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Hope Bay Project Doris-Madrid Interim Closure and Reclamation Plan

MAC RESOURCES

Hope Bay Project
Doris-Madrid Interim Closure and Reclamation Plan

Prepared for

TMAC Resources Inc.

Prepared by

SRK Consulting (Canada) Inc.
1CT022.013
November 2017

Hope Bay Project Doris-Madrid Interim Closure and Reclamation Plan

November 2017

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Revision History

Revision #	Date	Section	Summary of Changes	Author	Approver
0	October 2005	Entire Document	Initial version of plan submitted in support of Final Environmental Impact Statement Report	Miramar Hope Bay Ltd. (Written by AMEC)	Miramar Hope Bay Ltd.
1	April 2007	Entire Document	Submitted in support of Water Licence Application	Miramar Hope Bay Ltd.	Miramar Hope Bay Ltd.
2	August 2012	Entire Document	Project entered Care and Maintenance phase. Closure and Reclamation of existing advanced exploration facilities (no operating mine was constructed) in accordance with Type A Water Licence 2AM-DOH0713	Newmont, Hope Bay Mining Ltd. (Written by SRK)	Newmont, Hope Bay Mining Ltd.
3	March 2014	Entire Document	Transfer of ownership and re-activation of construction activities. Revised Plan in accordance with Type A Water Licence 2AM-DOH1323	TMAC Resources Inc. (Written by SRK)	TMAC Resources Inc.
4	June 2015	Entire Document	Updated Mine Development Plan and Revised Interim Plan in accordance with Type A Water Licence 2AM-DOH1323 Amendment 1	TMAC Resources Inc. (Written by SRK)	TMAC Resources Inc.
5	September 2016	Addendum	Addendum to Interim Closure and Reclamation Plan related to ponding water along rock fill structures	TMAC Resources Inc. (Written by SRK)	TMAC Resources Inc.
6	November 2017	Entire Document	Updated Mine Development Plan and Revised Interim Plan in accordance with Type A Water Licence 2AM-DOH1323 Amendment 1	TMAC Resources Inc. (Written by SRK)	TMAC Resources Inc.

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1 Introduction

1.1 Overview

The Hope Bay Project (the Project) is a gold mining and milling undertaking of TMAC Resources Inc. The Project is located 705 km northeast of Yellowknife and 153 km southwest of Cambridge Bay in Nunavut Territory, and is situated east of Bathurst Inlet. The Project comprises of three distinct areas of known mineralization plus extensive exploration potential and targets. The three areas that host mineral resources are Doris, Madrid, and Boston.

The Project consists of two phases: Phase 1 (Doris project), which is currently being carried out under an existing Water Licence, and Phase 2 (Madrid-Boston project) which is in the environmental assessment and regulatory stage. Phase 1 includes mining and infrastructure at Doris, while Phase 2 includes mining and infrastructure at Madrid and Boston located approximately 10 and 60 km due south from Doris, respectively.

For the development of Madrid-Boston Project, TMAC requires an amendment to Project Certificate No. 003, an amendment to the Type A Water Licence 2AM-DOH1323, and a new Type A Water Licence for the proposed development and operation at the Boston deposit. The amendment to the Type A Water Licence 2AM-DOH1323 pertains to the infrastructure at the Doris and Madrid sites as well as the Madrid-Boston all weather road (referred to as Doris-Madrid sites).

This Interim Closure and Reclamation Plan (ICRP) pertains to the Doris and Madrid sites and was written in accordance with the applicable guidelines as described in Section 1.5.2.

A separate plan pertaining to closure and reclamation of the Boston Site has been developed (SRK 2017a).

1.2 Background

The project is located on Inuit Owned Land administered by the Kitikmeot Inuit Association (KIA), in the West Kitikmeot Region of Nunavut, approximately 120 km southwest of Cambridge Bay (Figure 1).

At the Doris-Madrid site, the Madrid-Boston Project focuses on mining of the Doris, Madrid North, and Madrid South deposits by utilizing and expanding upon the Doris Project infrastructure for the integrated development of the Hope Bay Belt. Doris-Madrid construction activities will overlap with the operation activities at the Doris Site (Phase 1). The proximity of the Madrid area to the Doris Site, process plant, and TIA means that the Project can utilize existing infrastructure at Doris. This will minimize the footprint, and minimize the time required to develop the Madrid deposits. The permitted infrastructure and facilities at Roberts Bay and the Doris Site have sufficient capacity to support Project construction for Phase 2.

The Doris-Madrid construction will include:

- Expansion of the Doris TIA (raising of South Dam and construction of West Dam);
- Construction of an off-loading fuel and cargo dock and additional fuel storage at Roberts Bay;
- Development of the Madrid North and Madrid South mines to commercial production;
- Incremental expansion of surface infrastructure at Madrid North and Madrid South to accommodate production mining;
- Construction of a 1,200 tpd concentrator, power plant and fuel storage area at Madrid North;
- All-weather road linking the Roberts Bay Jetty to the cargo dock;
- All-weather access road and tailings pipeline from Madrid North to the south end of the TIA;
- All-weather road (AWR) linking Madrid to Boston; and
- Wind turbines near the Doris, Madrid and Boston sites.

A complete listing of facilities, both approved and proposed, is provided in Appendix A.

Since the issuance of the project's initial Type A Water Licence (2AM-DOH0713), in September 2007, the ownership of the Project has changed three times. Construction of the project began in June 2007 by the original owner Miramar Mining Corp. (Miramar) under its subsidiary Miramar Hope Bay Mining Ltd. (MHBL). In March 2008, Newmont Mining Corporation (NMC) purchased the project and continued construction activities under their wholly owned subsidiary Hope Bay Mining Limited (HBML). NMC however ceased construction in January 2012, and placed the project in temporary closure. In January 2013, NMC sold the project to TMAC who subsequently recommenced exploration activities in June 2013, and completed construction with first gold having been poured in February 2017. Further development is currently planned, with the Madrid North and Madrid South areas being included under the amended Type A water licence in preparation for bringing those mines into full production starting in 2019.

1.3 Closure and Reclamation Plan History

This ICRP (the Plan) presents the closure obligations and the plan for closing all facilities, and demonstrates how the closure obligations will be met.

The first Closure and Reclamation Plan for the site was prepared by AMEC (2005) and submitted as a supporting document for the Final Environmental Impact Statement (FEIS). The 2005 Closure Plan described closure of the Doris North Project had it produced and milled ore in accordance with the 2005 Miramar FEIS (MHBL 2005). Subsequent to this original closure plan, a number of amendments and modifications to the original Type A Water Licence 2AM-DOH0713 were submitted to the Nunavut Water Board for review and approval. These amendments and modifications also required revisions to the project's Closure and Reclamation Plan.

In 2012 a new Closure and Reclamation Plan was submitted by the new owners, Hope Bay Mining Ltd., when the site was placed into temporary closure. The 2012 Plan (SRK 2012) was reflective of this status and differed from the 2005 Plan. The 2012 Plan addressed the following key areas:

- The Project never advanced to the production stage and was only an advanced exploration program including underground bulk sampling and a decline that terminated are the ore face;
- The bulk sampling program produced waste rock and ore which were stored on surface on dedicated rock pads; and
- The mill was not constructed and tailings had not been produced.

After ownership change in 2014, the 2012 Plan was revised to reflect operations based on TMAC's intention of advancing the Project through to production. That Plan focused on the closure of the site in accordance with the existing Type A Water Licence 2AM-DOH1323. The 2014 plan was amended in 2015 and an addendum was issued in 2016 to reflect changes to the Project and incorporate the new conditions as per Amendment No.1 to Water Licence 2AM-DOH1323.

The update of the ICRP discussed in this report was necessary because the Madrid North and Madrid South advanced exploration areas originally approved under the 2BB-MAE1727 Water License are part of the proposed Phase 2 Doris-Madrid development and will be captured under Amendment No. 2 to Water Licence 2AM-DOH1323. The differences between the current and the immediately preceding revision of the ICRP are detailed below.

A chronological account of these revisions is provided in Table 1.

Table 1: Closure and Remediation Plan Revision History

Document Title	Author	Release Date	Key Changes
Preliminary Mine Closure and Reclamation Plan Doris North Project - Hope Bay Belt Nunavut, Canada	Miramar Hope Bay Ltd. (Written by AMEC)	October 2005	Initial version of plan submitted in support of Final Environmental Impact Statement Report.
Mine Closure and Reclamation Plan Doris North Project, Nunavut	Miramar Hope Bay Ltd.	April 2007	Submitted in support of Water Licence Application.
Doris North Closure and Reclamation Plan	Newmont, Hope Bay Mining Ltd. (Written by SRK)	August 2012	Project entered Care and Maintenance phase. Closure and Reclamation of existing advanced exploration facilities (no operating mine was constructed) in accordance with Type A Water Licence 2AM-DOH0713.
Doris North Mine Closure and Reclamation Plan	TMAC Resources Inc. (Written by SRK)	March 2014	Transfer of ownership and re-activation of construction activities. Revised Plan in accordance with Type A Water Licence 2AM-DOH1323.
Doris North Mine Interim Closure and Reclamation Plan June 2015	TMAC Resources Inc. (Written by SRK)	June 2015	Updated Mine Development Plan Revised Interim Plan in accordance to Type A Water Licence 2AM-DOH1323 Amendment 1.
Doris-Madrid Interim Closure and Reclamation Plan November 2017	TMAC Resources (written by SRK)	November 2017	Updated to include commercial production at Madrid North and Madrid South mines, and other changes to the Phase 2 project. Submitted as supporting document for the Final Environmental Impact Statement Report.

This ICRP addresses the following project changes from the current approved ICRP:

- Increase in waste rock volumes, but all waste rock is returned underground as backfill prior to closure of the mine;
- Increase in tailings volume. Filtered detoxified cyanide leach tailings continues to be mixed with waste rock and used as backfill and floatation tailings are deposited as a low solids content slurry in the existing Doris TIA;
- Raise of the South Dam and construction of the West Dam to accommodate the increased volume of tailings;
- Construction of a concentrator at Madrid North with the associated tailings pipeline along a new all-weather road;
- Development of the Madrid North and Madrid South Mines to full production;
- Construction of an all-weather road to Boston;
- Construction of up to six wind poser generation towers;
- Construction of a new Cargo Dock in Roberts Bay and construction of a new fuels storage facilities there; and
- Expansion of Doris Camp to accommodate 400 persons.

1.4 Water Licence Requirements

The Project and related facilities are operated in accordance with Water Licence No. 2AM-DOH1323. Table 3 below provides a summary of the requirements for closure, as set forth in the Water Licence, and how this document addresses each of these requirements.

Table 2: Table of Concordance with Type A Water Licence 2AM-DOH1323 Amendment No. 1

Licence Ref.	Licence Conditions (2AM-DOH1323)	Closure Plan Reference	Closure Plan Response/Specification
Part L. 1	Notification in writing will be submitted to the Board at least 60 (sixty) days prior any intent to achieve Recognized Closed Mine status	n/a	Compliance with licence condition will be met.
Part L. 2	Notification to the board as soon as practically possible of any intent to enter a Care and Maintenance Phase	n/a	Compliance with licence condition will be met.
Part L. 3	The Licensee shall, upon providing notice to the Board as per Part L, Item 2, review all operational plans and submit revised Plans to reflect the Care and Maintenance status, to the Board for approval in writing, within three (3) months of providing notice	n/a	Compliance with licence condition will be met.
Part L. 4	The Licensee shall provide to the Board, at least thirty (30) days advanced notification in writing, of the initial start of Operations or change of Project Phase. Notification maybe provided separately or in accordance with monthly monitoring report as per Part J, Item 19	n/a	Compliance with licence condition will be met.
Part L. 5	The Board has approved with the issuance of this Licence the Plan entitled “Doris Mine Interim Closure and Reclamation Plan, Hope Bay, Nunavut”, dated June 2015 and the addendum submitted in September 2016.	n/a	n/a
Part L. 6	The Licensee shall submit to the Board for approval in writing, at least two years following approval of the Amended Licence and prior to September 30, 2019, a revision to the closure plan referred to in PART L, Item 5.	n/a	This document will supersede the plan referred to in Part L, Item 5.
Part L. 7	The Licensee shall submit, subject to Part L. Item 8, to the Board for approval in writing, prior to September 30, 2022, a revision to the closure plan referred to in PART L, Item 5.	n/a	Compliance with licence condition will be met.
Part L. 8	The Licensee shall submit to the Board for approval, twelve (12) months prior to planned Closure, a Final Mine Closure and Reclamation Plan prepared in accordance with the Mine Site Reclamation Guidelines for the Northwest Territories, 2007 and consistent with the INAC Mine Site Reclamation Policy for Nunavut, 2002. The Final Plan shall incorporate revisions, which reflect the pending closed status of the mine, and include the following:	n/a	Compliance with licence condition will be met.
Part L. 8.a	Soil Quality Remediation Objectives along with CCME Guidelines and the Government of Nunavut Environmental Guideline for Site Remediation;	n/a	Compliance with licence condition will be met.
Part L. 8.b	A Protocol for the disposal of any contaminated soil into the underground mine at closure;	n/a	Compliance with licence condition will be met.
Part L. 8.c	Environmental Site Assessment plans in accordance with Canadian Standards Association (CSA) criteria; and	n/a	Compliance with licence condition will be met.
Part L. 8.d	An Evaluation of the Human Health and Ecological Risk Assessment.	n/a	Compliance with licence condition will be met.
Part L. 9	The Licensee shall, should the Project remain, or be in Care and Maintenance, submit an updated estimate of total mine closure restoration liability, within twelve (12) months of entering Care and Maintenance and every three (3) years thereafter.	n/a	Compliance with licence condition will be met.
Part L. 10	The Licensee shall include, with the Plan submitted under Part L, Items 6, 7 and 8, an updated estimate of the total mine closure restoration liability using the current version of RECLAIM, its equivalent or other similar method approved by the Board in writing, in accordance with principles of the INAC “Mine Site Reclamation Policy for Nunavut” (2000).	n/a	Compliance with licence condition will be met.
Part L. 11	The Licensee shall, if not approved by the Board, revise the Plan(s) referred to in this Part and resubmit to the Board for approval within thirty (30) days of receiving notification of the Board’s decision.	n/a	Compliance with licence condition will be met.
Part L. 12	The Licensee shall submit to the Board for approval, at least twelve (12) months prior to the start of Closure works, engineering drawings and specifications of the tailings final cover system design.	n/a	Compliance with licence condition will be met.
Part L. 13	The Licensee shall complete all reclamation work in accordance with the Plan(s) referred to in this Part, as and when approved by the Board in writing.	n/a	Compliance with licence condition will be met.
Part L. 14	The Licensee shall carry out progressive reclamation of any components of the project no longer required for the Licensee’s operations.	Section 5	See referenced section.
Part L. 15	All roads and airstrip, if any, shall be re-graded to match natural contour to reduce erosion.	Section 4.5.5	See referenced section.
Part L. 16	The Licensee shall remove any culverts and restore the drainage to match the natural channel. Measures shall be implemented to minimize erosion and sedimentation.	Section 4.5.5	See referenced section.
Part L. 17	In order to promote growth of vegetation and the needed microclimate for seed deposition, all disturbed surfaces shall be prepared by ripping, grading, or scarifying the surface to conform to the natural topography.	Sections 4.5.2 and 4.5.5	See referenced sections.
Part L. 18	Areas that have been contaminated by hydrocarbons from normal fuel transfer procedures shall be reclaimed to meet objectives as outlined in the Government of Nunavut’s Environmental Guideline for Site Remediation, 2010. Materials such as soil and rock that have been contaminated by hydrocarbons may be disposed of in the underground mine to remain frozen with permafrost. The use of reclaimed soils for the purpose of back fill or general site grading may be carried out only upon consultation and approval by the Government of Nunavut, Department of Environment and an Inspector.	Sections 4.5.4 and 4.5.5	See referenced sections.
Part L. 19	The Licensee shall contour and stabilize all disturbed areas to a pre-disturbed state upon completion of work.	Section 4.5.5	See referenced section.
Part L. 20	The Licensee shall consult traditional land users, land owners, and other stakeholders on the proposed post-closure land use criteria. Particularly, the proposal to leave certain facilities in place and confirm the soil quality remediation objectives.	Section 1.6	See referenced section.

