incorporate waste rock storage area and overburden piles as noise berms to Project. In addition to this reclamation efforts will be progressive on waste rock pile though operation leading to additional noise barriers to potential receptors of noise; and

o Noise management is described in Section 12.6, and follow-up monitoring is described in Section 13.4.3.

- Air Quality

o The Project will employ best practices that will help reduce and mitigate air quality effects including:

- Blasting will be conducted in a phased manner that optimizes the amount of explosives needed for a given area to be blasted, and that minimizes the area being blasted. Modern blasting methods used in mining are designed to direct the energy from the blasts into the rock. This reduces the amount of blasting agents required to achieve the desired blast objectives, and ultimately reduces the amount of dust generated. The dust generated from modern blasting result primarily from the physical impact of the displaced rock. The proposed blasting at the Project will likely be restricted to once per day, and only a few days during each week [Mit_029, Mit_043].
- Material will be loaded into haul trucks in a manner that minimizes the drop height from the loader or excavator bucket to the bed of the truck (or equivalent bed height as material is loaded into the truck) [Mit_031].
- Ensure that all internal combustion engines are properly maintained and all emission control systems (e.g., diesel particulate filters) are in good working order [Mit_044].
- Best management practices plan for dust will be implemented on the site to provide specific directions for operators. A draft Best Practices Plan for Dust was included as part of Appendix J to the EIS. Water and chemical suppressants will be used for dust control on the haul roads is used at the mine site, when temperatures are above freezing [Mit_046].

- Air emissions from mining operations are regulated through the ECA for air and noise, issued by the MOECC. Treasury Metals intends to provide a summary of the air quality follow-up monitoring results for all the measured parameters as part of the annual follow-up program report provided to government agencies, Indigenous peoples and stakeholders on an annual basis.

- Blasting Impacts
  - Blasting will be conducted in a phased manner that optimizes the amount of explosives needed for a given area to be blasted, and that minimizes the area being blasted. Modern blasting methods used in mining are designed to direct the energy from the blasts into the rock. This reduces the amount of blasting agents required to achieve the desired blast objectives, and ultimately reduces the amount of dust generated. The dust generated from modern blasting result primarily from the physical impact of the displaced rock. The proposed blasting at the Project will likely be restricted to once per day, and only a few days during each week [Mit_029, Mit_043].
- Access
  - Treasury Metals has noted continued access to resources is a primary concern of Indigenous communities. Treasury Metals is committed to working with Indigenous communities to define traditional land use aspects within the Project area, and define a suitable procedure for safe access to these resources.
  - Treasury Metals will establish and enforce traffic safety protocols, regulatory and cautionary signage, road maintenance and emergency response plans on all Project roads to prevent collisions and accidents.
  - Management plans associated with traffic are described in Section 12.15.
- Tailings Storage Facility
  - Tailings storage facility design is captured within Section 3.7.
  - The objective of the tailings storage facility, from an environmental perspective, is to ensure protection of the environment during operations and in the long-term (after closure), and to achieve effective reclamation at mine closure.
  - Further to this the overall tailings management plan is described in Section 12.4, with dam safety aspects described in Section 12.14.
- Cumulative Effects
  - Cumulative effects as currently determined for designated valued components are presented within Section 7.0. Further to this the description of Project effects are assessed in Section 6.0.
- Closure, Reclamation, and Post-Closure
  - Closure aspects are discussed in Section 3.14, and 3.16.9.

- Closure of the Project will be governed by the *Ontario Mining Act* (the Act) and its associated regulations and codes. The Act requires that a detailed Closure Plan be filed for any mining Project before the Project is initiated. Financial assurance is required before any substantive development takes place to ensure that funds are in place to carry out the closure plan.

- Climate Change
  - As a focus of Project design Treasury Metals has focused on reducing its overall carbon footprint and minimizing to the extent practicable GHG emissions; mitigation measures are identified in Section 13.7.4.
  - As a regulatory requirement under of Section 46 of the *Canadian Environmental Protection Act*, Treasury Metals will report the findings of the GHG emissions calculation on an annual basis to the ECCC. In addition, Treasury Metals intends to provide the GHG calculation results as part of the annual follow-up program report provided to government agencies, Indigenous peoples and stakeholders.
- Acid Rock Drainage and Acid Generation
  - Mitigation measures associated with acid rock drainage and the geochemical environment are presented in Section 13.3.4.
  - Follow-up monitoring components associated with the geochemical condition of the Project and are presented in Section 13.3.3 inclusive of pit lake monitoring, and further geochemical analysis for the Project.
- Mercury Usage;
  - Mercury is not an active component within Goliath Gold Project operational needs, although, as with virtually all rock types, it is present in trace amounts within the geochemical makeup of the host rock of the deposit. Further to this Treasury Metals intends to conduct supplemental ML/ARD static testing analysis to further assess mercury as a contaminant of potential concern.
  - Mercury will be treated as a component within the effluent of the Project, to ensure the health of downstream environment and ecosystem.
  - Monitoring of mercury in fish flesh would be undertaken in accordance with MMER Environmental Effects Monitoring protocols.
- Cyanide
  - Cyanide use and the management of cyanide in an operational capacity are captured within Section 3.6.1, Section 3.6.5, and Section 3.6.6.
  - Proper use and handling within the cyanide management plan is described in Section 12.5.
- Waste Disposal
  - Waste disposal in an operational capacity is captured within Section 3.10.

- Hazardous material management is described in Section 12.17, and the waste management plan is described in Section 12.2.

- Human Health
  - As part of the development of the Project a more detailed risk assessment may be completed using site-specific receptors based on communication with Indigenous and public stakeholders, exposure parameters including bioavailability assessments, and revised toxicity data will be incorporated into this assessment.
  - As described in Section 12.0 and Section 13.0, the mitigation measures put in place to avoid effects to geology and geochemistry, air quality, surface water quality and groundwater quality all have a benefit to avoiding adverse effects to human health noting that no potential risk in exceedance of Health Canada and MOECC risk benchmarks are anticipated as a result of the Project.

- Social Implications, Socio-economic Impact
  - Treasury Metals will develop follow-up programs with input from government agencies, Indigenous peoples and local stakeholders, to verify the effectiveness of the mitigation measures presented in Section 6.17.5, and monitor the extent of the positive and negative residual effects presented in Section 6.17.6.
  - Treasury Metals intends to provide the social follow-up monitoring results as part of the Annual Follow-up program report provided to government agencies, Indigenous peoples and stakeholders on an annual basis.

- Training and Education
  - Treasury is committed to develop and implement employment practices that give preference to local and regional labour where possible, including Indigenous communities
  - Treasury Metals as part of development of the Project will engage local educational institutions to build local capacity in support of the Project.
  - Treasury will promote the participation of local Indigenous and public residents in the economic activities of the Project, multiple skill category/level training including on the job training will be provided.

- Commercial, Employment/Job Opportunities
  - Current mitigation measures relating employment opportunities include that of:
    - Local hiring (employment and business practices that give preference to local and regional labour to the extent possible, including to Indigenous communities)
    - Workforce and education needs development (development of training policies and programs).

- Treasury Metals is committed to hire locally (Cmt_003), and purchase locally (Cmt_004).
- Treasury Metals intends to work with Indigenous communities and the public to identify services located locally including those related to construction and operation of the Project.
- Treasury Metals intends to provide the economic follow-up monitoring results as part of the Annual Follow-up program report provided to government agencies, Indigenous peoples and stakeholders on an annual basis.

- Accidents and Malfunctions
  - The potential for accidents and malfunctions including those related to a possible tailings storage failure are captured in Section 4.0 of the EIS.
- Commercial Agreements
  - Treasury Metals is committed to continuing engagement with Indigenous communities, and is open to commercial discussions.
- Follow-up Monitoring
  - Follow-up monitoring aspects for the Project are described within Section 13.0 of the EIS. Treasury Metals is committed to operating within the regulatory parameters as defined by the Crown, and as identified in this EIA.
  - Further to this and as defined by commercial components Treasury Metals is continuing discussions with Indigenous communities as part of the establish of an environmental committee to review follow-up monitoring components, and potentially participate in activities.
  - All of the applicable follow-up programs that encompass effects to Indigenous peoples from the Project will be reported either to required government agencies as part of regulatory reporting, or within the Annual Follow-up program report that will be provided to government agencies, Indigenous peoples and stakeholders.

9.4 Outstanding Indigenous and General Public Concerns

Treasury has attempted to provide answers to questions relating to the development of the Goliath Mine, and to respond to expressed concerns regarding potential environmental effects likely to arise from mine development, operation and closure. In one form or another, concerns have been expressed regarding a wide range of topics, as listed below.

- Aboriginal and Treaty Rights;
- Engagement process;
- Traditional land use impacts and incorporation;
- Cultural, ceremonial, and spiritual land use;

- Water management;
- Surface water quality;
- Surface water quantity;
- Groundwater quality;
- Groundwater quantity;
- Fish and fish habitat;
- Wildlife;
- Noise;
- Air quality;
- Blasting impacts;
- Access;
- Tailings storage facility;
- Cumulative effects;
- Closure, reclamation, and post-closure;
- Acid rock drainage and acid generation;
- Mercury usage;
- Cyanide;
- Waste disposal;
- Human health;
- Social implications, socio-economic impact;
- Training and education;
- Commercial, employment/job opportunities;
- Accidents and malfunctions;
- Commercial agreements; and
- Monitoring.