1.5 Regulatory Context

1.5.1 Legislation Applicable to Mine Closure

Legislation applicable to mine closure and reclamation planning in Nunavut includes:

- Nunavut Land Claims Agreement (Canada 1993);
- Territorial Lands Act (Canada 1985a);
- Territorial Lands Regulations (Canada undated);
- Nunavut Waters and Nunavut Surface Rights Tribunal Act (Canada 2002);
- Nunavut Waters Regulations (Canada 2013);
- Fisheries Act (Canada 1985b), and applicable regulations;
- Arctic Waters Pollution Prevention Act (Canada 1985c);
- Arctic Waters Pollution Prevention Regulations (Canada undated);
- Transportation of Dangerous Goods Act (Canada 1992);
- Transportation of Dangerous Goods Regulations (Canada 2001);
- Environmental Protection Act (Nunavut 1988a);
- Environmental Rights Act (Nunavut 1988b);
- Mine Health and Safety Act (Nunavut 1994); and
- Mine Health and Safety Regulations (Nunavut 1995).

The primary regulatory instruments applicable to mine closure in Nunavut are however land use authorizations and water licences.

Surface rights for Inuit Owned Land (IOL) are vested in the Kitikmeot Inuit Association (KIA), which administers the access and management of the IOL for the benefit of the Inuit in the region. This is done through land use permits and lease agreements.

Use of water resources and waste disposal in Nunavut is regulated by the Nunavut Water Board, and the Project will require a Type A Water Licence for mine development, pursuant to the Nunavut Waters Act. The closure and reclamation plan, including the associated cost estimate, will require approval under the water licence.

1.5.2 Applicable Guidelines Related to Mine Closure

The following guidelines are applicable to mine closure planning in Nunavut:

- Mine Site Reclamation Policy for Nunavut (INAC 2002); and
- Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories (MVLWB and AANDC 2013).

Although the NWT guideline applies outside of the Nunavut jurisdiction, it is considered as current best practice. This ICRP adheres to the content and reporting structure recommended in the NWT guideline, where no contradictions were found with the applicable NU policy.

1.5.3 Environmental Assessment Requirements

This ICRP will accompany the final environmental impact statement (FEIS) prepared for the Madrid-Boston Project and incorporates changes requested during the review process of the draft environmental impact statement (DEIS) submitted to the Nunavut Impact Review Board (NIRB) in December 2016 (SRK 2016).

As Project development advances, the level of detail contained in this ICRP will undergo further revisions to reflect the progress of the Project as well as changes in technology and/or standards or legislation. As required, the ICRP will include thresholds and identified adaptive management responses. Revisions should consider input from consultations with communities and other stakeholders.

1.6 Closure Principles

The site has been designed with closure in mind and throughout operations every effort to apply progressive reclamation will be evaluated and implemented where practical to do so. With this in mind, the overall objectives of this Plan are as follows:

- Establish stable chemical and physical conditions; and
- Ensure the future use and aesthetics of the project site following reclamation activities meets the requirements of Aboriginal, Federal and Territorial governments, landowners, local communities and regulatory authorities.

These closure principles and the subordinate objectives, criteria, and strategies presented in this report have been developed in accordance with the Nunavut Mine Site Reclamation Policy (DIAND 2002) and the Northwest Territories mine site reclamation guidelines (MVLWB / AANDC 2013).

In terms of future land use, some surface infrastructure components at the site may be considered a substantial contribution to the development of Nunavut and could be left in place after closure following consultation with all interested parties. For example, the fuel storage, airstrip, jetty, roads and rock pads can be used as a base for other projects in the area. However, for the purposes of this report it has been assumed these structures and facilities will all be removed and/or reclaimed to acceptable standards. Closure and reclamation of these facilities is also accounted for in the supporting cost estimate.

2 Project Environment

2.1 Climate

The climate in the Hope Bay Project area is one of extremes. There is relatively little precipitation, and temperatures stay below freezing for most of the year, reaching over 20°C for short periods in the summer. Summer is a season of nearly constant light, while darkness, twilight, and extreme cold dominate winter.

Inuit have noted changes in climate trends (as recorded in a Naonaiyaotit Traditional Knowledge Project report), and their observations are supported by historical climate data collected over the last half century. While predicting the effects of climate change is difficult, effects are believed to include higher temperatures and precipitation, which in turn may affect permafrost and snow depth.

Air quality in the Hope Bay Project area and elsewhere in Nunavut is generally of good quality, reflecting the low amount of air pollution from large populations. Outside of the Hope Bay Project area, most air emissions are from the use of diesel generators, heaters, vehicles, snowmobiles, all-terrain vehicles and boats. Noise levels are generally low.

Detailed climate and air descriptions is provided in the main FEIS document (TMAC 2017) .

2.2 Physical Environment

The Project is located on the Canadian Shield. Exposed bedrock outcrops are common, and mostly devoid of vegetation. Surface observations and subsurface investigations of the foundation soils found the proposed project area is characterized mostly by marine deposits of silty-clay with trace sand, with small pockets of glaciofluvial deposits of coarse sand and some gravel. Eskers are common in the southern part of the larger Phase 2 project area, but not within the disturbed footprint of the proposed Doris-Madrid sites.

Project-wide overburden consists of permafrost soils which are mainly marine clays, silty clay, and clayey silt, with pockets of moraine till underlying these deposits. The marine silts and clays contain ground ice ranging from 10 to 30% by volume on average, but occasionally as high as 50%. The till typically contains low to moderate ice contents ranging from 5 to 25%. Overburden soil pore water is typically saline due to past inundation of the land by seawater following deglaciation of the Project area. Salinity measurements (EBA 1996) range from 3 to 48 parts per thousand, which depresses the freezing point and contributes to higher unfrozen water content at below freezing temperatures.

Permafrost at the Project area extends to depths of about 565 m, with an average geothermal gradient of 0.021°C/m. Active layer depth in overburden soil averages 0.9 m, with a range from 0.5 to 1.4 m (SRK 2017b).

General foundation conditions, material properties for geotechnical analysis, and development of the overburden isopach surface are described in more detail in SRK (2017b).

2.3 Biological Environment

Where rock outcrops, water, and cliffs are absent on the landscape, trees and summer flowers are numerous and dense in the tundra of the Project area. Trees are short and stunted forms of dwarf birch, green alder, willow, and white and black spruce can be found in some areas. Sedge meadows and wetlands are common in low-lying moist areas. More than 870 plant species grow in the Project area, including many species of lichens, mosses, and algae.

Terrestrial animals in the region include barren-ground caribou (of the Dolphin/Union, and Beverly herds), muskox, grizzly bear, wolverine, and grey wolves, as well as several species of raptor, waterfowl, and upland breeding birds. Caribou and caribou hunting are central to Inuit culture, identity, recreation, and kinship and are of economic importance to the Inuit and other residents of Nunavut.

Four species of cliff-nesting raptors (peregrine falcon, gyrfalcon, rough-legged hawk, and golden eagle) and three ground-nesting raptor species (snowy owl, short-eared owl, and northern harrier) may live in the area. Waterbird species in the Project area include geese, tundra swan, several species of ducks, gulls, Arctic tern, four species of loons, and sandhill crane.

A total of fourteen fish species are found in lakes, ponds, and streams in the Project area. The most common fish species is the Ninespine Stickleback, followed by Lake Trout, Arctic Char, Arctic Grayling, Slimy Sculpin, Lake Whitefish, Cisco, Least Cisco, Burbot, and Broad Whitefish.

3 Project Overview

3.1 Project Timeline

The Project involves construction, operation, and closure of underground mines at Doris, Madrid North, and Madrid South as well as mineral processing facilities at Doris and Madrid North. In addition, the Project will consist of extended operations, then closure of existing facilities at Doris and Roberts Bay. A graphic representation of the timelines is presented in Figure 2. The stages associated with the Project are as follows:

- Operations, Phase 1: Operations of the Doris Mine, already permitted under an existing water license (2016 to 2021)
- Construction, Bulk Sample
  - Madrid North Mine (2018)
  - Madrid South Mine and access road to Madrid South (2019)
- Construction, Phase 2
  - Madrid North Mine (2019)
  - Madrid South Mine (2029)
  - Boston Mine, and access road to Boston (2019 to 2023)
  - Expansion of the TIA infrastructure at Doris (2019)
  - Expansion of the Doris infrastructure (cargo dock, fuel storage) to support Phase 2 (2019 and 2020).
- Operations, Phase 2
  - Madrid North Mine (2019 to 2031)
  - Madrid South Mine (2029 to 2032)
  - Boston Mine (Years 2022 to 2029)
  - Extended operation of the infrastructure at Doris (2019 to 2032).
- Closure: Closure of all facilities (2032 to 2035).
- Post-closure: Post-closure monitoring (Years 2034 to 2044).

Although the Boston Mine operations are not regulated under the Doris-Madrid Water Licence, they were included in the overall schedule above for completeness.

The Doris-Madrid mine plan consists of underground mining of 16.1 Mt of ore, over an approximately 14-year mine life (TMAC 2017). Ore processing will occur at Doris at a maximum rate of 2,400 t/day and at Madrid North at a maximum rate of 1,200 t/d.

Gold recovery from ore will involve three generic steps, as follows:

- *Step 1 – milling and flotation*: the ore is crushed and ground followed by classic flotation methods (without cyanide) to separate a gold concentrate representing about 6-8% of the original ore. Flotation tailings will be produced at Doris and Madrid North processing facilities, representing about 92-94%% of the original mass of ore. The tailings is pumped to the Doris TIA for disposal from either processing facility.
- *Step 2 – cyanide leaching and resin absorption*: the gold concentrate is ground finer and mixed with cyanide solution to leach the gold. The gold from solution is then captured on a special resin resulting in a cyanide leach tailings cake. The residual cyanide in these tailings is destroyed through a detoxification process. The detoxified tailings cake is then used as underground backfill. Flotation concentrate from Madrid North will be hauled to Doris, where the cyanide leaching will be completed.
- *Step 3 – electrowinning and smelting*: the gold bearing resin and the clarified gold-bearing cyanide solution is processed through electrolysis to precipitate the gold which is then smelted to produce gold doré (unrefined gold bars), the final product from the mine.

3.2 Geochemical Characterization

Extensive geochemical testing and characterization have been completed on the Project (SRK 2017c, 2017d, 2017e). This includes characterization of ore, tailings, waste rock and quarry material that will be used in construction.

Waste rock and ore from Doris, Madrid South and Madrid North have a low risk of acid rock drainage (ARD). The primary geochemical concern with respect to waste rock and ore is neutral metal leaching, specifically arsenic. Only quarry or waste rock with low risk of ARD and metal leaching will be used to construct permanent surface infrastructure.

Flotation tailings are classified as non-potentially acid generating (non-PAG), with potential for leaching of arsenic under neutral pH conditions. The detoxified cyanide leach tailings are classified as potentially acid generating (PAG), with dissolved metal concentrations expected to increase under acidic conditions. However, based on humidity cell testing, these tailings are expected to remain neutral for decades, with potential for arsenic leaching under neutral conditions like the flotation tailings.

All material used for reclamation will be sourced from approved quarries or existing stockpiles (Quarry #2 and Quarry #3). Where overburden soils will be used for reclamation, a sampling and testing program will be carried out to ensure no chemical or hydrocarbon contamination exist within the stockpiles. The CCME soil quality guidelines (CCME 2015) and the Nunavut Environmental Guidelines, Industrial Land Use, Coarse-Grained Soils (Government of Nunavut 2009) will provide guidance to the acceptability of these materials.

3.3 Tailings Management

Flotation tailings will be produced at Doris and Madrid North, with cyanide leach tailings only produced at Doris.

Flotation tailings from Doris and Madrid North will be deposited in the Doris TIA, which will be expanded from the 2.5 Mt Phase 1 facility to a storage capacity of 18.0 Mt. To accommodate the additional tailings from Phase 2, the South Dam will be raised and a new West Dam will be constructed. The North Dam will remain unchanged. Flotation tailings will be spigotted from the south and eastern end of the facility forming a beach with a slope angle of approximately 1% with a reclaim pond at the north end of the facility against the North Dam. The Interim Dike, from Phase 1, will be buried by the tailings as deposition progresses.

Filtered detoxified cyanide leach tailings will be mixed with waste rock and used as backfill underground at Doris and Madrid North. At closure, these mines will be flooded which will prevent further development of ARD and the release of acidity and/or metals. Based on the mine schedule and estimated reflooding times, at closure, the detoxified leach tailings backfill at Doris will not become acidic. In the Madrid North mine, some of the detoxified tailings may become acidic prior to flooding.

3.4 Waste Rock and Ore Storage

The current mine plan requires all mine waste rock be used for underground backfill (TMAC 2017). During early operations, a portion of the produced waste rock will be temporarily stored on the surface in waste rock piles located at Doris, Madrid North and Madrid South; the remainder will remain underground. All waste rock stored on the surface will be hauled underground for backfill prior to mine closure. The deficit in backfill material will be supplemented from quarry rock.

In the event localized ARD is produced, it is anticipated that the high carbonate content in the overall waste rock stockpiles would provide sufficient buffering capacity that the overall drainage from the stockpile would remain neutral to alkaline. During operations, all runoff from the waste rock piles and ore stockpiles will be collected in contact water ponds.

3.5 Water Management

Water encountered at the Doris and Madrid is classified into five categories based on the contact surface. Each type of water is managed separately to achieve the water management goals

Table 3: Water Classification, Management and Discharge Approach

Type	Contact Surface	Management Approach	Discharge Approach
Non-Contact Water	Undisturbed runoff, and runoff from access roads and overburden piles.	Manage sediment where required according to Best Management Practice (BMPs)	Discharge to natural catchment downstream of sediment controls (if required)
Mine Water	Water which enters the underground workings	Pumped to Marine Mixing Box at Doris	Discharged to Roberts Bay
Contact Water	Runoff in contact with waste rock, ore stockpiles, and tailings	Contained in diversion channels and storage ponds, transferred via pumped pipelines	Used in processing as make-up water or pumped to the TIA
Freshwater	Freshwater from lake	Pumped from Windy Lake existing or proposed intake systems for potable and industrial use. Pumped from Doris Lake for concentrator make-up water	Not applicable
Treated Sewage water	Domestic sewage	Treated on-site	Discharged to the TIA or the tundra

3.6 Ancillary Facilities

Site layouts, including a work breakdown structure, for all expected facilities are provided in Figure 3 to Figure 11. Ancillary facilities at the Project site will include process plants, power generation, worker accommodations, administration offices etc.

4 Permanent Closure and Reclamation

4.1 Definition of Permanent Closure

According to the MVLWB and AADNC (2013) "*Permanent closure is the final closure of a mine site with no foreseeable intent by the existing proponent to return to either active exploration or mining*". This indicates that once closure activities on the site are complete, the site is anticipated to have no activity except post-closure monitoring and maintenance. Permanent closure does not preclude future exploration and mining activities.

4.2 Decision to Close

Permanent mine closure will occur when either all mineable and economic mineral reserves have been exhausted, or if for other reasons, over a sustained period of time, the Project is no longer a viable economic proposition. Since permanent closure will affect mine employees, suppliers and the public, careful consideration will be taken in any decision to close.

4.3 Overview and Schedule

Some mine infrastructure may stay in place should the local communities, KIA, government or other bodies choose to take ownership of it. Additionally, as outlined previously, some mining infrastructure could be reclaimed prior to closure. The closure schedule is outlined in Figure 2; however, assumes that all infrastructure associated with the Project will be removed during the final closure stage. Based on this schedule, closure is expected to take less than three years.

4.4 Description of Mine Facilities

Figure 1 shows the geographic location of the Doris-Madrid Project. In this Plan, the Doris-Madrid site is described by facility type. Each facility type may be present at multiple work areas. Each Facility is assigned a work breakdown structure (WBS) code. A complete list of the facilities, work area, associated WBS code and the corresponding section of this plan that describes each facility is provided in Appendix A. Detailed descriptions of each area are provided in the following sections.

4.4.1 Underground Mine Workings

Underground workings will be located at Doris (Figures 3 and 6), Madrid North (Figures 8 and 10), and Madrid South (Figures 9 and 10). Each mine will have a portal with a decline and associated vent raises. Some of the vent raises have various associated facilities like the Mine Air Heating Facility and a fuel tanks, while others have only a plenum and emergency shelter facilities on surface. Access to each of these facilities is through all-weather access roads.

The underground mining methods are similar in all three areas, with sublevel long hole retreat (SLR) method followed by a combination of cemented rock fill (where required) and unconsolidated waste rock backfill. Filtered detoxified cyanide leach tailings will be mixed with the waste rock prior to backfill. Ore is extracted from sublevel panels and hauled to surface by truck. Once a stope block is finished, backfill can be introduced to fill and stabilise the area. This way a large proportion of the waste rock will be used directly as backfill, without the need of hauling it to surface. Crown pillar recovery trenches (CCRT) will be excavated at each of the mines breaking through to the surface, and will be completely backfilled as part of normal operations.

A combined quantity of nearly 24 million tonnes of ore and waste rock will be mined, over the 14 years of the proposed mine life, representing 16.1 million tonnes of ore and about 7.8 million tonnes of waste rock. The quantities of waste rock are in fact insufficient to satisfy the backfill requirements, with an additional 1.8 million tonnes of quarry rock being required TMAC 2017.

The Doris mine will be partially located in permafrost and will intercept the Doris Lake talik (SRK 2015), whereas the Madrid North and Madrid South mines will intercept unfrozen ground, either at the edge of the open taliks formed by Wolverine Lake and Patch Lake or in the subpermafrost (SRK 2017f). Results of the groundwater modelling suggest that the maximum mine inflow at the Doris Mine will be in the order of 2,650 m^3/day, gradually decreasing to about 1,630 m^3/day. Maximum predicted inflows at Madrid North and Madrid South will be in the order of 1,180 m^3/day and 550 m^3/day respectively. Water from the lakes will contribute about 70% at Doris, 96% for Madrid North and 90% for Madrid South, with the remainder coming from deep regional groundwater. In all instances, the elevation of the mine openings at surface (portals and vent raises) exceeds the elevation of the nearby lakes, eliminating the possibility of mine water outflow. During operations, the mine water will be pumped to the Marine Mixing Box in the Doris Mill, and onward to the Roberts Bay Discharge System.

4.4.2 Waste Rock Dumps, Ore stockpiles, and Overburden Piles

According to the guidelines (MVLWB/AANDC, 2013) this project component category includes waste rock dumps and ore stockpiles. Overburden storage dumps were included into this category for closure cost estimating purposes.

Waste rock dumps and ore stockpiles will be developed at each of the Doris (Figure 6), Madrid North (Figure 8), and Madrid South (Figure 9) areas. While footprints and shapes vary according to the storage capacity requirements and the local topography, in all instances these facilities will be located on purpose-built rock fill pads. The rock fill will be geochemically suitable ROQ from approved quarries.

According to the Water License (2AM-DOH1323) only non-mineralized waste rock may be left on surface at the end of the mine. However according to the mine plan no waste rock will be left on surface. It is assumed that all ore will have been processed at the end of the mine life. The top layer of the rock fill of the Ore Pads will be removed and disposed of in the TIA or underground. The remaining clean rock will be regraded to prevent permanent ponding.

Overburden dumps were developed at Roberts Bay (Figure 4), Doris, (i.e., Quarry#2 Overburden Dump (Figure 6), and Quarry D, i.e., the drill core laydown (Figure 3)). No such facilities are being planned for Madrid North and Madrid South. These facilities were built directly onto the tundra and do not have a rock fill pad as base. The Roberts Bay Overburden Dump is comprised mainly of oversize rock from the excavation of the Roberts Bay Fuel Tank Farm and pockets of overburden soils. The top of the Overburden Dump was covered with a layer of crushed rock. The 2H:1V side slopes are constructed of oversize rock and are stable. The Quarry #2 Overburden Dump is comprised largely of the soils and snow/ice excavated from the North Dam key trench and the various other excavations around the Doris Camp area. It was built in a wedge shape, with a steeper side-slope of three sides and a more gently sloping top surface. The quarry D overburden pile is relatively small and was shaped with a flat top surface to serve as drill core laydown.

Contact water ponds are located downstream of each of the waste rock dumps and ore stockpiles. The berms containing these ponds will be constructed based on a common design section, with a frozen foundation and a geomembrane incorporated into the fill as the water retaining element. Downstream of the overburden piles sedimentation berms are constructed. These are simple structures that aim to slow down and elevate the head of water and allow the sediments to fall out and do not incorporate impermeable geomembranes.

4.4.3 Tailings Impoundment Area

The Doris TIA area is located approximately 1.5 km east of Doris within the basin of the former Tail Lake. The TIA is comprised of three containment structures (North, South and West dams) which contain subaerial tailings and the reclaim pond (Figure 7). Flotation tailings will be spigotted in the south and western side of the facility, creating a tailings beach against the South and West dams and pushing the water in the Reclaim Pond against the North Dam. No tailings will be deposited placed against the North Dam.

Only flotation tailings will be deposited within the TIA. Detoxified leach tailings will be mixed with waste rock and placed underground as backfill. The flotation tailings are non-PAG, and can therefore, be deposited subaerially and closed using a dry cover.

Water from the Reclaim Pond will be used for make-up process water in the Doris Processing Facility and the Madrid North Concentrator. Excess TIA water will be pumped to the Marine Mixing Box and onward to the Roberts Bay Discharge System.

4.4.4 Buildings and Equipment

A complete itemised list of all buildings and facilities is presented Appendix A. The following general categories of buildings exist or will be constructed at Doris-Madrid:

- 400-person camp facility and associated utilities;
- Ore beneficiation facilities (Doris Process Plant and Madrid North Concentrator);
- Maintenance shops;
- Offices and Mine Dry;
- Warehousing;
- Fuel tank farms;
- Reagent and explosives storage facilities;
- Diesel power generation plants and wind power generators; and
- Air heating facilities for underground ventilation.

Buildings and facilities are constructed in clusters at Roberts Bay, Doris, Madrid North, and Madrid South.

There are few buildings and facilities at Roberts Bay (Figures 3 and 4). This is an area primarily serving as the marine transportation hub for fuel, materials and supplies, with the Cargo Dock and the Jetty located here. The three main fuel tank farms are located here, with a combined storage capacity of 45 million liters.

The Doris Camp is located approximately 5 km south of Roberts Bay and is shown on Figures 3 and 6. This is the centre of operations for the Project. It includes the up a 400-person accommodation complex, an office complex, and a mine dry facility linked by an arctic corridor. A primary and a backup power plant, together with warehousing and mining operations support buildings and facilities are located here. The Process Plant, including crushing and milling facilities are located in a large. A fuel tank farm of 7.5 million liters and a firewater tank are also found at Doris.

The Madrid North area is located about 14 kilometers from Roberts Bay (Figure 3). The facilities include a Concentrator and mine support facilities such as offices, warehousing, and mechanical shop. A diesel power plant and a backup generation unit will be installed at Madrid North, together with a fuel tank farm with storage capacity of 4.5 million liters.

Typical mine support structures are located at the Madrid South area, which is about 19 km south of Roberts Bay (Figure 3).

All buildings and structures are located on bedrock or non-acid generating rock-fill pads. The rock fill pads were constructed to ensure positive drainage and prevent permanent ponding. All areas are accessible by all-weather roads.

Tall structures like the communication towers consist of steel girders. The largest structures like the Doris Process Plant and the Madrid North Concentrator are steel frame buildings with sheet metal siding. Some of the buildings, e.g. the Doris Office and Mine Dry Complex, were assembled from Seacan containers, while other structures like the Doris Coreshack are steel frame tent structures. Each of these buildings were inventoried in the closure cost estimate and the dimensions were obtained from engineering drawings or estimated from site photographs.

Utilities to the buildings are distributed through utility corridors slightly elevated on steel structures. Pipelines, where running water and sewage is provided, are insulated and heat traced.

The wind power generators will be located on bedrock pads along spur roads near the main roads. Two generators will be located just south of Doris (Figure 3), two between Madrid North and Madrid South (Figure 10 and 11), and the last two just north of Boston (Figure 11).

The main Explosives Storage Facility will be built along the Secondary Road near the South Dam, as shown in Figure 7. This facility will be comprised of a series of storage pads for high explosives and ammonium nitrate. The high explosives storage pads will be located west of the road, whereas the two AN/FO pads will be built east of the road.

4.4.5 Mine Infrastructure

A complete listing of all infrastructure is provided in Appendix A. The following general categories are included:

- Rockfill pads;
- All-weather roads (about 70.5 km total) and associated water crossings (bridges and culverts);
- All-weather airstrip and ice airstrip;
- Roberts Bay cargo dock and jetty;
- Quarries (a total of 28); and
- Laydown areas.

Nearly all facilities already built or planned to be built at Doris-Madrid have a rock fill pad foundation (Figures 4, 5, 6, 8, 9, 10), with notable exceptions like the overburden dumps, tailings area, and facilities constructed on bedrock outcrops. The purpose of the rock fill pads is to protect the underlying permafrost and ensure the physical stability of the structures and facilities built upon them. Only geochemically suitable run-of-quarry (ROQ) rockfill can be used to build these pads. ROQ is sourced from approved quarries around the project sites. The top of these pads is in general flat, or slightly sloped towards the edges to promote run-off. The side-slopes are typically 1.5H:1V for fill thicknesses up to 2 m and 2H:1V where fill thickness exceeds 2 m. In some cases, a 0.15 m thick surfacing layer of crushed gravel is placed on top of the pads.