In responding to these concerns, Treasury Metals has attempted to document measures proposed or considered to avoid or minimize adverse Project-related effects that relate to these concerns. Of particular note have been concerns expressed by the Agency, or the Indigenous communities, regarding the incorporation of traditional knowledge and traditional land and resource use data, potential adverse effects to traditional land and resource use, and the engagement process itself.

Traditional knowledge and traditional land and resource use aspects, that have been communicated to date, have been captured as part of this updated EIS, noting primary source information collection, as well as secondary source information used to supplement primary source data. These materials are provided in Sections 5.1 to 5.13 of the EIS, and were used in Sections 6.21 and 6.22 to help determine likely effects to traditional land and resource use by Indigenous peoples. Treasury Metals as stated is continuing to work to validate these traditional knowledge and traditional land and resource use aspects, and continues to reach out to all communities in an effort to share any further information regarding traditional land use practices. Treasury Metals also believes that it has been successful in informing the communities of Project details, environmental impacts and effects, and current activities on site. In conjunction to this Treasury Metals has been engaged in commercial discussions with Wabigoon Lake Ojibway Nation, and initial discussions have been brought forward, post-original EIS, with other Treaty #3 First Nations. Treasury Metals has secured a MOU with the Métis Nation of Ontario. This MOU is designed to foster a cooperative and productive ongoing relationship between the MNO and Treasury Metals and to assess any potential impacts of the Project on the MNO citizens.

As such, the information presented in this document is not intended to reflect an end-point to engagement efforts associated with the Goliath Gold Project, and it is recognized that further efforts are still required. Having said this, Treasury Metals is of the opinion that a sufficient understanding of traditional land and resource use has been gained to allow for a reasoned determination of the likely effects of the Project on the natural and human use environments to allow the EA process to move to the next stage of more detailed technical review. During this more detailed technical review stage Treasury Metals will continue with further engagement efforts, focused particularly on those involving Indigenous communities.

A complete listing of all contacts made by Treasury relating to Public participation is included in Appendix V. The Aboriginal Engagement Report is included as Appendix DD to the revised EIS.

10.0 COMMITMENTS AND MITIGATION MEASURES SUMMARY

At the request of the Agency, a summary of the effects assessment by discipline and Project phase has been provided in Table 6.23-1 of the main body of the EIS, which depicts the linkages between the Project effects and commitments and mitigation measures. To facilitate the review of the EIS and the tracking of delivery on these commitments and mitigation measures during the life of the Project, each commitment and mitigation measure has been given a unique reference number. These reference numbers have been inserted into the text of the EIS where applicable.

A summary of the commitments and mitigation measures is provided in Table 10.0-1 and Table 10.0-2, respectively. These summaries provide a complete list of each commitment and mitigation measure currently planned by Treasury Metals. As the assessment process continues to advance, Treasury Metals understands that additional commitments and mitigation measures may be identified and requested within the EA process, as well as through engagement with Federal and Provincial governments, Indigenous communities, and public stakeholders, and that any such additional commitments and mitigations will be added to Tables 10.0-1 and 10.0-2, at appropriate intervals, as the EA process progresses.

As part of the ongoing assessment process for the Goliath Gold Project, Treasury Metals has developed a series of key commitments that will be reported on in accordance with the Federal EIS guidelines (Table 10.0-1). Treasury Metals takes these commitments very seriously, and for this reason, commitments are focused on specific measurable items that are relevant, and will stand up over the life of the Project.

Once commitments are made, they cannot be easily withdrawn or adapted to reflect changing conditions. Therefore, specific mitigation measures incorporated into the assessment of Project effects have not been identified individually as commitments per se to ensure flexibility within the Project for incorporating new and evolving technologies. To help track mitigation measures relied on in the EIS, each of the mitigation measures identified in the EIS has been assigned a unique identifier, which is referenced throughout the EIS when mitigation measures are listed. A full listing of all individual mitigation measures is provided in Table 10.0-2. These mitigation measures are listed separate from the commitments listed in Table 10.0-1, as the mitigation measures establish a level of control to be achieved, while affording flexibility to adapt to the conditions encountered as the Project advances, as well as adapting to allow the adoption of new technologies and standards as they become available. This approach allows for adaptive management within the Project, which supports the concept of continuous improvement.

Table 10.0-1: Commitments for the Project

Commitment Identifier	Commitment
Cmt_001	Treasury will continue to document all comments, issues, or concerns raised by stakeholder groups. All input Treasury receives will be duly considered and acted upon according to the nature of the input received.

Table 10.0-1: Commitments for the Project (continued)

Commitment Identifier	Commitment
Cmt_002	Treasury will follow CEAA protocols in distributing the EIS document for review, including posting for Notice of Public Information Events for Project updates to stakeholder groups.
Cmt_003	Treasury will maintain a local hiring policy, including First Nation communities. The application of this policy is dependent upon the skills and workforce being available locally.
Cmt_004	Treasury will maintain, where applicable, a local purchasing policy to purchase goods and services from local suppliers. This policy has the expectation that goods and services will be purchased locally assuming price, delivery and service is competitive with outside suppliers.
Cmt_005	Treasury will maintain an active safety program aimed at protecting worker safety ensured by meeting applicable occupational health and safety legislation standards, as well as utilizing other best practices. Employee involvement will be a cornerstone of the safety plans, policies and programs.
Cmt_006	All workers and visitors will receive an orientation and safety training prior to conducting work on site. This will include a health and safety overview.
Cmt_007	All health and safety policies and procedures will be reviewed annually.
Cmt_008	Emergency response procedures will be established. All incidents will be reported as per the applicable standards set with the health and safety policies and procedures.
Cmt_009	All vehicles will maintain an emergency kit including communication equipment, first aid kit, and a fire extinguisher where appropriate.
Cmt_010	All chemicals used at the site will have a Material Safety Data Sheet (MSDS) for safe use, relevant regulatory and safety requirements in place and PPE available for use at all times.
Cmt_011	All buildings will meet fire protection requirements and codes. Fire drills will occur on a regularly scheduled basis. All new workers, contractors and visitors will receive a safety orientation which will include a fire response training
Cmt_012	Treasury will continue to engage with Aboriginal communities and groups through the life of the project.
Cmt_013	Ditching and drainage will be designed to collect and manage runoff from site, and will be established around stockpiles. All collection ponds will be integrated with the site water management plan.
Cmt_014	All chemicals on site will be stored according to government regulations and industry best practices. Spill protection systems will be designed according to industry best practices.
Cmt_015	All chemical spills within the processing plant, or chemical storage areas will be controlled through provision of secondary containment as appropriate. Spills of potentially hazardous materials during transport, or from on-site material storage and handling facilities will be managed. Measure will be taken to prevent and clean up any hydrocarbon spills (and other spills) at source to ensure such materials do not enter the surrounding natural environment where practical.
Cmt_016	In the event of a spill, it will be reported according to Ministry of Environment and Climate Change (MOECC) protocols.
Cmt_017	Best management practices for dust control will be implemented. A plan will be prepared to identify all potential sources of dusts, outline mitigation methods to employ, and detail all records and inspections required by regulatory officials. Treasury will monitor air emissions through implementation of current industry standards to meet regulatory requirements (Ontario Reg. 419/05, AAQC, MOECC).
Cmt_018	Treasury will design the operation to meet noise emission regulatory requirements (NPC-103, MOECC)
Cmt_019	Treasury will consult local stakeholders throughout Project life to ensure the Company is aware of general or specific concerns the public may have. A formal public complaint logging and feedback system will be implemented when plant construction commences. This system will be in place for the life of the mine.
Cmt_020	Dangerous wildlife awareness will be part of the site's safety program. Safety training will be provided to workers to raise awareness and to assist in protecting them from injury. Food waste will be managed in a manner that limits contact/attraction of potentially dangerous wildlife.