The all-weather roads were built by placing ROQ fill directly on tundra, similarly to the rockfill pads. The road fill thickness was design to ensure protection of permafrost. Turnouts were built in suitable locations to allow two-way traffic. The typical road width is 8 m, with embankment side slopes of 1.5H:1V where road fill is up to 2 m thick, and 2H:1V where road fill exceeds 2 m thickness. A surfacing layer of crushed rock is placed on the roads. All ROQ and crushed rock was sourced from approved quarry sites.

The all-weather airstrip was built by placing Run-of-Quarry (ROQ) directly on tundra, thus they are very like the roads and rock pads. The ice airstrip will be built seasonally on Doris Lake or Windy Lake, when minimum ice thickness is suitable.

The Roberts Bay jetty is a rock fill structure that extends into Roberts Bay at the south end of the bay. The Roberts Bay cargo dock will consist of a series of interlocking extruded sheet piles that are driven to bedrock and tied back with anchor sheet piles into a mechanically stabilized embankment on the western edge of the bay. All-weather access roads link these facilities to the Roberts Bay laydown areas and fuel tank farms.

A lined landfarm was constructed on the northwest corner of Doris Camp as shown in Figure 6. The purpose of this facility is temporary storage of contaminated soils and water. As most other facilities, it was built on a rock fill pad and has three cells separated by lined berms.

4.4.6 Quarry #3 Landfills

The source of all rock fill material for the TIA (the Secondary Road extension, the South Dam and the West Dam) will be Quarry #3 (Figure 7). The quarry, located on a natural rock outcrop, will be developed in a manner that avoids collecting and impounding any water. Once quarry operations are complete, a non-hazardous waste landfill will be constructed in the northeast corner of the developed quarry. The landfill will contain only inert waste and no leachate will be generated.

4.4.7 Water Management Systems

The water management system at Doris-Madrid consists of pipelines, ponds, and collection sumps. A complete listing is provided in Appendix A.

Tailings and reclaim water pipelines will be constructed between the TIA and the Doris Process Plant (Figures 3) and the Madrid North Concentrator (Figure 3) respectively. The Roberts Bay discharge system (Figures 3 through 6) will convey the combined groundwater inflow from the underground mine and excess reclaim water from the TIA Reclaim Pond to the undersea diffuser located at the 40 m bathymetric contour line in Roberts Bay. The pipeline will originate in the process building, and it will consist of a single heat-traced 254 mm HDPE pipe. Various other fresh water and sewage discharge pipelines will also be built (Figure 6).

The pipelines will be routed along roads and on rock fill pads wherever possible or placed on appropriate supports, if needed, where any sections must be routed on the tundra. Insulation and heat tracing is typical for pipelines in cold environments.

All contact water and pollution control ponds (Figures 6, 8, and 9) will be unlined and contained by frozen foundation berms incorporating an impermeable liner. These ponds will be operated as normally empty. The Doris Sedimentation Pond is the only fully lined pond. Other sedimentation ponds are not lined and do not have frozen foundations.

4.5 Permanent Closure and Reclamation Requirements

4.5.1 Underground Mine Workings

The specific closure objectives for the underground mine workings are as follows:

- Prevent access into the workings by humans and animals; and
- Ensure physical stability by stabilizing the workings as necessary to prevent surface expression of underground failures (i.e., surface subsidence).

Chemical stability of the underground workings is not a concern, as the mine openings are in permafrost above the elevation of the surrounding lakes, and thus mine water outflow following closure is not possible.

At closure, all underground utilities and installations will be removed and disposed of as appropriate. As per the mine plan, most workings will be backfilled with waste rock, detoxified leach tailings, or quarry rock to ensure stability. All backfilling will be completed as part of regular mine operations, and will therefore occur before closure. The entrance of the underground portals will be sealed with 15 m thick rock fill plugs. The rock fill used for the plugs will be salvaged from rock fill pads, clean quarry rock or geochemically suitable waste rock.

Ducts, pipes, and cables entering the vent raises will be removed and disposed of or salvaged as appropriate. Vent raises will be capped with appropriately sized structural concrete plugs to prevent access, and appropriate signage will be posted to warn of existence of these sealed openings. A detailed engineering design will be completed prior to closure to determine the risk of subsidence and determine the most suitable cap design.

The areas surrounding the portals and vent raises will be regraded as required to ensure positive drainage away from the openings and blend in with the surrounding terrain as much as possible.

Appurtenant facilities will be demolished or removed and the debris will be collected and disposed of as appropriate. Where present, the fuel tanks will be decommissioned, drained, and hauled to Roberts Bay for shipping off-site. The liner of the secondary containments will be cleaned, removed, cut into pieces, and disposed of as non-hazardous waste. The area will be backfilled and regraded to prevent permanent ponding.

Access roads will be graded to prevent ponding and culverts will be removed to restore the natural flow paths.

Once mining ceases and the mine workings have been prepared for closure, the mine dewatering pumps will be switched off and the mine will reflood. Doris mine will reflood in about 1.7 years (SRK 2015), Madrid North in about 19 years, and at Madrid South Mine in about 9.5 years (SRK 2017f).

4.5.2 Waste Rock Dumps, Ore stockpiles, and Overburden Piles

The closure objectives for each of these facilities are to ensure physical and chemical stability of any residual facilities. Leachate emanating from rock fill pads must be safe for the environment.

While physical stability of side slopes of the rock fill pads is inherent through the design of the pads, the overburden stockpiles will be regraded to a stable landform as required and revegetated where possible. Leachate quality from the rock fill pads is not expected to be a problem as only geochemically suitable rock is used for construction. Similarly, leachate quality from the overburden dumps is not a concern, as only clean overburden and ice/snow free of contaminants was placed in these piles.

Once the waste rock and ore is removed the top surface of the underlying rock fill pads will be regraded to prevent ponding then left in place as described in Section 4.5.5

Overburden dumps will be constructed with closure in mind, and will be closed throughout the operations period when they are no longer necessary. At closure, if not already complete, the side slopes of all overburden dumps will be regraded to no steeper than 3H:1V and the final dump surface will be contoured for drainage control. Erosion protection measures will be installed as appropriate.

Contact water pond berms and any sedimentation berms will be breached to restore the natural drainage path. Pieces of liner removed from the lined berms will be disposed of in the Quarry #3 landfill.

4.5.3 Tailings Containment Area

The specific closure objectives for the TIA can be summarised as follows:

- Ensure long-term physical stability of tailings surface and associated retaining structures;
- Prevent direct contact of tailings with humans and wildlife;
- Ensure chemical stability by minimizing release of neutral metal leaching to the receiving environment; and
- Create a final landform that blends into the natural topography as much as possible.

Although the tailings surface is landscaped to allow free drainage, the tailings are susceptible to hydraulic erosion, which will mobilize tailings towards the remnant Reclaim Pond with a resultant increase in total suspended solids. Therefore, a tailings cover that functions to prevent wind and water erosion will be constructed over the entire tailings surface. This cover will also function as a separation barrier to prevent tailings contact with humans and wildlife. The minimum thickness of cover that can practically be placed over the tailings surface would be about 0.3 m thick, and therefore the cover design has been set at 0.3 m thick ROQ material.

The TIA water and load balance (SRK 2017g) confirms that neutral metal leaching does not pose a limitation in ensuring that the water quality from the closed TIA meet the required closure water water quality criteria, and therefore no infiltration reduction cover is required over the tailings surface.

It was demonstrated through stability and creep analyses (SRK 2017h) that the South and West dams will remain stable after closure. The north Dam will be breached, and therefore will not perform any long-term post-closure function.

Part of the tailings will not be trafficable for some years following tailings placement. Therefore, to place the cover over those areas, winter construction over a frozen tailings surface will be required. Although thermal modeling has demonstrated that the bulk of the tailings mass will freeze back in the long term, and remain frozen for the foreseeable future (SRK 2017h), consolidation settlement in the 2-m thick active layer can still be expected (SRK 2017h). In addition, should ice lenses develop within the active layer of the tailings beach, it could further contribute towards long term differential settlement of the tailings surface and subsequently any associated cover system. Such differential settlement will however not negatively affect the cover performance since localized ponding that might result, would not prohibit the cover from ensuring that wind and water erosion is mitigated.

Water quality in TIA will continue to be monitored after completion of the mining and milling activities. According to the water quality model (SRK 2017g) the constituents of concern in the Reclaim Pond originate mainly from the process water. Once active milling operations are concluded, the tailings pore water contribution to the Reclaim Pond is less of a concern with respect to meeting discharge water quality criteria.

As a first step in the reclamation of this facility all of the remaining inventory of water will be discharged to the ocean through the Roberts Bay Discharge System, at the rate as specified in the Water License. The small residual pond area will then be backfilled to prevent ongoing impoundment of water.

Once the isolation cover is completed, the North Dam will be breached and the natural flow path re-established. The breach will be 20 m wide, cut to the original ground elevation (of 28.3 masl) with 4H:1V side slope. The cut slopes will be covered with a 2.5 m thick layer of ROQ material to ensure physical and thermal stability (SRK 2017h). The cut in the dam will be clad in rip-rap for erosion protection. Tail Lake outflow will be re-established along the base of the cut and suitable bedding material will be put in place to ensure channel stability.

All instrumentation will be removed and salvaged or disposed of, as appropriate.
The thermosyphon radiators will be dismantled, and the support superstructure cut at ground level and removed. The buried evaporator pipes of the thermosyphons and the sub-surface sections of the ad-freeze piles will be left in place.

The South Dam and the West Dam will be left in place as the retaining structure of the subaerial tailings. No water is anticipated to be ponding against these dams, thus no additional closure activities are required.

4.5.4 Buildings and Equipment

The overall objective is to restore areas occupied by buildings to a condition compatible with future land use, and to ensure that the buildings and facilities are not, and will not become a source of contamination to the environment or a safety hazard for human activity or wildlife.

The only practical option is to remove all buildings and structures.

Prior to demolition hazardous wastes and chemicals remaining on-site will be collected and placed in sealed containers suitable for storage and shipping. This includes any remaining fuel, hydraulic oil, antifreeze, batteries, and other lubricating fluids and chemicals. All materials will be packaged and manifested at the Waste Management Facility for transport to a licensed facility in accordance with appropriate Federal, Provincial, Territorial, or Municipal hazardous waste regulations, for reuse or disposal.

Reusable equipment and supplies will be salvaged from the camp buildings and facilities prior to demolition and shipped off-site to a third-party destination, or point of sale. No salvage value was credited in the cost estimate. Where salvage is not possible, or not practical, the equipment will be decontaminated, drained of all fluids, and consolidated within the Quarry #3 Landfill for final disposal. An inventory of disposed equipment will be completed, together with a photographic record.

All utilities to structures and facilities will be decommissioned, disconnected, and dismantled while the structures will be emptied prior to demolition. All buildings will be dismantled or demolished and the debris will be placed in the Quarry #3 Landfill. All other facilities will be decommissioned, demolished, levelled, and the debris placed in the landfill

Concrete floors will be broken up and covered in place. Concrete wall foundations will be demolished flush with the existing ground and the remnants covered in place. All seacan containers will be removed or disposed of the in landfill.

The facilities directly associated with the (Doris Process Plant and Madrid North Concentrator) will be cleaned of all remaining chemicals and process reagents and the resulting hazardous waste disposed of in licensed off-site facilities. The residual ore and ore dust will be removed by flushing the equipment and/or washing with high pressure water. The collected solids will be slurried and pumped to the TIA. The steel frame buildings will be disassembled and disposed of in the Quarry #3 Landfill. The concrete bases will be broken up and covered in place using rock fill. The milling and processing equipment will be decommissioned, cleaned, and prepared for shipping off-site. No salvage value is assumed for this equipment.

Underground equipment will be salvaged or placed in underground workings for final disposal. Equipment placed underground will be decontaminated and stripped of any hazardous components such as batteries, and drained of all fluids and lubricants.

The bulk fuel storage facilities at Roberts Bay, Doris, and Madrid North will be decommissioned and the tanks dismantled. The tanks will be pressure washed and the water resulting from pressure washing will be treated through an oil / water separator. The residual fuels from all Doris-Madrid tank farms and portable fuel storage will be consolidated in one tank at Roberts Bay and then transferred into a fuel barge to be hauled to Cambridge Bay and gifted to the community. The granular protective cover of the tank farms will be tested for the presence of unacceptable levels of hydrocarbons. Remediation options will be determined following the testing, to be appropriate for the type and extent of contamination. If required, this material will be placed in mega-bags and disposed of underground. The geosynthetic liners will be removed and the containment berms breached to prevent ponding of water and reshaped to conform to the original topography as much as possible.

The wind power generation units will be carefully dismantled and hauled to Roberts Bay in preparation for shipping to a third-party location. The foundation blocks and anchors will be left in place and covered with ROQ. For cost estimation purposes, it was assumed that decommissioning and dismantling costs are equal to initial construction costs. No salvage value was credited in the cost estimate.

The explosives facility will be dismantled. The magazines will be emptied and disposed of in the Quarry #3 Landfill. Any residual prepared explosives will be disposed of underground. Remaining blast caps will be destroyed by a qualified person.

4.5.5 Mine Infrastructure

The reclamation objective for the rock fill pads, roads, and airstrip is to ensure long-term physical and chemical stability and to protect the permafrost. Leachate emanating from rock fill pads must be safe for the environment.

Two broad options were considered: removing the pads or reclaiming them in place. The chosen option was to leave the rock fill in place, for the following reasons:

- All pads were constructed of non-acid generating clean quarry rock, thus leachate quality is not a concern, and
- Since construction the underlying vegetation has died and the permafrost will have aggraded into the rock fill, removal of the pads would therefore accelerate permafrost degradation and erosion due to lack of well-established vegetation.

The closure method is to crown the roads and regrade the pads and airstrip to ensure positive drainage and prevent ponding of water resulting in permafrost degradation. As some of the closure activities could be performed in the winter, the areas to be regraded should be staked during the previous summer to be easily identified during the winter reclamation work. Any depressions where positive drainage cannot be achieved by regrading will be backfilled with clean rock, geochemically stable drill cuttings, overburden soils, or a combination of these materials. Suitable soils from the existing overburden piles will be preferentially used.

In areas backfilled with suitable overburden soils, revegetation works may consist of application of seeds collected from the surrounding vegetation. Active revegetation of barren rock fill pads is not practical because the rock fill cannot support vegetation; however, it is expected that lichens will colonise the rock surface in time, likely decades.

Culverts and bridges will be removed from the crossings under the roads and natural drainage paths will be restored. Any area, where prolonged ponding has been observed during the operational period, will be excavated to restore drainage and thereby prevent ongoing ponding.

Where contamination of the rock fill pads has been observed or is suspected, field investigations will be completed prior to closure by qualified personnel to define the nature and extent of contamination. An assessment of remediation options will be conducted once the full extent and nature of the contamination is determined. Localized areas with limited contamination could be bioremediated in-situ if appropriate. If large contiguous areas of contamination are found, excavation and underground disposal will be considered. Excavations will be backfilled with rock, overburden, drill cuttings, wood chips and/or a mixture of these to prevent surface water ponding and ensure permafrost preservation.

The Nunavut Environmental Guidelines, Industrial Land Use, Coarse-Grained Soils (Government of Nunavut, 2009) will be used for determining if soil remediation is required.

The cargo dock and the jetty will be partially removed, to an elevation 0.3 m below the low water level. The rock fill will be placed into the surrounding water. The mooring points and buoys will be removed from site.

The quarries will be decommissioned and reclaimed. All vertical faces in the quarries will be scaled. Safety berms will be left in place. The area of each quarry will be inspected by a qualified inspector, to ensure no loaded holes are remaining on-site.

At the laydown areas all overhead electrical cables, where present, will be decommissioned and the posts removed. All waste and materials will be collected and disposed of as appropriate. The surface will be regraded for positive drainage and to prevent permanent ponding.

The solid waste contained within the Land Farm cells will be tested for contaminants. If levels exceed remediation criteria, the soils will be disposed of in the underground workings. Any water contained within the ponds will be tested, treated as appropriate, and discharged when water quality criteria are met, or transferred to the TIA if criteria cannot be met.

The liner of the Land Farm will be removed, cleaned, cut in pieces and disposed of as non-hazardous waste. The protective cover layer of crushed rock over the liner will be removed, tested, and if it meets the appropriate reclamation criteria will be used as backfill. If the testing program finds that the cover material is contaminated, it will be placed in mega bags and disposed of underground. The containment berms will be levelled and the area regraded to prevent ponding of water.

Areas where vegetation has died and permafrost degraded at the Sewage Treatment Plant discharge point will be backfilled with a suitable fill material to prevent permanent ponding. The sewage discharge pipeline will be flushed, cut up, and removed. The resulting debris will be disposed of in the landfill.

4.5.6 Quarry #3 Landfill

The objective of the closure for this facility is to have a physically stable structure, with all waste isolated from human and wildlife contact and will not become a source of contamination to the environment. Surface water run-off and seepage water quality must be safe to humans and wildlife.

At closure, the only solid waste management structure remaining will be the Quarry #3 landfill. Release of contaminants will be prevented by placement of only non-hazardous waste in the facility, with all other waste being managed by other appropriate means. The landfill will be located entirely on bedrock, and will be covered with a 0.3 m thick isolation cover built of a single layer of ROQ, which is erosion resistant. The cover will be engineered to accommodate any settlement the waste may have in time. Appropriate drainage pathways will be engineered to prevent ponding of water in the facility. The final surface of the landfill will be graded like the foundation base grade, of 1%, to shed water. Permafrost will partially aggrade into the landfill waste over time.

4.5.7 Water Management Systems

The closure objectives for all pipelines are dismantling and removal. All pipelines will be flushed, drained, and the heat tracing system will be decommissioned. Heat tracing controllers and power cables will be removed and landfilled. The pipeline will be cut into manageable sections which will be placed in the landfill. All pipeline supports will be removed and disposed of as appropriate. The Marine Outfall Pipeline will be left in place. The Marine Outfall Berm will be partially removed, to an elevation 0.3 m below the low water level, similarly to the Jetty. The rock fill will be placed into the surrounding water.

The overarching closure objective for the water management ponds is to restore the natural drainage paths where possible and to prevent excessive erosion while ensuring that no long-term active care and maintenance is required. In areas where permanent discharges exist, engineered discharge points (spillways) must be physically and geotechnically stable on the long-term for safety of humans and wildlife.

To achieve these objectives, options for decommissioning, breaching, or removing each of these structures will be evaluated on a case-by-case basis. The chosen option however will only be implemented when post-closure water quality objectives are met. Erosion protection and sediment control measures will be installed where necessary.

Existing water management structures will be maintained at the Project until post-closure water quality objectives are met. Once the runoff water from all areas meets the water quality objectives, the collection sumps and the pipeline to TIA will be decommissioned.
The Sedimentation, Pollution Control and Contact Water Ponds will be breached to re-establish the natural drainage path.

The sumps will be decommissioned and backfilled with crushed rock or soil from the Doris Overburden Dump.

4.6 Closure Uncertainties

Closure strategies employed in this Plan are based on a set of assumptions and predictions representing the current understanding of the environment at the Project site and the future behavior of various infrastructure components. The interim nature of this plan indicates that uncertainties still exist with regards to the closure options, which will be clarified once the detailed engineering of closure activities for each area or infrastructure component is completed at the final closure stage.

Throughout operations and into closure the results of the various environmental monitoring programs will be evaluated to confirm the closure assumptions and validate the models used to make those predictions. If monitoring data indicates that certain structures or processes behave in a different manner than anticipated during the closure planning phase, adaptive management will be adhered to and the closure plans will be adjusted to mitigate those unforeseen effects.

At this time, specific uncertainties directly affecting the closure planning were identified regarding the following closure components:

- Discharge water quality from the covered tailings surface caries uncertainty which will only become clear once operational data has been evaluated in the period immediately preceding closure.
- The type and extent of hydrocarbon contamination will not be known until final closure is started.
- Final volume of the landfill is based on a conservative estimate of the volume of demolition debris at closure. While every effort will be made to minimise the voids within the landfill, the final volume is difficult to predict accurately. This translates into uncertainty with regards to the actual footprint of the facility and the volume of rock required for the final cover.

4.7 Post Closure Monitoring and Maintenance

Based on engineering design and analysis, it is expected that post-closure monitoring will be required for ten years. However, post-closure monitoring will take place at the Project site until such time that the objectives of the closure and remediation activities have been met to the satisfaction of the regulatory authorities and all affected parties.

Coupled with the proper implementation of closure and remediation activities as described in this ICRP, the following post-closure monitoring will be required:

- The Project should be visually inspected on an annual basis by a Professional Engineer, for three consecutive years, and then 6 and 10 years following closure to ensure physical stability;
- Post-closure monitoring of all covers will be performed every two years, for a ten-year period, or until it is confirmed the areas are physically stable. These inspections will be completed by a qualified inspector to ensure the physical integrity of the cover is maintained. Maintenance will be performed on areas identified as needing repairs.
- The annual seep sampling program carried out in accordance with Type A Water Licence 2AM-DOH1323 will be continued to detect any changes in the leachate chemistry downstream of the remediated areas for a period of five years and then year 7 and year 10 following closure or until the leachate is confirmed to be chemically stable and consistent with the site-specific closure criteria.
- Contact Water Ponds will be monitored as part of the post-closure SNP monitoring network prior to breaching.
- Water from the Reclaim Pond will be drawn down by pumping to Roberts Bay for approximately two years following closure, following which the water in the residual pond will be backfilled. Once the tailings cover is completed, the North Dam will be breached and the natural flow path restored.

Post-closure air quality, wildlife and vegetation monitoring is not planned, as once the Project site is closed there is not expected to be any activities occurring that would warrant continued monitoring.

In addition, the monitoring requirements may again change as a result of the Performance assessment report which will be prepared and submitted to the NWB for their review following the initial post-closure monitoring period which will be defined in consultation with NWB as part of the final closure and remediation plan.

4.8 Contingencies

Specific contingencies were developed for some of the closure elements that have inherent uncertainties that cannot be quantified at this stage in the project. If any of the proposed closure strategies will be ineffective or no longer apply, new strategies will be developed in consultation with stakeholders. The subsections below provide details of these contingencies.

4.8.1 Water Quality

In the case where water quality standards cannot be met by the end of the post-closure period specified in the water management plan, the monitoring time may be extended as required. Alternatively, water treatment options could be explored once the cause of the delay is known and quantified.

4.8.2 Subaerial Tailings

The current closure plan for the subaerial tailings is a cover constructed of clean rock. In the case that water quality monitoring indicates that tailings will become a source of contaminants exceeding the presently predicted effects, the contingency of a low permeability cover was considered. The final cover configuration will be determined at later stages of closure planning.

4.8.3 Waste Rock and Ore Stockpiles

According to the current mine plan there will be no ore and/or mineralised waste rock left on surface at closure. Several alternatives were considered as contingency for any ore and/or mineralized waste rock left on surface. One option is moving the piles to TIA for placement in the tailings area. Another option is consolidating, contouring and covering the piles with an impermeable liner and a 0.3 m thick protective layer of crushed rock. Additional options may also be considered. All above ground storage options are subject to approval by NWB. A design and/or description of the final waste rock disposal or storage alternative, if required, will be included in the application for approval.

4.8.4 Climate Change Effects

Most closure activities considered climate change to the level it is currently understood. Any changes not anticipated will be dealt with at time of closure and monitored as they develop. Financial security will be updated periodically as mandated by the regulations, to consider any changes to the environment or operations.

5 Progressive Reclamation

5.1 Definition of Progressive Reclamation

Progressive reclamation as outlined by MVLWB and AADNC (2013) is defined as:

> "*Progressive reclamation takes place prior to permanent closure to reclaim components and/or decommission facilities that no longer serve a purpose. These activities can be completed during operations with the available resources to reduce future reclamation costs, minimize the duration of environmental exposure, and enhance environmental protection. Progressive reclamation may shorten the time for achieving closure objectives and may provide valuable experience on the effectiveness of certain mitigation measures that might be implemented during closure*."

5.2 Candidate Facilities/Areas and Reclamation Activities

Based on the mine plan, reclamation of entire mine areas is not expected prior to the end of operations. Opportunities for progressive reclamation of facilities while the facilities are still in operations will be identified whenever possible. Progressive reclamation opportunities that may arise include:

- Regrading and/or cover placement over any area of the TIA that will not be disturbed by future tailings placement;
- Removal, and reclamation of buildings and infrastructure that become unnecessary over the life of the mine;
- Placement of waste rock underground for backfill and the reclamation of the waste rock pile footprint, if additional on-surface storage is no longer required;
- Immediate cleanup of materials (e.g. soil, snow, ice) that may become contaminated during construction and operations due to fuel or other spills; and
- Periodic shipment of hazardous waste off-site to minimize the amount of waste requiring removal at final closure.

5.3 Reclamation Studies

There are no direct research projects currently undertaken at Hope Bay. However, monitoring data gathered as part of the compliance monitoring program is being continuously collected and periodically reviewed by qualified specialist consultants. The data gathered on site includes the following:

- Weather data;
- Seep surveys;
- Water quality;
- Flow monitoring;
- Permafrost monitoring;
- Visual observations of reclaimed areas;
- Vegetation studies;
- Dust monitoring;
- Noise monitoring;
- Wildlife surveys;
- Fish surveys and benthic fauna;
- Annual geotechnical inspections (for rock fill pad stability / road stability / permafrost stability); and
- Physical and Geochemical characterization of waste rock, ore, and tailings samples.

If any of the data is found to be indicative of problematic trends or unforeseen processes, a more detailed evaluation will be undertaken. Where appropriate, dedicated research programs will be undertaken to reduce uncertainty and evaluate the performance of specific closure methods.

5.4 Progressive Reclamation Schedule

Progressive reclamation activities will take place as opportunities arise.

6 Temporary Mine Closure

6.1 Definition of Temporary Closure

The MVLWB and AADNC (2013) define temporary closure, or Care and Maintenance as:

> "*When an advanced mineral exploration or mining operations ceases with the intent of resuming activities in the near future"*.

The duration of temporary closure is to be proposed by the proponent based on the requirements of their operation, and temporary closure could last weeks or years depending on the factors contributing to the temporary closure. Temporary closure could occur due to economic factors such as severely depressed metal prices, late delivery of critical supplies, major mechanical failures, environmental factors, or social factors such as labour conflicts.

Temporary closure could also lead to permanent closure, without the resumption of mining if the factors contributing to temporary closure cannot be resolved. If the mine were in care and maintenance and the decision was made not to resume operations, then TMAC would need to file the FCRP with the NWB, or notify the NWB that they intend to execute the latest ICRP. Following all required approvals, the final closure and reclamation measures would be executed.

6.2 Temporary Closure Principals and Goals

The temporary closure principals and goals are similar to the overall closure criteria: ensure the site is safe for humans, animals and the environment, by ensuring physical and chemical stability; and protecting the future use of the site by, where practicable, maintaining mine infrastructure in a state that is amenable to recommencement of operations.

6.3 Temporary Closure Management and Accountability Structure

Temporary closure activities will be managed by a core team of TMAC site personnel. The level of site presence will be established based on the stage of the Project, expected duration of temporary closure, and level of effort required to reach the temporary closure goals. The site caretakers would report to TMAC management.

6.4 Temporary Closure Activities

The following temporary closure activities will always occur, and is not dependant on the stage of operations when temporary closure is triggered:

- Secure and restrict access to buildings and structures;
- Lockout and secure mechanical, hydraulic and electrical systems and equipment that are not required to operate during the temporary closure period;
- Park mobile equipment in a no-load condition;
- Guard or block all underground openings and post warning signs;
- Continue all monitoring (physical, chemical, biological) in accordance with the Project licenses and permits;
- Continue all treatments (physical, chemical, biological) in accordance with the Project licenses and permits;
- Record fuel levels in all fuel tanks and regularly monitor for leaks or hazards, or alternatively remove fuel from site;
- Collect and inventory hazardous waste (processing chemicals, reagents, and petroleum products) and properly store or remove from site;
- Collect and inventory explosives, and properly store or remove from site;
- Maintain waste rock and ore piles, and tailings facilities so that they are physically stable;
- Continue surface water management measures throughout temporary closure;
- Maintain infrastructure including plowing of roads and airstrip, repairing culverts and employing sediment and erosion control measures; and
- Secure and isolate unused camp facilities.