Table 10.0-1: Commitments for the Project (continued)

Commitment Identifier	Commitment
Cmt_021	Road-killed animals or any other carcasses found on-site will be removed in a timely and legal manner to limit the attraction of wildlife.
Cmt_022	Tailings Storage Facility (TSF) will be constructed to meet all regulatory requirements and industry best practices standards as described within the Provincial Lake and Rivers Improvement Act. TSF will be designed and constructed to withstand the probable maximum flood and maximum credible earthquake. A remedial action plan will be developed as part of the emergency management plan, and environmental management plan with appropriate government agencies, in the event of a dam breach.
Cmt_023	Groundwater monitoring wells will be installed across Project site (as described in Section 13 and Appendix M).
Cmt_024	Environmental monitoring will be conducted in accordance with standard practice and regulatory requirements, including any site –specific environmental approvals (Water Resources Act (Section 34, Section 53), PWQG, ODWS, NPC-103, and NPC-119).
Cmt_025	A blasting schedule and plan will be developed to notify the public when blasting will occur and to describe all blasting activities on site. This plan will be developed though consultation with local stakeholders and regulatory officials.
Cmt_026	All personnel who handle explosive will be checked to ensure they have the required certified training. All un-authorized or non-essential personnel will be restricted from access to blasting sites, and storage facilities.
Cmt_027	Operational procedures for all unit operations and jobs will be implemented to ensure worker safety and prevent operational upsets and equipment failure due to improper use, Accountability systems will be in place to deal with procedural violations. All operational procedures will be reviewed annually.
Cmt_028	All operational and maintenance procedures will be reviewed annually and revised if required to reflect changes that may have occurred.
Cmt_029	A “progressive change management” system will be implemented to ensure that any material changes to operations, maintenance or engineering go through a formal review process to ensure that the possibility of injury, environmental incidents, equipment damage and production interruptions are minimized to the greatest extent possible.
Cmt_030	A list of environmental management plan commitments made during the environmental assessment process will be maintained indicating: • The nature of the commitment • To whom (e.g., public, agency) the commitment was made, if specific • Whether the commitment is addressed or linked to a regulatory instrument such as regulation or environmental approval • Any applicable timeline associated if any • Status of the commitment • Additional actions required to fulfill the commitment
Cmt_031	Environmental aspects and potential impacts of the project will be managed within an environmental management plan (EMP) which integrates environmental performance with overall project management.
Cmt_032	Implementation and maintenance of the EMP will be driven by Treasury commitment to environmental compliance and regulatory needs. Workers will be educated on Treasury’s commitment to environmental excellence and environmental policies.
Cmt_033	EMP will be reviewed annually using a precautionary and progressive approach considering changing circumstances which could affect the suitability of monitoring and effectiveness of the goals of the EMP.

Table 10.0-1: Commitments for the Project (continued)

Commitment Identifier	Commitment
Cmt_034	During operations, effluent discharged from the Project to Blackwater Creek will meet the Provincial Water Quality Objectives (PWQO) for the parameters listed below, or background concentrations if background levels are above the PWQO. Where there is no PWQO for a parameter, the commitment will be to meet the Canadian Water Quality Guidelines (CWQG). For total mercury, the commitment will be that effluent discharged to Blackwater Creek will meet background concentrations for that watercourse. Background concentrations for Blackwater Creek are defined as the 75th percentile in accordance MOECC receiving water assessment policy. Detailed parameters will be determined through engagement with appropriate Provincial and Federal regulatory bodies.
Cmt_035	• Aluminum • Antimony • Arsenic • Beryllium • Boron (total) Cadmium
Cmt_035	All final effluent discharge points will have control structures to immediately cease discharge if and when necessary.
Cmt_036	All final effluent and point source air discharge points will be sampled and results reported to the appropriate authorities in accordance with environmental permit requirements.
Cmt_037	Progressive reclamation of mine waste rock area will be undertaken, where practical, once maximum height has been reached.

Table 10.0-2: Summary of Mitigation Measures

Mitigation Identifier	Mitigation Description
Mit_001	Reduce the overall height of the constructed features to the extent possible.
Mit_002	Construct WRSA and overburden stockpiles with an overall a 3:1 (horizontal to vertical) side slope to maintain a more natural appearance.
Mit_003	Initiate construction of the WRSA from the western edge
Mit_004	Vegetate the western facing side of the WRSA as soon as practicable.
Mit_005	Vegetate of the overburden stockpile as soon as practicable
Mit_006	Decommission the low-grade ore (LGO) stockpile at the end of operations
Mit_007	Overburden materials (clay, sand or organic material) stripped during the site preparation and construction phase will be placed in the overburden stockpiles located directly to the south of the proposed open pits.
Mit_008	Progressively construct a perimeter ditch and seepage collection system around the operations area to capture and direct all runoff from the site to the water management system.
Mit_009	Equipment will be maintained in good working order and inspected regularly
Mit_010	Re-fueling of equipment will be done in a manner to limit the potential for spills
Mit_011	Fuel will be stored in a lined, contained area.
Mit_012	Fueling vehicles will be parked in a concrete lined area when not in use.
Mit_013	Emulsion explosives will be stored and dispensed in a lined, contained area
Mit_014	Trucks used for the delivery of emulsion explosives will be parked in a concrete lined area when not in use.
Mit_015	Processing plant area will be lined and equipped with runoff and seepage collection

Table 10.0-2: Summary of Mitigation Measures (continued)

Mitigation Identifier	Mitigation Description
Mit_016	LGO stockpile will be equipped with runoff and seepage collection
Mit_017	Activities on the overburden stockpiles will be minimized and the stockpiles left undisturbed until closure activities are underway.
Mit_018	The WRSA will be capped with a low permeability cover, then a layer of overburden, then vegetated during closure.
Mit_019	Waste rock will be evaluated and segregated between PAG and NAG rock, if feasible
Mit_020	The PAG waste rock would be placed in the mined out areas of the open pit, to the extent practical.
Mit_021	During operations, tailings will be maintained in saturated conditions, and a water cover will be maintained over the majority of the TSF to prevent the onset of acidification.
Mit_022	The open pit will be allowed to flood at closure
Mit_023	Tailings within the TSF will be isolated using either a low permeability dry cover, or a wet cover of non-process water. The preferred option for limiting environmental effects is a wet cover.
Mit_024	The pit lake will be monitored as it is filling to determine whether batch treatment will be required to ensure the water meets PWQO, or background if background levels exceed the PWQO, prior to the discharge from the pit lake to a tributary of Blackwater Creek.
Mit_025	Heavy equipment activity will be conducted between the hours of 07:00 and 22:00, if feasible
Mit_026	Endeavor to schedule noise causing events, such as blasting, to reduce disruption to residents.
Mit_027	Advise nearby residents of significant noise-causing activities, such as blasting.
Mit_028	All internal combustion engines will be fitted with appropriate muffler systems
Mit_029	Implement a modern blasting program that minimizes the blast area, the overall amount of explosives required, and through detonating procedures, minimize the amount of explosives per delay.
Mit_030	Adjust blasting practices if effects of vibration to spawning shoals is identified
Mit_031	Material will be loaded into haul trucks in a manner that minimizes the drop height from the loader or excavator bucket to the bed of the truck
Mit_032	The WRSA and overburden stockpile will be situated to act as noise berms where possible
Mit_033	In the event that complaints lead to the identification of specific sources of concern, source-specific abatement such as noise walls, berms, or operational restrictions will be employed, as appropriate.
Mit_034	Activities during the site preparation and construction phase will generally occur during the daytime. If there are times when lighting is required to ensure the safety of the workers, portable lighting will be used in required areas only.
Mit_035	Portable lighting will be directed downward
Mit_036	The higher Lux illumination levels (>80) will be placed within the process plant and mine infrastructure buildings, which contains the process and electrical equipment.
Mit_037	All externally mounted luminaires and their associated lamps will be designed to meet the requirements and recommendations of the Canadian Electrical Code (CEC), and the Building Code of Ontario.
Mit_038	External light fixtures will be installed at a tilt angle of 45º
Mit_039	Cut off angles for external lightings will be designed to minimize the off-site light trespass
Mit_040	Nighttime illumination will not be provided at the tailings storage facility (TSF).
Mit_041	Nighttime illumination will only be provided in the open pit when required. Portable lighting will be used in these situations.
Mit_042	Activities during the closure phase will generally occur during the daytime. If there are times when lighting is required to ensure the safety of the workers, portable lighting will be used in required areas only.
Mit_043	Blasting will likely be restricted to once per day, and only a few days per week.

Table 10.0-2: Summary of Mitigation Measures (continued)

Mitigation Identifier	Mitigation Description
Mit_044	All internal combustion engines will be properly maintained and all emission control systems (e.g., diesel particulate filters) will be kept in good working order.
Mit_045	Water and chemical suppressants will be used for dust control on the haul roads at the mine site when temperatures are above freezing
Mit_046	Best management practices plan for dust control will be implemented on the site during site preparation and construction, operations and closure.
Mit_047	The Project will utilize the 115 kV transmission line adjacent to the Project
Mit_048	The WRSA will be located immediately to the north of the open pit
Mit_049	Placing the overburden storage area immediately to the south of the open pit to reduce the haul distances.
Mit_050	Project design incorporates a compact footprint.
Mit_051	Perimeter runoff and seepage collection systems will be constructed around the TSF.
Mit_052	The drawdown zone of the dewatering process will capture all seepage that bypasses the seepage collection systems and will report to the open pit.
Mit_053	During operations, excess water not required in the process will be treated to concentrations that meet Provincial Water Quality Objectives (PWQO) or Canadian Water Quality Guidelines (CWQG) for the protection of aquatic life, or background if background levels exceed the PWQO, prior to discharging to Blackwater Creek. In the case of mercury, effluent will be treated to meet the background concentrations in Blackwater Creek.
Mit_054	Industry standard erosion and sediment controls, such as sediment traps within ditches, will be implemented during the site preparations and construction phase.
Mit_055	There will be no discharges to surface water during the closure phase.
Mit_056	During closure, the site will be graded such that runoff from the operations area will be directed to the open pit during closure and post-closure phases.
Mit_057	Effectively manage water collected on-site using constructed storage facilities, reducing the need for fresh water withdrawals and discharges of treated water.
Mit_058	An engineered structure, designed to dissipate flows and avoid erosion, will be constructed to discharge effluent during operations into Blackwater Creek.
Mit_059	Fresh water takings from tree nursery irrigation ponds on Thunder Lake Tributaries 2 and 3 will not exceed 5% of the flow entering the ponds
Mit_060	Once the open pit has been filled, excess water from the open pit will be passively released through an engineered spillway into the existing channel of Blackwater Creek Tributary 1.
Mit_061	The process will employ a thickener to help recover cyanide solution from the tailings for reuse in processing. The resulting tailings will then be treated using the SO_2-air process to reduce cyanide in the tailings directed to the TSF so as to meet MMER requirements over a long-term basis.
Mit_062	The floor of the TSF will be a low-permeability layer capable of achieving seepage rates that ensure receiving surface water quality is equivalent to baseline, or meet PWQO. The liner would be comprised of natural material, or if necessary, an HDPE liner laid over a prepared basin of sand or comparable material.
Mit_063	Deepen those wells where the drawdown affects the wells ability to provide the required supply.
Mit_064	Financial assurance would be provided to the MNDM as required and applicable as per regular permitting processes to ensure maintenance and provision of neighbouring residential wells
Mit_065	Minimized the amount of habitat clearing required for the Project by siting Project infrastructure, to the extent practicable, in previously disturbed areas and optimizing the use of existing roadways.
Mit_066	Develop slope dependent vegetated buffers along rivers creeks and wetlands in conjunction with the MNRF. Buffers should be 120 m, wherever feasible.
Mit_067	Timber clearing will be conducted outside the breeding bird window (May 1 to August 15).

Table 10.0-2: Summary of Mitigation Measures (continued)

Mitigation Identifier	Mitigation Description
Mit_068	Closure activities should include revegetation with species suitable for the development of habitats capable of supporting a diversity of wildlife species.
Mit_069	Enforcement of speed limits within the Project area
Mit_070	Minimize disturbing areas with suitable bird breeding habitat, where practicable.
Mit_071	Wildlife awareness training for all staff will be provided including SAR identification/legislation and education regarding seasonal changes in animal behaviour and their presence.
Mit_072	Disposal of food waste generated on site will be done in an appropriate manner
Mit_073	Clearing of potential terrestrial reptile and amphibian breeding habitats will be restricted to periods outside the breeding season as directed by MNRF
Mit_074	Develop a wetland clearing strategy with the local MNRF to reduce the effects to overwintering frogs (i.e. draining wetlands to discourage hibernation).
Mit_075	If habitat destruction / damage cannot be avoided, alternate nesting habitat will be provided as a provision of compensatory habitat for species protected under the ESA
Mit_076	Acceptable buffers will be provided around all raptor nests identified throughout all Project phases
Mit_077	Prior to overburden removal, any beaver dams within the Project footprint will be removed and the impoundments will be allowed to draw down.
Mit_078	Activities and the construction of Project components that will impact or overprint watercourses will occur during the fisheries timing window when in-stream work is permitted.
Mit_079	To the extent practicable, fish in the sections of Blackwater Creek Tributary 1 that will be isolated by the construction of the perimeter ditch and overprinted by the removal of overburden from the open pit will be captured and relocated to the same tributary downstream from the operations area, or to the main branch of Blackwater Creek.
Mit_080	To the extent practicable, fish in the sections of Blackwater Creek Tributary 2 that will be isolated by the construction of the perimeter ditch and overprinted by the construction of the TSF and minewater pond will be captured and relocated to the same tributaries downstream from the operations area, or to the main branch of Blackwater Creek.
Mit_081	Pump intakes in the irrigation ponds at the former MNRF tree nursery will be fitted with fish screens to prevent entrainment.
Mit_082	As the Project advances, detailed engineering will be completed to ensure that all downstream culverts can support any predicted increases in flows and maintain current levels of fish passage.
Mit_083	Provide offsetting of fisheries habitat losses as part of the authorization required under the Fisheries Act.
Mit_084	Retention of forested areas wherever feasible.
Mit_085	Identify and protect the locations of any known SAR or provincially significant plant.
Mit_086	Broadcast spraying of herbicides will be avoided
Mit_087	Revegetation of final grade slopes around the open pit to encourage the development of riparian habitats.
Mit_088	Reclamation of mining footprints to be carried out in accordance with O.Reg. 240/00.
Mit_089	Seeding or hydro-seeding of the reclaimed areas with native seed mix.
Mit_090	Minimize crown land in the Project footprint
Mit_091	Minimize activities on the eastern portion of the Project property.
Mit_092	During the operating life of the Project, no access will be permitted to the operations area for security and safety reasons. Access to the former MNRF tree nursery will be controlled. Aboriginal peoples will be able to arrange for accompanied access to these areas with Treasury Metals. Appropriate signage will be placed around areas where access is limited.

Table 10.0-2: Summary of Mitigation Measures (continued)

Mitigation Identifier	Mitigation Description
Mit_093	Implement a Communications Management Plan to address ongoing engagement with potentially affected stakeholders and Aboriginal groups throughout the life of the Project. The plan should include a framework for a transparent grievance process.
Mit_094	Treasury Metals will undertake additional land and resources use studies to ensure a pre-construction baseline of the land and resource users as supported by local communities.
Mit_095	Develop a Socio-Economic Management Plan to help ensure commitments are implemented, adverse socio-economic effects are minimized, results are monitored, and effects are adaptively managed.
Mit_096	Continue to collect additional traditional land use information for the Project area through meetings and traditional land use studies to identify areas of plant gathering, hunting, trapping, fishing, and cultural activities.
Mit_097	Contract security services to help promote a secure and safe worksite environment
Mit_098	Incorporate strategies and actions to aid residents following closure in the Socio-Economic Management Plan.
Mit_099	Treasury Metals will establish and enforce traffic safety protocols, regulatory and cautionary signage, road maintenance and emergency response plans on all Project roads to prevent collisions and accidents.
Mit_100	Ongoing engagement with potentially affected Aboriginal peoples throughout the life of the Project.
Mit_101	Ongoing engagement with potentially affected stakeholders throughout the life of the Project.
Mit_102	Treasury Metals will undertake an update of the socio-economic baseline to establish a pre-construction baseline of the affected communities prior to commencing the Project site preparation and construction
Mit_103	Employment preference will be given to local and regional labour where possible, including Aboriginal and non-Aboriginal communities. This will be dependent upon the skills and workforce being available locally.
Mit_104	Develop training and job transfer policies to support workforce development in the socio-economic study area
Mit_105	Develop training programs for unemployed and under employed residents and non-workers
Mit_106	Treasury Metals will communicate appropriate information (e.g., the timing and communities in which new residents may locate) to the school district(s) to assist with their resource planning process.
Mit_107	Treasury Metals will communicate education requirements needed for employment on the site.
Mit_108	Treasury Metals will work with specific affected homeowners to ensure that their concerns about potential Project-related effects are addressed.
Mit_109	Treasury Metals will work with local and regional governments to minimize the effects of in-migration and out-migration where possible.
Mit_110	Treasury will work with public safety services to develop safety and work policy guidelines for mine workers, including a policy of no alcohol or drugs onsite and policies and guidelines to support a respectful work environment.
Mit_111	Incorporate strategies and actions to help local agencies monitor community wellbeing and take corrective actions where appropriate.
Mit_112	Treasury Metals will engage the Local Services Board in Wabigoon to acquire Tree Nursery Road in its entirety from north of Normans Road.
Mit_113	Treasury Metals will approach MTO to discuss recommendations presented within the transportation study (Appendix E to the Revised EIS) regarding the snow plow turn-around for Anderson Rd. and Highway 17.
Mit_114	Treasury Metals will approach MTO to discuss recommendations presented within the transportation study (Appendix E to the Revised EIS) regarding the need for lighting at the Anderson Rd. and Highway 17 intersection.
Mit_115	Treasury Metals will approach MTO to discuss recommendations presented within the transportation study (Appendix E to the Revised EIS) regarding clearing of shrubbery, trees, soil mounds, etc. that could cause a visual obstruction for vehicles using the Anderson Rd. and Highway 17 intersection.