Other activities may also be required, depending on the stage of the Project at the time of temporary closure and the expected duration of temporary closure.

6.5 Monitoring and Reporting During Temporary Closure

During temporary closure, programs will be conducted to monitor the physical and chemical stability of mine components and compliance, reclamation and environmental studies would also be continued in accordance with approved license conditions. Monitoring will also occur to maintain site security. Physical inspections will be conducted to ensure that all infrastructure are performing as designed. Monitoring, maintenance, and reporting will include:

- Reclaim Pond water levels;
- Pumping of contact water ponds and TIA Reclaim Pond, and recording of pumping volumes;
- Collection of meteorological and hydrological data;
- Physical inspections of TIA dams, access roads, pipelines, intake structures, and tailings surface;
- Ongoing water quality and environmental effects monitoring (as prescribed in the Water Licence);
- Monthly site inspections by the Environmental Superintendent or designate;
- Annual geotechnical inspections by a qualified geotechnical engineer;
- Ongoing maintenance of access roads;
- Ongoing enforcement of security and access protocols; and
- Detailed site inspections by the Environmental Superintendent or designate following extreme events, including freshet to identify and assess any damage.

All inspections will be formally recorded and provided to TMAC management. Annual monitoring reports will be prepared to present the findings of the inspections in accordance with licence requirements. Recommendations for maintenance and any suggested modifications to the monitoring program will be included in the reports.

This monitoring and the associated maintenance activities will be conducted until the Project changes status by either resuming operation or advancing to final closure.

6.6 Temporary Closure Schedule

The temporary closure activities will be carried out immediately following the stoppage of operations and the decision to prepare the site for an indefinite period of care and maintenance. It is expected that several months would be required to complete all the temporary closure activities.

7 Cost Estimate

The estimated closure cost for the Doris and Madrid mines is $58.3 million in undiscounted 2017 Canadian dollars (SRK 2017i). These costs were developed using an NWB approved spreadsheet based cost estimating process that is consistent with the principles of RECLAIM version 7.0. The basis of estimate for the closure costs was summarised under a different cover (SRK 2017i).

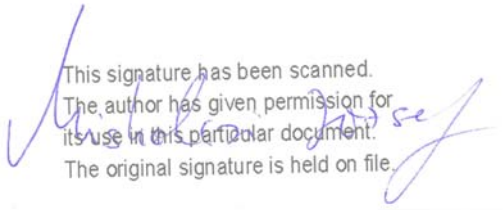
8 Schedule

Closure of the Doris-Madrid site will occur upon completion of mining and milling of ore. It is anticipated that all decommissioning and closure activities can be completed in three years. An interim care and maintenance (ICM) period of 18 months was assumed, following which final closure activities will be initiated.

Water management activities will start during the ICM period and will continue until water quality criteria are met.

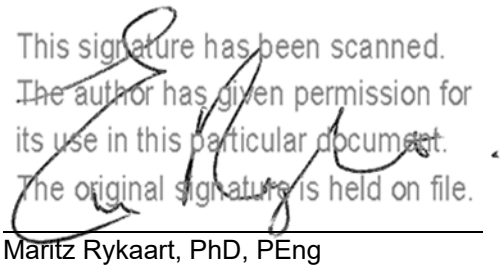
Year 3 of closure will be the initial year of the post closure monitoring and maintenance period and as discussed above will require approximately 10 years.

This report, Doris-Madrid Interim Closure and Reclamation Plan, was prepared by



Iozsef Miskolczi, MASc, PEng
Senior Consultant

and reviewed by



Maritz Rykaart, PhD, PEng
Principal Consultant

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

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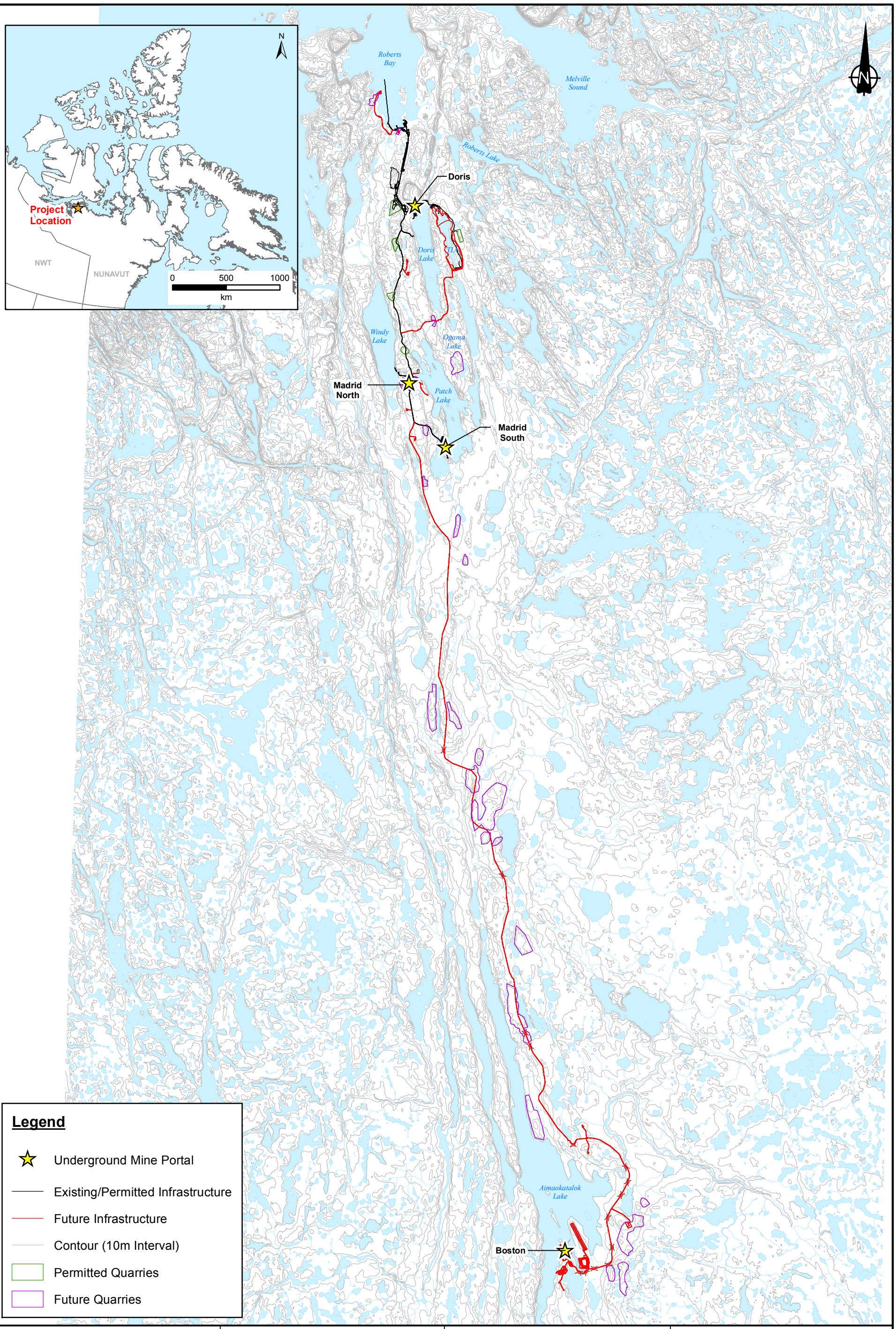
Figures


N
Project Location
NWT
NUNAVUT
0
500
1000
km
Roberts Bay
Melville Sound
Roberts Lake
Doris
Doris Lake
TIA
Windy Lake
Ogama Lake
Madrid North
Patch Lake
Madrid South
Aimaokatalok Lake
Boston
Legend
Underground Mine Portal
Existing/Permitted Infrastructure
Future Infrastructure
Contour (10m Interval)
Permitted Quarries
Future Quarries
0 2 4 6 8 10
Kilometres
Notes:
1. Coordinate System: NAD 1983 UTM Zone 13N
2. Base Topo Data: CanVec, Natural Resources Canada
srk consulting
Project No: 1CT022.013
Filename: 1CT022.004.200.10_Fig_1_DorisClosureReclamSite
TMAC RESOURCES
HOPE BAY PROJECT
Doris - Madrid Interim Closure and Reclamation Plan
Site Location Map
Date: 2017/12/12
Approved: IM
Figure: 1
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calendar year	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2038	2039	2040	2040	2041	2042
Timeline Summary	Construction Phase																									
	Operation Phase																									
														Closure Phase											
																Post Closure Phase										
PHASE 2																										
1) Robert's Bay																										
Construction of Cargo Dock																										
Construction of Fuel Storage																										
Receiving freight/fuel	Receiving freight/fuel and Backhaul																Closure	Post Closure								
2) Doris Site																										
Camp expansion																										
TIA Expansion																										
Mining																										
Processing	Processing Activities at Doris - 2,400 tpd														Closure		Post Closure									
Use of Camp and Infrastructure																										
3) Madrid North																										
Process Plant Construction																										
Road to Doris TIA																										
Mining	Mining													Closure		Post Closure										
Transporting Ore	Ore transport to Doris																									
Processing		Processing at Madrid North - 1,200 tpd																								
Transport Concentrate to Doris		Transport of Concentrate to Doris Process Plant																								
4) Madrid South																										
Mining											Mining at Madrid South				Closure		Post Closure									
Transporting Ore											Transportation of Ore to Doris															
5) All-Weather Road																										
Construction of Road																										
Use of Road				On-going use of All-weather Road for Access to Boston													Closure	Post Closure								

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TMAC RESOURCES

HOPE BAY PROJECT

Doris-Madrid Interim Closure and Reclamation Plan

Project Timeline

Date: 2017/12/12 | Approved: IM | Figure: 2

Roberts Bay

Roberts Bay Area
See Figure 4

PL - 001

Airstrip and
Reagent Pad Area
See Figure 5

Doris Camp
See Figure 6

DM - 033

DM - 034

TIA

Tailings Impoundment
See Figure 7

Quarry A Area
(See Inset 1)

DW - 005

DW-011

Doris
Lake

DW - 004

DW-012

DW - 004

MNT-003

DW - 003

DW - 001

MNT-002

MNT-004

Windy Lake

MNT-001

New Windy Camp
(See inset 2)

Old
Windy Camp

Madrid North Portal
Area
See Figure 8

Patch Lake

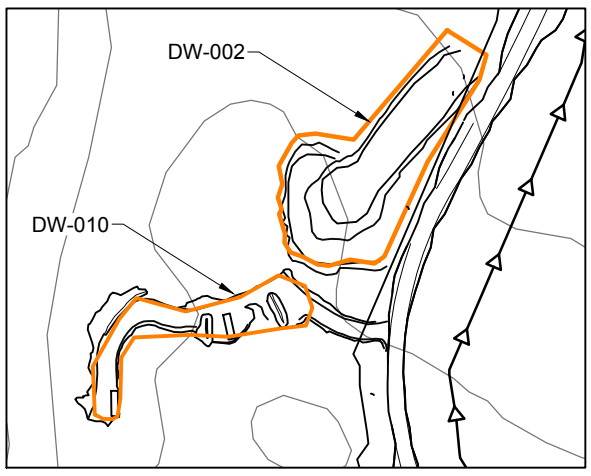
MBR-038

MBR-039

Madrid South
See Figure 9

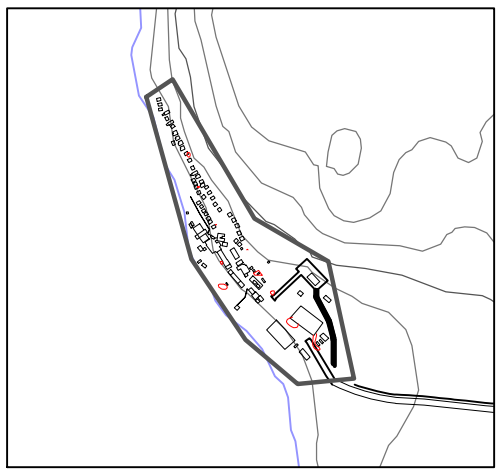
DW-001

0m 500 1000 2000 3000 4000 5000



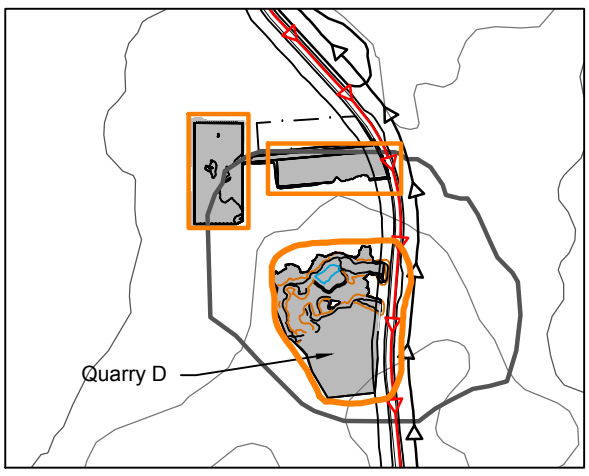
1 INSET 1 - QUARRY A AREA

0m 20 40 60 80



2 INSET 2 New Windy Camp Area

0m 50 100 150 200



3 INSET 2 New Windy Camp Area

0m 50 100 150 200

Work Area	Facility	WBS Code
Doris Windy Road	All-Weather Road	DW-001
	Quarry A	DW-002
	Quarry B	DW-003
	Clear-span Crossings	DW-004
	Arched Culvert Crossing	DW-005
	Explosives Facility	DW-010
	Turbine Pad 1#	DW-011
	Turbine Pad 2#	DW-012
New Windy Camp Area	Oversized Dump	DW-09
	Heli-pad	WC-001
	Drill Core Laydown	WC-002
	Quarry D	WC-003
	Camp Pad	WC-004
Pipeline	Roberts Bay Discharge System	PL-001
Doris	Connector Vent Raise	DM-033
	Central Vent Raise	DM-034
Madrid North - TIA Road	All-Weather Road	MNT-001
	Culvert Crossings	MNT-002
	Bridge Crossing	MNT-003
	Quarry AG	MNT-004
Pipeline	Madrid North Reclaim Pipeline	PL-002
	Madrid South Groundwater Pipeline	PL-003
Madrid Boston All weather road	Turbine Pad #3	MBR-038
	Turbine Pad #4	MBR-039