Table 10.0-2: Summary of Mitigation Measures (continued)

Mitigation Identifier	Mitigation Description
Mit_116	Treasury will maintain, where applicable, a local purchasing policy to purchase goods and services from local suppliers. This policy has the expectation that goods and services will be purchased locally assuming price, delivery and service is competitive with outside suppliers.
Mit_117	Revegetation of the WRSA and TSF will be done using species that are not traditionally used for medicinal purposes, or for consumption, and would deter these types of plants from growing.
Mit_118	Leave a 50 m buffer zone around remaining watercourses within the Project area.
Mit_119	If previously undocumented archaeological resources are discovered, the person discovering the resources will stop alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (I) of the Ontario Heritage Act.
Mit_120	If human remains are discovered, alteration of the site will stop and the person making the discovering will immediately notify the police, or coroner, and the Registrar of cemeteries, at the Ministry of Consumer Services, as required under the Cemeteries Act, R.S.O. 1990 c.C.4 and the Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 (when proclaimed in force).
Mit_121	Restrict activities and development within 300 m of major water sources and within 300 m of historical travel routes, to only those areas where an archeological assessment has been completed.
Mit_122	Do not allow new ground altering activities to occur in areas where an archaeological assessment has not been completed. Once an archaeological assessments has been completed ground altering activities.
Mit_123	At closure, continue training opportunities to help residents to increase their competitiveness and chances to get employment elsewhere
Mit_124	Once the pit lake is fully flooded, it is expected that the monitoring of the water quality in the pit lake will continue for a period of time to determine whether additional batch treatment may be required to ensure the water released from the pit lake meets effluent release limits.
Mit_125	Spills will be contained and the soil remediated in accordance with the Emergency and Spills Response Management Plan.
Mit_126	Prior to construction activities, Treasury Metals will engage with the local trapping council, Indigenous communities and the MNRF to prepare a plan for the removal of nuisance wildlife (i.e., beaver) within the Blackwater Creek watershed.
Mit_127	There will be no drinking water wells installed on the Project during the operations, closure, or during the portion of the post-closure phase when monitoring is required to confirm performance of the reclamation landscape..
Mit_128	MOECC Fish consumption advisories for Thunder Lake and Wabigoon Lake will be adhered to.
Mit_129	Project workers and site visitors will receive sufficient risk protection from direct contact with soil and water and/or dust inhalation via the implementation of PPE and requirement for suitable clothing.
Mit_130	Access to the waste rock storage area (WRSA) and the tailings storage facility (TSF) during operations and closure will be restricted to those workers with the required health and safety training and personal protective equipment (PPE).

11.0 BENEFITS TO CANADIANS

The effects assessment of the Project, provided in Section 6, used the methodical approach consistent with the EIS Guidelines to determine the residual effects of the Project. The residual effects remaining, after avoidance and mitigation measure are in place, can be further categorized into positive or negative effects. Those effects identified as being positive are considered benefits to Canadians. The positive effects identified in Section 6 were all related to the human environment.

Public comments and input regarding the Project, received through engagement and consultation activities, highlighted concerns regarding significant local and regional declines in employment and population. Employment has largely decreased due to downsizing and permanent closures of paper machines and sawmilling capacity in the forestry industry (Appendix CC). The Project will have a positive effect on the local economy. Employment opportunities arising from the Project may also allow skilled trade workers who left the City of Dryden after downsizing of the Weyerhaeuser/Domtar pulp and paper facilities to return to the region and find employment at the Project. Job opportunities created at the Project will provide an opportunity for youth to stay in the region, and attract new working age migrants. The overall effect of the Project will be felt most within commuting distance from the site (estimated 100 km).

Treasury Metals is committed to hiring locally [Cmt_003], to the extent the requisite skills and workforce are available. Additionally, Treasury Metals are committed to purchasing locally [Cmt_004], assuming price, delivery and service is competitive with outside suppliers. Treasury Metals are also looking to hire and train local Indigenous peoples, and provide business opportunities to Indigenous communities. Where the employment requirements and standards or competitiveness are met, Treasury Metals will look to preferentially select local Indigenous peoples and Indigenous businesses.

To date, Treasury Metals has demonstrated their willingness to follow-through with these commitments through the makeup of its local workforce and its purchasing records. Training, work experience and additional skills gained through involvement in the Project are expected to result in abilities that are transferrable to other economic sectors including forestry and manufacturing. Many of the skills developed while working at the Project will be transferrable to other mining operations and industries, should people either choose to move or be compelled to move post-closure. The skill building associated with the Project will thereby allow the region's economic base to take advantage of other future employment and business opportunities well beyond the life of the Project. Additionally, the Project may help to encourage other mineral development projects in the region, and potentially set Dryden up as a support service and supply hub for other similar regional exploration and mining projects.

A summary of the identified benefits to Canadians is provided in Table 11.0-1 below.

Table 11.0-1: Benefits to Canadians

Discipline	VCs	Benefit to Canadians
Land Use	Cottagers and Outfitters	Outfitters may experience an increase in clientele related to the need for accommodations, which could be viewed as a positive economic effect to the outfitter.
Aboriginal Peoples	Labour Force, Labour Participation and Employment	During the construction and operations phases of the Project, there will be a demand for trained workers, and training opportunities will be available locally and regionally.
	Business Opportunities	The demand for services at the mine site will generate opportunities for Indigenous business and joint-venture enterprises
	Generalized socio-economic Effects	The demand for employees, goods and services will increase in the general study area during the construction and operations phases, creating employment and business spin-off benefits to Indigenous communities.
Economic Factors	Labour Force, Labour Participation and Employment	Site preparation and construction and operations will create a demand for workers, and increase employment and labour income in the Project area.
	Income Levels	During site preparation and construction and operations, employment from the Project will increase the labour income in the Project area.
	Real Estate	During the site preparation and construction and operations phases, workers moving into the Project area may cause an increase in the demand for housing, and therefore affect real estate prices.
	Economic Development	During site preparation and construction and operations, employment and purchasing from the Project will increase government tax revenues, which could be used for local development.
	Existing Businesses	During site preparation and construction and operations, the Project will increase the Project area demand for goods and services from local businesses. This could be direct purchasing by Treasury Metals, or by the Project employees.
	Government Revenues	During site preparation and construction and operations, there will be an increase in government revenues through the payment of Project-related business and employment taxes.
Social	Education	Treasury Metals will provide opportunity for training and education opportunities for unemployed and under-employed residents and non-resident workers. It is anticipated that any increase in training would be able to be accommodated within existing education and training facilities.
	Housing and Property Values	There is potential for a noticeable increase in property values with increased income levels.

12.0 ENVIRONMENTAL MANAGEMENT PLANS

Environmental Management Plans (EMP) act as a tool to manage adverse environmental effects through well-defined measures and controls that are integral components of environmental stewardship. Treasury Metals has developed a conceptual EMP framework that effectively encompasses all environmental aspects of the Project and incorporates each phase of development. This conceptual framework consists of 21 individual management plans that will help to ensure that the Project activities proceed as planned, and that procedures are in place if unforeseen events occur. The EMP framework will provide authentication of Treasury Metals' ongoing environmental commitments and provide performance results to Indigenous peoples and stakeholders. To best allow open communications, share results and receive input on the EMP and Follow-up Programs between Treasury Metals and Indigenous communities, Treasury Metals proposes to form an Environmental Management Committee.

The EMP framework has been designed around the central principles stated within the Company's core environmental policy: demonstrate

- Manage our operations to minimize or eliminate impacts on the environment through use of best management practices and appropriate application of technology;
- Adopt and promote policies specific to protecting the environment;
- Implement measures to ensure the efficient use of resources, energy and materials to minimize environmental impacts through all phases of the operation;
- Ensure compliance with all environmental legislation and regulations;
- Set objectives and put processes in place to continually improve our environmental performance; and
- Curtail operation if necessary to prevent or resolve environmental non-compliance conditions.

In preparing the individual EMPs, pertinent legislation and regulations will be used in developing policies and procedures. The EMPs will be finalized through discussions and input from government agencies, Indigenous peoples and stakeholders. The following lists of 21 EMPs were considered significant environmental aspects of the Project and will be developed as the permitting and approval process for the Project is advanced:

- Project Environmental Management Plan;
- Waste Management Plan;
- Water Management Plan;
- Tailings Management Plan;
- Cyanide Management Plan;

- Noise Management Plan;
- Best Management Practices Plan for Dust;
- Greenhouse Gas Management Plan;
- Wildlife Management Plan;
- Fish Management Plan;
- Archaeological and Cultural Heritage Resource Management Plan;
- Socio-Economic Management Plan;
- Emergency and Spill Response Management Plan;
- Dam Safety Management Plan;
- Transportation and Access Management Plan;
- Mine Rock Management Plan;
- Hazardous Materials Management Plan;
- Fuel Handling and Storage Management Plan;
- Explosives Management Plan;
- Health and Safety Management Plan; and
- Communications Management Plan.

A description of each of the 21 EMPs is provided in Section 12 of the revised EIS, along with anticipated timing of implementation and the application of each plan. However, as the Project advances and becomes more refined, this list of individual EMPs is subject to refinement to ensure that changes to the Project have been addressed through the EMP framework.

13.0 ENVIRONMENTAL FOLLOW-UP AND MONITORING PROGRAM

13.1 Introduction

In accordance with CEAA 2012, a follow-up program is procedural methodology for “verifying the accuracy of the environmental assessment of a designated project”, and for “determining the effectiveness of any mitigation measures”, that are implemented to mitigate the adverse effects of the project. In accordance with the EIS Guidelines, the follow-up program is to be described in “sufficient detail to allow independent judgment as to the likelihood that it will deliver the type, quantity and quality of information required to reliably verify predicted effects (or absence of them), and to confirm both the assumptions and the effectiveness of mitigation”. The follow-up program will also include:

- Specific commitments that clearly describe how the proponent intends to implement them;
- Any contingency procedures/plans or other adaptive management provisions as a means of addressing unforeseen effects or for correcting exceedances as required to comply or to conform to benchmarks, regulatory standards or guidelines; and
- Monitor the implementation of mitigation measures resulting from Indigenous consultation.

Environmental monitoring is a key part of the follow-up program, and is one of the tools used to help verify that realized environmental effects during Project development and operation are in line with predictions made in the EIS effects analysis. Many aspects of the environmental monitoring program are expected to be prescribed in the various Provincial and Federal approvals that will be needed for mine operations.

Principal components of the Project follow-up programare the following:

- EIS prediction (including an overview of follow-up programand monitoring objectives);
- Rationale for inclusion in the follow-up program;
- Proposed monitoring program (verification / assessment methods);
- Current mitigation measures;
- Criteria for considering adaptive management and potential adaptive measures;
- Applicable regulatory instruments and associated government agencies;
- Program responsibilities; and
- Reporting requirements.

At the EIS stage, the follow-up program is typically presented at a framework level of detail, recognizing that further details will be developed at a later stage, following completion of the EIS, in conjunction with the mine permitting phase. The level of detail presented at the EIS stage must,

nevertheless, be sufficient to provide confidence in the overall program, and its ability to confirm, track and respond to environmental performance.

The follow-up program for the Project is structured on a discipline basis as per the CEA Agency request. The follow-up program elements that do not lend themselves to division by discipline such as those involving tailings dam performance, health and safety, and traffic are considered separately.

The follow-up program is designed to be adaptive to account for any environmental effects that were not expected, new information that becomes available or mitigation measures that are found to not to be effective. Therefore, the follow-up program is subject to change as the Project is further developed, and as input is received from government agencies, Indigenous groups, and stakeholders. This inclusive process will allow for all parties involved to have input into the final follow-up program.

For each of the major disciplines or components where a follow-up program is required, the program is structured into the following elements:

- EA prediction and overview of follow-up program and monitoring objectives;
- Rationale for including in the follow-up program;
- Proposed monitoring program;
- Current mitigation measures;
- Criteria for considering adaptive management and potential adaptive measures;
- Applicable regulatory instruments and associated government agencies;
- Program responsibilities; and
- Reporting.

Additionally, a number of follow-up monitoring programs will be developed in pursuit of environmental approvals and permits, but will be developed at a later date. These specific regulatory monitoring programs require direct input from applicable government agencies, which is historically completed following the approval of the EIS. The follow-up monitoring programs provided in Section 12 of the revised EIS take into consideration input from the Round 1 information requests made by government agencies, Aboriginal peoples and stakeholders, to incorporate concerns made throughout Project engagement.

13.2 Summary

A summary monitoring table has been provided below that summarizes monitoring elements of the Follow-up programs (Table 13.2-1). These monitoring programs have been developed to help verify the effects assessment of the EIS and confirm the effectiveness of the avoidance and

mitigation measures proposed. It should be noted that Treasury Metals is aware that regulatory monitoring will be required by government agencies upon EA approval (i.e. ECA monitoring); however, these monitoring programs have not yet been developed and are not included in the summary of EIS monitoring table.

Table 13.2-1: Summary of the EA Monitoring Programs

Discipline	Parameter	Monitoring Method	Project Phases	Location
Terrain and Soils	WRSA Height	Visual from Thunder Lake	Operations Closure	Select locations on Thunder Lake
Terrain and Soils	WRSA Elevation	Survey the elevation of the WRSA	Operations Closure	WRSA
Geology and Geochemistry	Metals (dissolved) In-situ field parameters Major ions (anions and cations)	Water sample will be taken from a safe location as the pit is filling with water.	Post-Closure	Open pit / pit lake
Noise and Vibration (Ambient Noise)	A-weighted equivalent noise levels (L_{eq} in dBA)	72-hour monitoring intervals	Site preparation and construction Operations Closure	Selected sensitive receptors (receptors along east Thunder Lake Road and along Tree Nursery Road)
Noise and Vibration (Wildlife Noise)	A-weighted equivalent noise levels (L_{eq} in dBA)	A series of 1-hour measurements at varying distance from the site	Site preparation and construction Operations Closure	Varying locations around and outside the operations area
Noise and Vibration (Blasting)	Peak sound Pressure (dBA) Peak particle velocity (cm/s)	Measurements taken during blasting events in pit 1	Operations (when open pit mining activities are in pit 1 and relatively close to the surface)	Selected sensitive receptors along east Thunder Lake Road
Light	Configuration of artificial lighting	To be conducted when new artificial lighting is installed at the Project site	Site-preparation and construction Operations Closure	Within the operations area
Air Quality (continuous)	24-hour TSP Annual TSP 24-hour PM_{10} 24-hour $PM_{2.5}$ 1-hour NO_2 24-hour NO_2	Continuous air sampler will be used that is capable of measuring the require parameters	Site preparation and construction Operations Closure	At the security gate south of the Project
Air Quality (passive)	1-hour NO_2 1-hour SO_2	Passive sampling	Site preparation and construction Operations Closure	West of the Project on Thunder Lake Road and east of the Project on Normans Road

Table 13.2-1: Summary of the EA Monitoring Program

Discipline	Parameter	Monitoring Method	Project Phases	Location
Climate (meteorological)	Precipitation Wind speed / direction Temperature Evaporation	Continuous monitoring at a meteorological station	Site preparation and construction Operations Closure	Undetermined
Climate	GHG emissions (t/year)	Annual calculation based on fuel and gas consumption	Site preparation and construction Operations Closure	Operations area
Surface Water Quality	Metals (dissolved) Cyanide Major ions (anions and cations) In-situ field parameters	Surface water samples will be taken using industry approved methods	Site preparation and construction Operations Closure Post-closure	Watercourse that have the potential to have surface water quality effects from the Project (see Figure 13.8.2-1)
Surface Water Quantity	Discharge (m/s) Channel geomorphology	Flow measurements will be taken using industry approved methods	Site preparation and construction Operations Closure Post-closure	Blackwater Creek Thunder Lake Tributaries 2 and 3 Little Creek and Hoffstrom's Bay Tributary
Groundwater Quality	Metals (dissolved) Cyanide Major ions (anions and cations) In-situ field parameters	Samples will be taken following water level measurements four time a year	Site preparation and construction Operations Closure Post-closure	The monitoring wells described in Section 13.10
Groundwater Quantity	Groundwater elevation	Manual water level measurements on a monthly basis, until continuous pressure transducers are installed, for once a day measurements with barometric loggers for barometric effects correction	Site preparation and construction Operations Closure Post-closure	The monitoring wells described in Section 13.10
Wildlife and Wildlife Habitat	# of ha of direct habitat loss or disturbed	Assess the amount of habitat that has been overprinted as a result of the Project	Site preparation and construction Operations Closure	Operations area
Wildlife and Wildlife Habitat	Wildlife mortality	Make a log of anytime wildlife is struck by equipment on site	Site preparation and construction Operations Closure	Operations area

Table 13.2-1: Summary of the EA Monitoring Program

Discipline	Parameter	Monitoring Method	Project Phases	Location
Wildlife and Wildlife Habitat	SAR species habitat compensation and utilization	Assess whether the SAR habitat compensation area is being used by SAR species	Site preparation and construction Operations Closure Post-closure	Operations area
Fish and Fish Habitat	Fish species composition	Assess the fish species composition	Site preparation and construction Operations Closure Post-closure	Blackwater Creek Thunder Lake Tributaries 2 and 3 Little Creek and Hoffstrom's Bay Tributary
Fish and Fish Habitat	Fish species composition	Assess the fish species composition in the habitat offset location	Operations (once the offset habitat is completed until the DFO determines it is adequate)	Fish habitat offset location
Fish and Fish Habitat	Sub-lethal toxicity / Acute toxicity test	Use industry standard methods for testing	Site preparation and construction Operations Closure	Water from end of pipe effluent
Wetlands	Wetland extent	Mapping of wetland extent in 5-year intervals	Site preparation and construction Operations Closure	Wetlands within the drawdown zone
Wetlands	Water level monitoring	Water level collected using water level loggers and barometric pressure loggers	Site preparation and construction Operations Closure Post-closure	Wetlands within the drawdown zone
Vegetation	Monitor dust deposition on plant surfaces		Site preparation and construction Operations Closure	Varying locations around the Project site
Vegetation	Wetland flora composition	Conduct wetland flora species surveys every 5 years	Site preparation and construction Operations Closure	Wetlands within the drawdown zone
Social	In-migration / outmigration of employees	To be tracked annually through Company human resource records	Site preparation and construction Operations Closure	TBD upon consultation with Indigenous communities, government agencies and stakeholders

Table 13.2-1: Summary of the EA Monitoring Program

Discipline	Parameter	Monitoring Method	Project Phases	Location
Social	Local hiring	To be tracked annually through Company human resource records	Site preparation and construction Operations Closure	RSA
Social	Training	To be tracked annually through Company human resource records	Operations	RSA
Social	House availability	To be tracked annually with community assistance	Operations	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Social	Real estate values	To be tracked annually based on community / realtor assistance	Operations	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Social	Crime	To be tracked annually from publically available police records	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Social	Emergency services	To be tracked annually based on Company health and safety records	Site preparation and construction Operations Closure	RSA
Social	Traffic accidents	To be tracked annually based on Company health and safety records	Site preparation and construction Operations Closure	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Economic	Employment	To be tracked annually through Company human resource records	Site preparation and construction Operations Closure	RSA
Economic	Business and contracting opportunities	To be tracked annually through Company procurement records	Site preparation and construction Operations Closure	RSA
Economic	Training courses	To be tracked annually through	Operations	RSA

Table 13.2-1: Summary of the EA Monitoring Program

Discipline	Parameter	Monitoring Method	Project Phases	Location
		Company human resource records		
Economic	Worker profile	To be tracked annually through Company human resource records	TBD upon consultation with Indigenous communities, government agencies and stakeholders	TBD upon consultation with Indigenous communities, government agencies and stakeholders
Economic	Economic commitments	To be tracked annually based on Company human resource and business procurement records	Site preparation and construction Operations Closure	RSA
Indigenous	Indigenous employment during operations	To be tracked annually through Company human resource records	Operations	Potentially affected communities
Indigenous	Indigenous employment during closure	To be tracked annually through Company human resource records	Closure	Potentially affected communities
Indigenous	Indigenous employment following closure	To be tracked annually through Company human resource records	Post-closure	Potentially affected communities

14.0 FEDERAL CONSIDERATIONS

As outlined in Section 10.1.2 of the EIS Guidelines (Appendix Y), there are specific requirements of the Act that require the federal government to clearly understand the potential effect of the Project on aspect of the environment under their jurisdiction, to understand the effects Project on locations under federal jurisdictions (i.e., federal and transboundary lands), and to understand the implications or effects that may arise from incidental federal decisions. To facilitate the review by federal regulators, this information was pulled together in Section 14 of the EIS.