LEGEND

- Existing Pipes
- Future Pipelines
- Exisiting/Permitted Infrastructure
- Future Infrastructure
- Area Boundary

NOTES

1. Contours are shown in 20m intervals.

REFERECE

NAD83 UTM Zone 13

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SRK JOB NO: 1CT022.013

FILE NAME: 1CT022.013_Doris_N_Closure.dwg

TMAC RESOURCES

Hope Bay Project

Doris-Madrid Interim Closure and Reclamation Plan

Doris to Madrid South General Layout
Work Breakdown Structure

DATE:	APPROVED:	FIGURE:
2017/12/12	IM	3

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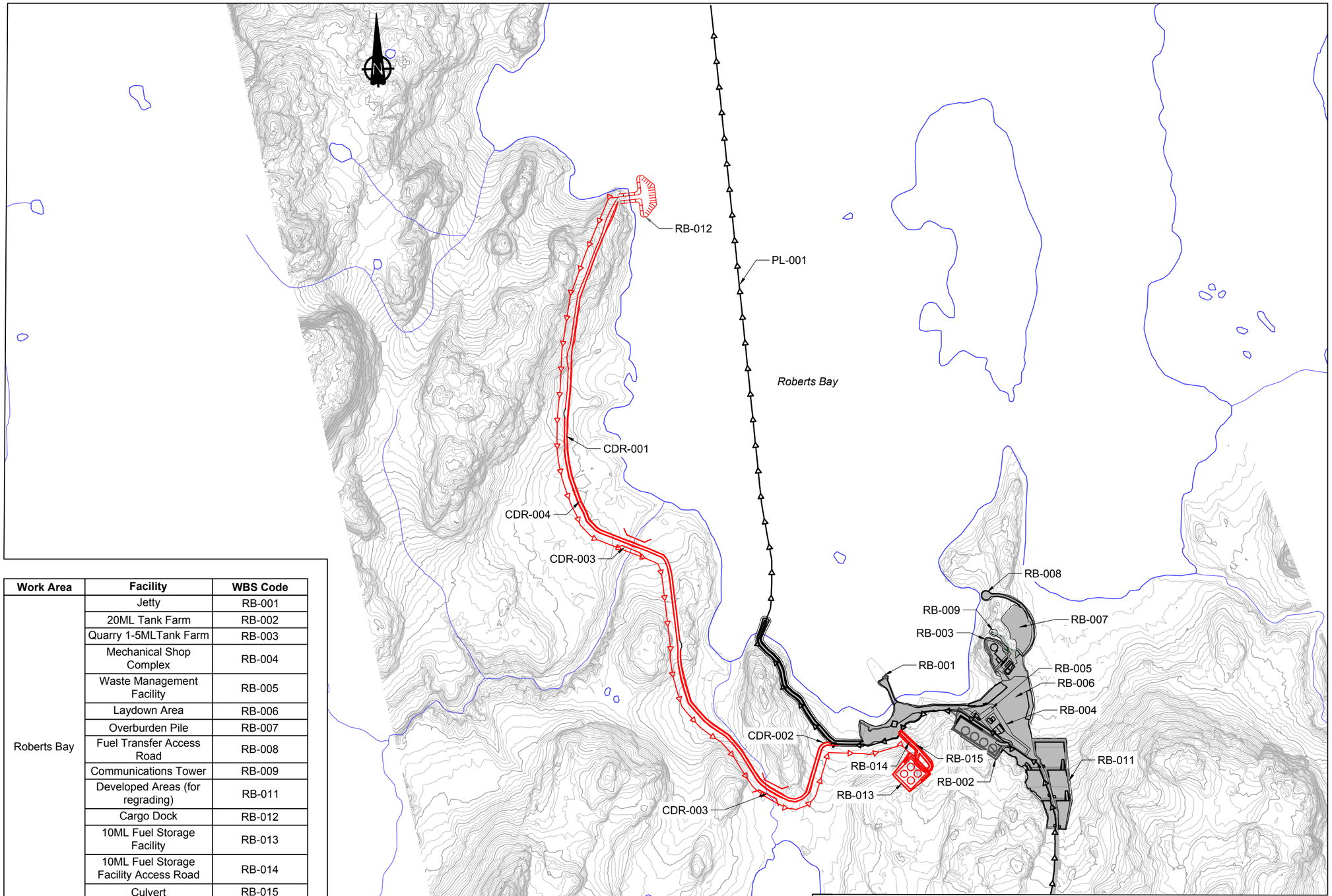

LEGEND

- Developed Areas (for regrading)
- Bridge Crossing
- Existing/Permitted Infrastructure
- Future Infrastructure
- Fuel Transfer Pipe (CDR-004)
- Roberts Bay Discharge System (PL-001)

NOTES

1. Contours shown at 1m intervals

REFERECE

NAD83 UTM Zone 13

Work Area	Facility	WBS Code
Roberts Bay	Jetty	RB-001
	20ML Tank Farm	RB-002
	Quarry 1-5MLTank Farm	RB-003
	Mechanical Shop Complex	RB-004
	Waste Management Facility	RB-005
	Laydown Area	RB-006
	Overburden Pile	RB-007
	Fuel Transfer Access Road	RB-008
	Communications Tower	RB-009
	Developed Areas (for regrading)	RB-011
	Cargo Dock	RB-012
	10ML Fuel Storage Facility	RB-013
	10ML Fuel Storage Facility Access Road	RB-014
	Culvert	RB-015
Pipeline	Roberts Bay Discharge System	PL-001
	Fuel Transfer Pipeline	CDR-004
Cargo Dock Access Road	All-Weather Road	CDR-001
	Culvert Crossings	CDR-002
	Bridge Crossing	CDR-003

0m 100 200 300

srk consulting

SRK JOB NO.: 1CT022.013

FILE NAME: 1CT022.013_Rob Bay_Closure2.dwg

TMAC RESOURCES

Hope Bay Project

Doris - Madrid Interim Closure and Reclamation Plan

Roberts Bay
Work Breakdown Structure

DATE: 2017/12/12 | APPROVED: IM | FIGURE: 4

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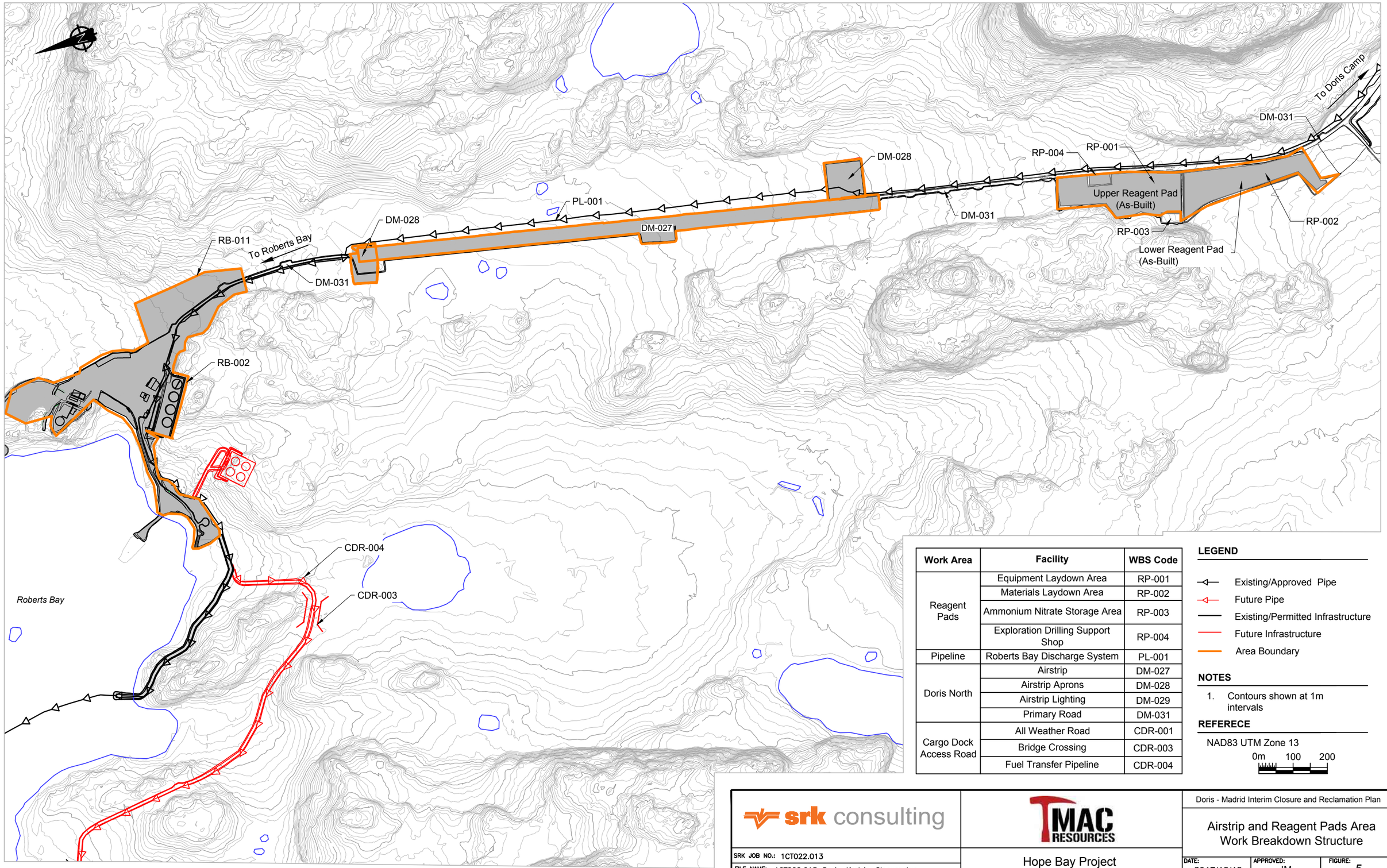

Work Area	Facility	WBS Code
Reagent Pads	Equipment Laydown Area	RP-001
	Materials Laydown Area	RP-002
	Ammonium Nitrate Storage Area	RP-003
	Exploration Drilling Support Shop	RP-004
Pipeline	Roberts Bay Discharge System	PL-001
Doris North	Airstrip	DM-027
	Airstrip Aprons	DM-028
	Airstrip Lighting	DM-029
	Primary Road	DM-031
Cargo Dock Access Road	All Weather Road	CDR-001
	Bridge Crossing	CDR-003
	Fuel Transfer Pipeline	CDR-004

LEGEND

- Existing/Approved Pipe
- Future Pipe
- Existing/Permitted Infrastructure
- Future Infrastructure
- Area Boundary

NOTES

1. Contours shown at 1m intervals

REFERECE

NAD83 UTM Zone 13

0m 100 200

srk consulting

SRK JOB NO.: 1CT022.013

FILE NAME: 1CT022.013_Doris Airstrip_Closure.dwg

TMAC RESOURCES

Hope Bay Project

Doris - Madrid Interim Closure and Reclamation Plan

Airstrip and Reagent Pads Area Work Breakdown Structure

DATE:	APPROVED:	FIGURE:
2017/12/12	IM	5

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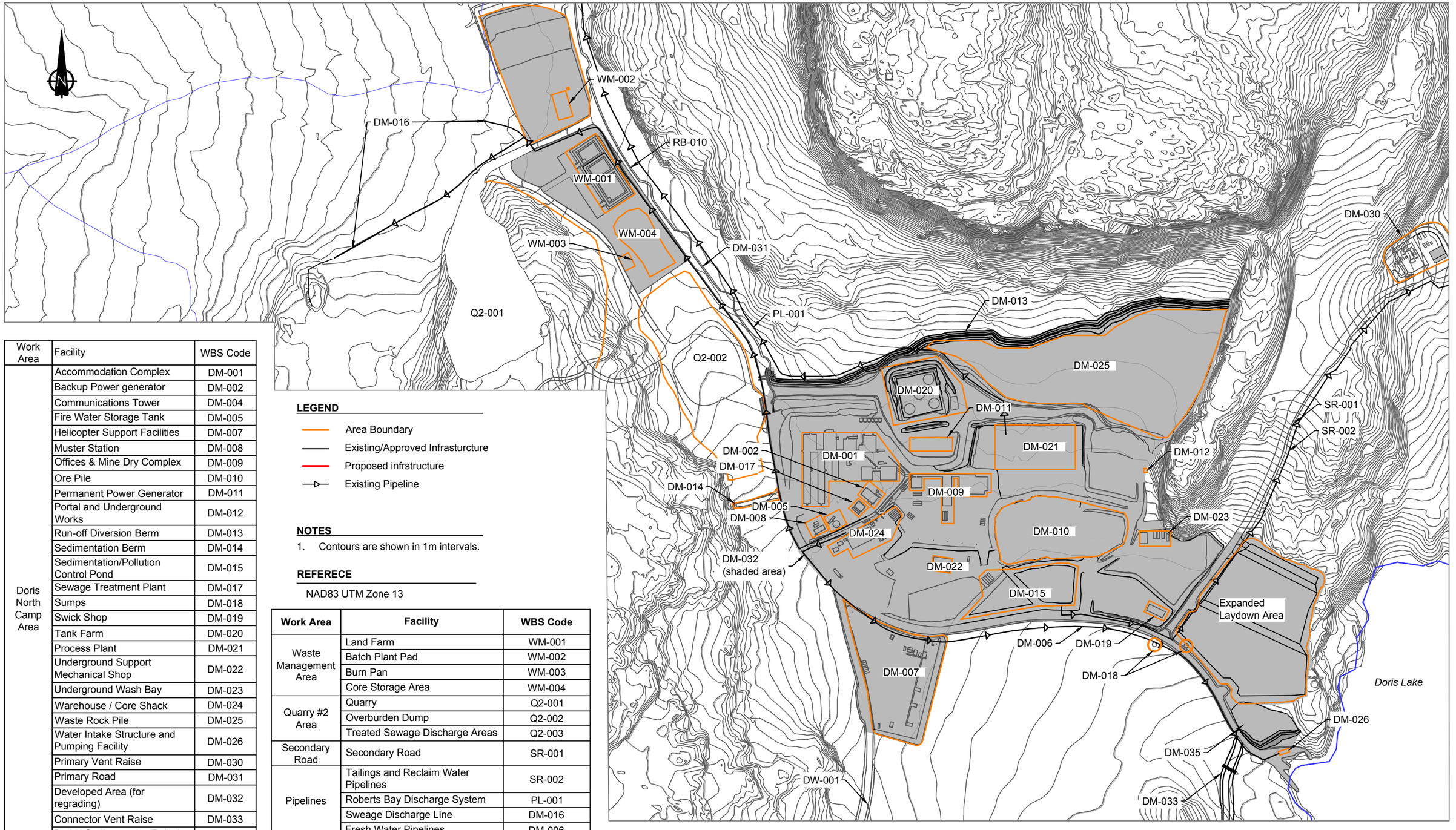