14.1 Changes to Components of the Environment within Federal Jurisdiction

Components of the environment where changes are anticipated, which are within the Federal jurisdiction, include fish and fish habitat, migratory birds, and species at risk. The effects are summarized in Table 14.1-1.

The Project activities including overprinting watercourses and altering flows in watercourses, which may interfere with navigation in non-scheduled waters under the *Navigation Protection Act* may be subject to the common law right of navigation. Treasury Metals has received a letter from the Navigation Protection Program of Transport Canada (2017) indicating that the Project would not require an exemption under the *Navigation Protection Act*.

14.2 Changes to the Environment on Federal or Transboundary Lands

There are no changes to the environment as a result of the project that may occur on federal lands or lands outside the province in which the project is to be located.

The Project is not anticipated to cause any changes to the environment on federal lands. The Project is located about 120 km from the border between Canada and the United States, which is beyond the 100 km range where notification may be required under the 1991 Canada-United States Air Quality Agreement. There are no other transboundary effects of the Project.

beyond the 100 km range where notification may be required under the 1991 Canada-United States Air Quality Agreement. There are no other transboundary effects of the Project.

Table 14.1-1: Summary Residual Adverse Effects, Mitigation Measures, and Applicable Federal Jurisdictions

Discipline	Valued Component (VC)	Indicator	Residual Adverse Effect	Proposed Mitigation	Applicable Federal Jurisdiction
Wildlife and wildlife habitat	Upland birds (Section 6.12)	Upland birds	Habitat loss – 95 ha of coniferous forest, 43 hectares of deciduous forest and 70 ha of successional areas Habitat alteration or disruption (ha)- 4.3 Potential for Mortality (%)- medium	Efforts to develop a compact site, with avoidance of sensitive habitats to the extent practicable; major tree and land clearing to take place outside of the bird nesting season; habitat rehabilitation at closure; sound abatement; ; pre-treatment of processing tailings to reduce cyanide levels in the TSF below potentially toxic thresholds; reduced vehicular speed limits	Protection of migratory birds under the *Migratory Birds Convention Act*
		Marsh birds	Habitat loss – 33 ha of wetland habitat Habitat alteration or disruption (ha)- 7.5 Potential for Mortality (%)-low	Efforts to develop a compact site, with avoidance of sensitive habitats to the extent practicable; major tree and land clearing to take place outside of the bird nesting season; habitat rehabilitation at closure; pre-treatment of processing tailings to reduce cyanide levels in the TSF below potentially toxic thresholds; reduced vehicular speed limits	Protection of migratory birds under the *Migratory Birds Convention Act*
		Common Nighthawk	Habitat loss – 300 ha Habitat alteration or disruption (ha)- 198 Potential for Mortality (%)- medium	Efforts to develop a compact site, with avoidance of sensitive habitats to the extent practicable; major tree and land clearing to take place outside of the bird nesting season; habitat rehabilitation at closure; SAR awareness training; light pollution reduction;	Species and habitat protection under *Species at Risk Act*

Table 14.1.1-1: Summary Residual Adverse Effects, Mitigation Measures, and Applicable Federal Jurisdictions (continued)

Discipline	Valued Component (VC)	Indicator	Residual Adverse Effect	Proposed Mitigation	Applicable Federal Jurisdiction
Wildlife and wildlife habitat (cont'd)	Wildlife SAR (Section 6.12) (cont'd)	Northern Myotis/ Little Brown Myotis	Habitat loss – 15.85 ha Habitat alteration or disruption (ha) - NA Potential for Mortality (%)-low	Efforts to develop a compact site, with avoidance of sensitive habitats to the extent practicable; major tree clearing to take place outside of the bat roosting season; habitat rehabilitation at closure; SAR awareness training; Major tree clearing outside of the bat roosting season; light pollution reduction; SAR awareness training	Species and habitat protection under *Species at Risk Act*
		Barn Swallow	Habitat loss – several locations Habitat alteration or disruption (ha) - 198 Potential for Mortality (%) – medium	Efforts to develop a compact site, with avoidance of sensitive habitats to the extent practicable; major land clearing to take place outside of the bird nesting season; habitat rehabilitation at closure; SAR awareness training; sound abatement; Major land clearing outside of the bird nesting season; reduced speed limits;	Species and habitat protection under *Species at Risk Act*
Fish and Fish Habitat	Stream-resident fish populations (Section 6.14)	Direct loss or alteration of habitat	Habitat Loss – 7.01 km of portions of Blackwater Creek Tributaries 1 and 2 Habitat Alteration or Disruption – 4.5 km of Blackwater Creek Mainstem; 2.58 km of Hoffstom's Bay Tributary; 1.94 km of Little Creek	Efforts to develop a compact site; fish removal prior to habitat destruction; site rehabilitation at closure; provision of fish habitat offsets	Fish, fish habitat, fisheries and waters frequented by fish considered under the *Fisheries Act*, and MMER Schedule 2 provisions

14.3 Changes to the Environment Directly Linked or Necessarily Incidental to Federal Decisions

The environmental effects linked to a federal authority's exercise of a power or performance of a duty or function, in relation to subsection 5(2) of the Act. Subsection 5(2) of the Act specifies that effects to be considered pursuant to subsection (5(2) are in "addition to" those considered pursuant to subsection 5(1). Section 6 of the EIS considers environmental effects linked to Project development and operation for a broad list of VCs, including several VCs that are beyond the scope of subsection 5(1) requirements, where subsection 5(1) requirements are defined specifically as those related to the following acts:

- Fisheries Act;
- Species at Risk Act;
- Migratory Birds Convention Act; and
- Those related to Aboriginal peoples as defined in subsection 5(1)(c) of the Act.

The exercise of a power or performance of a duty by a federal authority, in relation to the Project, as this could apply to subsection 5(2) of the Act, is limited that potentially associated with application of the:

- Fisheries Act;
- Species at Risk Act;
- Migratory Birds Convention Act;
- Navigation Protection Act; and
- Explosives Act.

These effects are detailed in Section 14.1.3 of the EIS.

14.4 Effects of Changes to the Environment on Aboriginal (Indigenous) Peoples

Participants in the EA process include Indigenous (formally referred to by the Government of Canada as Aboriginal) communities. The following Indigenous communities were identified around the project area to be included as stakeholders in the EA process for the Goliath Gold Project:

- First Nations
    - Wabigoon Lake Ojibway Nation.
    - Eagle Lake First Nation.
    - Wabauskang First Nation.

- Lac Seul First Nation.
- Whitefish Bay First Nation (Naotkamegwanning First Nation).
- Grassy Narrows First Nation.
- Lacs des Mille Lacs First Nation.
- Grand Council Treaty #3.

- Métis Nation of Ontario
  - Northwest Métis Council.
  - Kenora Métis Council.
  - Sunset Country Métis Council.
  - Atikokan Métis Council.
- The Aboriginal People of Wabigoon.

Treasury Metals recognizes that Indigenous people live, work, hunt, fish, trap, collect water, and harvest throughout their lands and rely on them for their individual as well as their communities' overall cultural, social, spiritual, physical, and economic well-being. Further to this, Treasury Metals recognizes that these traditional lands are inextricably connected to a community's identity and culture, inclusive of ceremonial and spiritual recognition. Treasury in respect to this recognizes the importance of assessing any Project-related impacts as these relate to traditional land and resource use activities and practices; and Treasury Metals acknowledges that the Project may impact these activities or practices within the Project area, and is committed to working with all communities to identify, mitigate, and avoid or minimize any such related impacts.

In order to perform a comprehensive investigation of the effects of the project on Aboriginal peoples, meaningful engagement activities were required between Treasury Metals and the Indigenous communities identified above. Details of the engagement activities are summarized in Section 9 of the EIS, and full details including engagement logs are provided in Appendix DD. During the engagement activities, traditional knowledge was shared on each of the disciplines assessed in the EIS. Additionally, information regarding the current use of land and resources for traditional purposes was shared and is summarized in Section 5.13.3 in the EIS. The information acquired during engagement with respect to traditional knowledge and current uses of lands and sources for traditional purposes was then considered in selecting the valued components and indicators for the effects assessment.

The effects of the Project on the environment are described in Sections 6.2 through 6.21. The effects of the project on Aboriginal peoples is specifically assessed in Section 6.21 of the EIS. In the EIS the effects of changes the Project may cause to the environment, with respect to Aboriginal peoples was performed using the following valued components:

- Health effects;

- Harvesting and gathering of plant material;
- Hunting;
- Trapping;
- Fishing;
- Cultural and spiritual; and
- Socio-economic factors.

In addition, Section 6.22 of the EIS provides specific information to address subparagraph 5(1)(c)(iii) of CEAA 2012 “with respect to aboriginal peoples, an effect occurring in Canada of any change that may be caused to the environment on the current use of lands and resources for traditional purposes”. This section uses the information obtained via meaningful engagement activities with respect to current use of lands and resources for traditional purposes (Appendix DD and as summarized in Section 5.13) as per paragraph 4(1)(d) of CEAA, 2012.

Under subparagraph 5(1)(c)(iii), effects from a designated project on the current use of lands and resources for traditional purposes are considered through a change in the environment. The current use of lands and resources for traditional purposes, as well as the exercise of treaty rights, is associated with an Aboriginal group’s practices, traditions or customs, which are part of an Aboriginal group’s distinctive culture and fundamental to their social organization and the sustainment of present and future generations. Practices, traditions and customs are generally defined as follows:

- Practice: a way of doing something that is common, habitual or expected;
- Tradition: a custom, opinion or belief handed down primarily orally or by practice; and
- Custom: a particular, established way of behaving.

For the purposes of the EIS, Aboriginal and Treaty Rights are defined as the historic and current uses of lands and resources for traditional purposes by members of Indigenous communities. It is Treasury Metals’ understanding that Aboriginal peoples are entitled to access to their lands according to their Aboriginal and Treaty #3 (1873) Rights, and Treasury Metals is committed to working with the Indigenous communities to ensure that the effects of the Project on their traditional land and resource use, or alternatively referred to as Aboriginal and Treaty Rights, are appropriately considered and protected.

Section 6.21.6 provides a summary of the residual adverse effects of the Project on Aboriginal peoples, which are further summarized in Table 14.2.1-1 of the EIS.

14.4.1 Changes to the Environment Directly Linked or Necessarily Incidental to Federal Decisions

Section 14.1.3 (above) describes environmental effects linked to a federal authority's exercise of a power or performance of a duty or function, in relation to subsection 5(2) of the Act. Subsection 5(2) of the Act specifies that effects to be considered pursuant to subsection (5(2) are in "addition to" those considered pursuant to subsection 5(1). Section 6 of the EIS considers environmental effects linked to Project development and operation for a broad list of VCs, including several VCs that are beyond the scope of subsection 5(1) requirements, where subsection 5(1) requirements are defined specifically as those related to the following acts:

- Fisheries Act;
- Species at Risk Act;
- Migratory Birds Convention Act; and
- Those related to Aboriginal peoples as defined in subsection 5(1)(c) of the Act.

The exercise of a power or performance of a duty by a federal authority, in relation to the Project, as this could apply to subsection 5(2) of the Act, is limited that potentially associated with application of the:

- Fisheries Act;
- Species at Risk Act;
- Migratory Birds Convention Act;
- Navigation Protection Act; and
- Explosives Act.

Full descriptions of each Act under Federal jurisdiction are provided above in Section 14.1.3 above.

Effects of changes to the environment as a result of the Project that are directly linked or necessarily incidental to federal decisions "other than as they pertain to Aboriginal peoples" were described in Section 14.1.1 of the EIS. The identified effects of the Project on Aboriginal Peoples is described in Section 14.2.1 of the EIS.

15.0 CONCLUSIONS

As part of the approval process Treasury Metals is undergoing for their Goliath Gold Project, they completed a thorough and comprehensive environmental assessment in accordance with the Project-specific EIS Guidelines prepared by the Canadian Environmental Assessment Agency (the Agency). Treasury Metals submitted an EIS for the Project to the Agency in March of 2015, and April of 2015 the Agency confirmed that Treasury Metals' EIS as met conformity with the requirements of the EIS Guidelines. Following a period of technical review and public comment, the Agency issued a series of requests to Treasury Metals. As part of the information request (IR) process, the Agency requested that Treasury Metals prepare and submit a revised EIS Treasury Metals submitted a revised EIS to the Agency on September 5, 2017. Following review of the September 2017 revised EIS, the Agency determined that the revised EIS was still deficient in a number of areas, and Treasury Metals was directed to prepare and resubmit a further revision to the EIS. This further revised EIS was prepared in accordance with the Agency's request, including additional efforts to incorporate Aboriginal traditional knowledge, a stronger focus on describing the potential for the Project to affect the traditional use of lands and resources by Aboriginal peoples, and the completion of further technical work required as part of the IR responses.

This revised EIS lays out the evaluation of potential effects of the Project in a traceable and methodical manner. The effects of the Project were evaluated for the following disciplines:

- Terrain and soils;
- Geology and geochemistry;
- Noise;
- Light;
- Air quality;
- Climate;
- Surface water quality;
- Surface water quantity;
- Groundwater quality;
- Groundwater quantity;
- Wildlife and wildlife Habitat;
- Migratory Birds;
- Fish and fish habitat;
- Wetlands and vegetation;
- Land use;
- Social;
- Economic;
- Human health;
- Heritage resources; and
- Aboriginal peoples.

For each of these disciplines, valued components were identified. These VCs were described from both ecological and socio-economic perspective. The VCs used in this revised EIS are described fully in Section 6.1.3 of the revised EIS, and are summarized in Table 6.0-1.

The methodical steps taken for evaluating the effects on the identified disciplines and VCs included the following:

- **Identify the Likely Potential Effects of the Project on the Environment**: The likely potential effects of the Project on each discipline during each of the four Project phases were identified, along with the possible linkages between the various disciplines and VCs.
- **Predict the Effects of the Project**: Using clearly described approaches, the effects of the Project on the disciplines and VCs. The prediction of effects needs to identify and evaluate those measures incorporated in the Project to avoid effects. The results of the effects prediction should cover all Project phases, and indicate whether the Project is predicted to result in adverse effects.
- **Mitigation Measures**: As set out in the EIS Guidelines, mitigation measures need to be identified in those cases where ad verse effects were predicted, In keeping with the EIS Guidelines, such mitigation should be technically and economically feasible.
- **Residual Effects**: Residual adverse effects are those effects that remain after consideration of the application technically and economically feasible mitigation measures. The residual effects that remain after mitigation are those that are carried forward for consideration of possible cumulative effects (Section 7) and ultimately for the determination of significance (Section 8).

The findings of the effects assessment are provided in Section 6, and summarized in Table 6.23-1.

For each of the identified residual effects (see Table 6.23-1), the EIS Guidelines require that the assessment consider the potential for there to be cumulative effects. The cumulative effects assessment, presented in Section 7, followed the process set out by the Agency in the document entitled “Technical Guidance for Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012” (CEAA 2014). The assessment of cumulative effects also relied on Agency’s operational policy statement entitled “Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012” (CEAA 2015). The future Projects included in the assessment of possible cumulative effects (see Figure 7.2.2-1) was expanded to include Projects identified by the Agency as part of Round 1 information request process. The results of the cumulative effects assessments, which are summarized within Table 7.5-1, concluded that there would be cumulative effects for selected disciplines, VCs and indicators. The analysis was able to quantify the cumulative effects for selected disciplines, VCs and indicators, while for others the cumulative effects were determined to not alter the magnitude of the predicted residual effects associated with the Project, nor would they alter the determination of significance.

For each of the identified residual effects (see Table 6.23-1), including the cumulative effects (see Table 7.5-1), a determination of significance was completed (Section 8). The significance assessment incorporated consideration of the following measures identified in the EIS Guidelines:

- Magnitude;
- Geographic extent;

- Timing and duration;
- Duration;
- Frequency;
- Reversibility;
- Ecological and social context; and
- Existence of environmental standards, guidelines or objectives for assessing the impact.

The methods used for assigning the above measures are described in Section 8.1. The determination of significance was completed on a discipline by discipline basis (Sections 8.2 through 8.21 of the EIS). The results of the determination of significance for all of the identified residual effects, including consideration of cumulative effects, indicated that there were no significant residual adverse effects identified for the Project. A summary of the significance determinations is provided in Table 8.2-1.

As described in Sections 6.16 (Land Use), 6.17 (Social Factors), 6.18 (Economic Factors), and 6.21(Aboriginal Peoples), some of the effects of the Project were identified as being beneficial. In accordance with the EIS guidelines (Appendix Y), residual beneficial effects were not carried forward for the determination of significance. However, Section 11 provides a summary of the benefits to Canadians as a result of the Project which include:

- Investment in local business, including indigenous businesses;
- Enhanced employment opportunities, including for members of Indigenous communities;
- Project-specific training that will enhance the skill base locally; and
- Government revenue in the form of royalties and taxes.