Work Area	Facility	WBS Code
Doris North Camp Area	Accommodation Complex	DM-001
	Backup Power generator	DM-002
	Communications Tower	DM-004
	Fire Water Storage Tank	DM-005
	Helicopter Support Facilities	DM-007
	Muster Station	DM-008
	Offices & Mine Dry Complex	DM-009
	Ore Pile	DM-010
	Permanent Power Generator	DM-011
	Portal and Underground Works	DM-012
	Run-off Diversion Berm	DM-013
	Sedimentation Berm	DM-014
	Sedimentation/Pollution Control Pond	DM-015
	Sewage Treatment Plant	DM-017
	Sumps	DM-018
	Swick Shop	DM-019
	Tank Farm	DM-020
	Process Plant	DM-021
	Underground Support Mechanical Shop	DM-022
	Underground Wash Bay	DM-023
	Warehouse / Core Shack	DM-024
	Waste Rock Pile	DM-025
	Water Intake Structure and Pumping Facility	DM-026
	Primary Vent Raise	DM-030
	Primary Road	DM-031
	Developed Area (for regrading)	DM-032
	Connector Vent Raise	DM-033
	Pad U Sedimentation/Pollution Control Pond	DM-035

LEGEND

- Area Boundary
- Existing/Approved Infrasturcture
- Proposed infrstructure
- Existing Pipeline

NOTES

1. Contours are shown in 1m intervals.

REFERECE

NAD83 UTM Zone 13

Work Area	Facility	WBS Code
Waste Management Area	Land Farm	WM-001
	Batch Plant Pad	WM-002
	Burn Pan	WM-003
	Core Storage Area	WM-004
Quarry #2 Area	Quarry	Q2-001
	Overburden Dump	Q2-002
	Treated Sewage Discharge Areas	Q2-003
Secondary Road	Secondary Road	SR-001
Pipelines	Tailings and Reclaim Water Pipelines	SR-002
	Roberts Bay Discharge System	PL-001
	Sweage Discharge Line	DM-016
	Fresh Water Pipelines	DM-006

0m 20 40 60 80

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SRK JOB NO.: 1CT022.013

FILE NAME: 1CT022.013_Doris_Camp_Closure.dwg

TMAC RESOURCES

Hope Bay Project

Doris-Madrid Interim Closure and Reclamation Plan

Doris Camp
Work Breakdown Structure

DATE:	APPROVED:	FIGURE:
2017/12/05	IM	6

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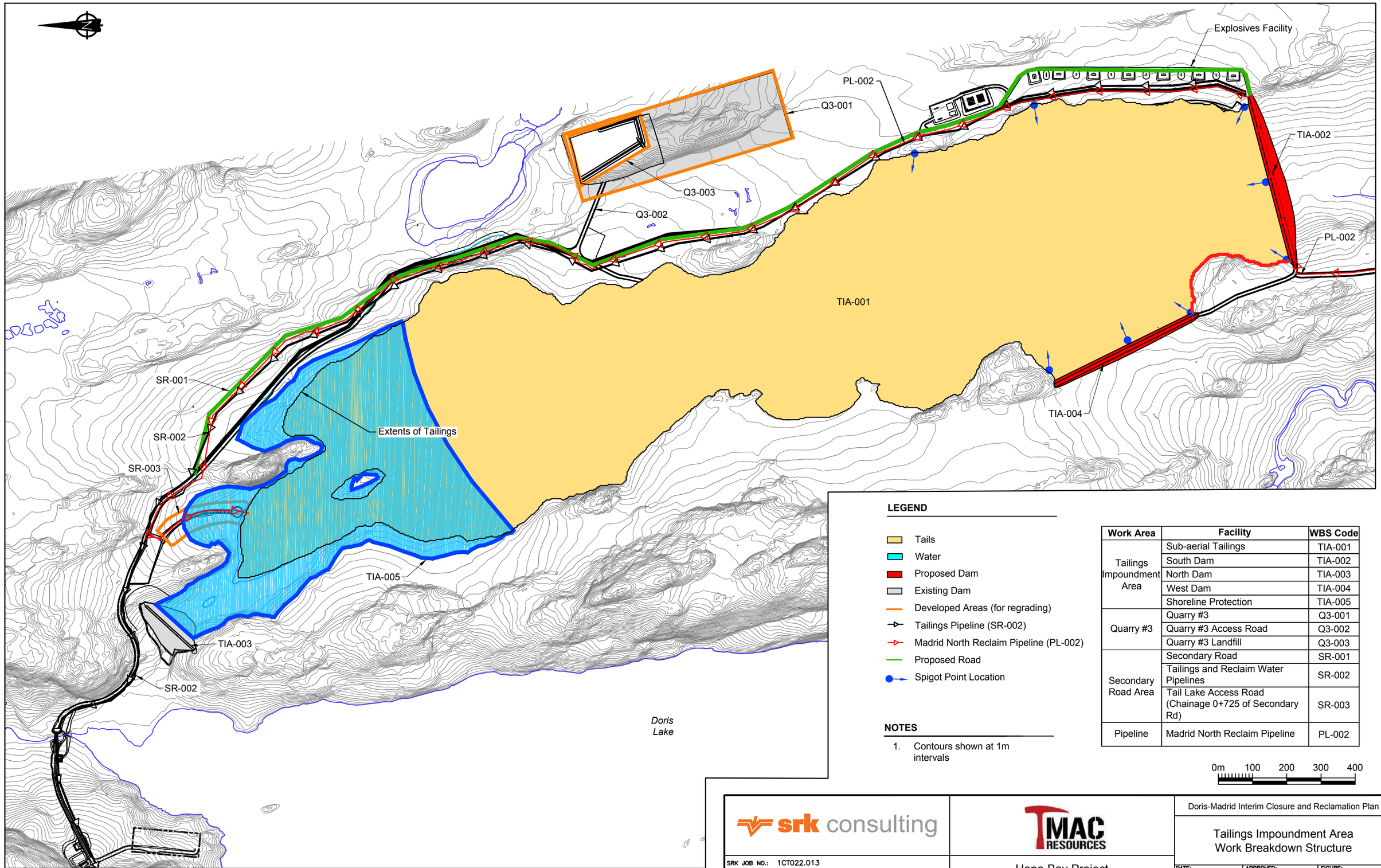

LEGEND

- Tails
- Water
- Proposed Dam
- Existing Dam
- Developed Areas (for regrading)
- Tailings Pipeline (SR-002)
- Madrid North Reclaim Pipeline (PL-002)
- Proposed Road
- Spigot Point Location

NOTES

1. Contours shown at 1m intervals

Work Area	Facility	WBS Code
Tailings Impoundment Area	Sub-aerial Tailings	TIA-001
	South Dam	TIA-002
	North Dam	TIA-003
	West Dam	TIA-004
	Shoreline Protection	TIA-005
Quarry #3	Quarry #3	Q3-001
	Quarry #3 Access Road	Q3-002
	Quarry #3 Landfill	Q3-003
Secondary Road Area	Secondary Road	SR-001
	Tailings and Reclaim Water Pipelines	SR-002
	Tail Lake Access Road (Chainage 0+725 of Secondary Rd)	SR-003
Pipeline	Madrid North Reclaim Pipeline	PL-002

0m 100 200 300 400

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SRK JOB NO.: 1CT022.013

FILE NAME: 1CT022.004_Tail Lake_Closure.dwg

TMAC RESOURCES

Hope Bay Project

Doris-Madrid Interim Closure and Reclamation Plan

Tailings Impoundment Area
Work Breakdown Structure

DATE: 2017/12/12 | APPROVED: IM | FIGURE: 7

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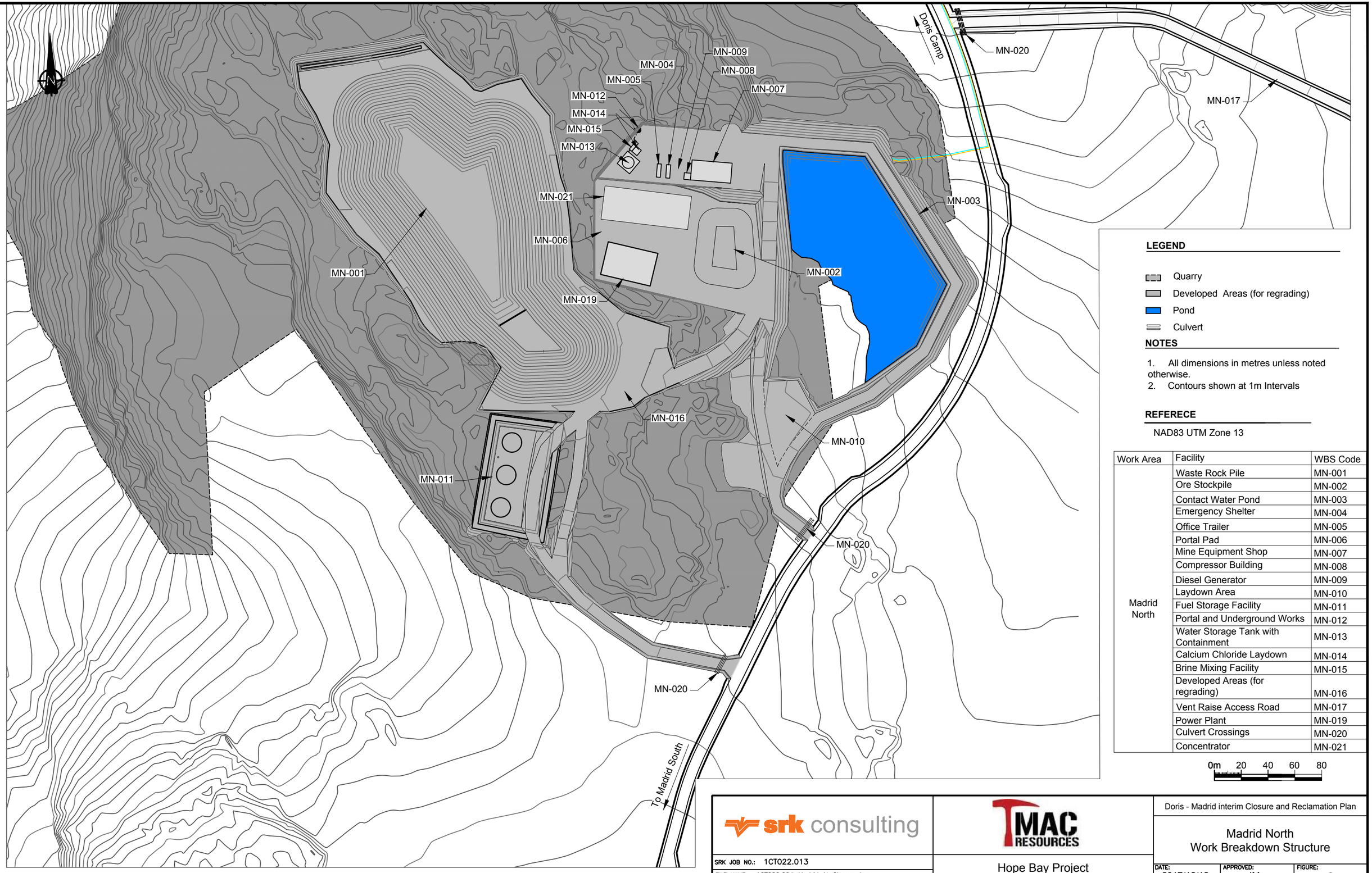

LEGEND

- Quarry
- Developed Areas (for regrading)
- Pond
- Culvert

NOTES

1. All dimensions in metres unless noted otherwise.
2. Contours shown at 1m Intervals

REFERECE

NAD83 UTM Zone 13

Work Area	Facility	WBS Code
Madrid North	Waste Rock Pile	MN-001
	Ore Stockpile	MN-002
	Contact Water Pond	MN-003
	Emergency Shelter	MN-004
	Office Trailer	MN-005
	Portal Pad	MN-006
	Mine Equipment Shop	MN-007
	Compressor Building	MN-008
	Diesel Generator	MN-009
	Laydown Area	MN-010
	Fuel Storage Facility	MN-011
	Portal and Underground Works	MN-012
	Water Storage Tank with Containment	MN-013
	Calcium Chloride Laydown	MN-014
	Brine Mixing Facility	MN-015
	Developed Areas (for regrading)	MN-016
	Vent Raise Access Road	MN-017
	Power Plant	MN-019
	Culvert Crossings	MN-020
	Concentrator	MN-021

0m 20 40 60 80

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SRK JOB NO.: 1CT022.013

FILE NAME: 1CT022.004_Madrid_N_Closure.dwg

TMAC RESOURCES

Hope Bay Project

Doris - Madrid interim Closure and Reclamation Plan

Madrid North
Work Breakdown Structure

DATE: 2017/12/12 | APPROVED: IM | FIGURE: 8

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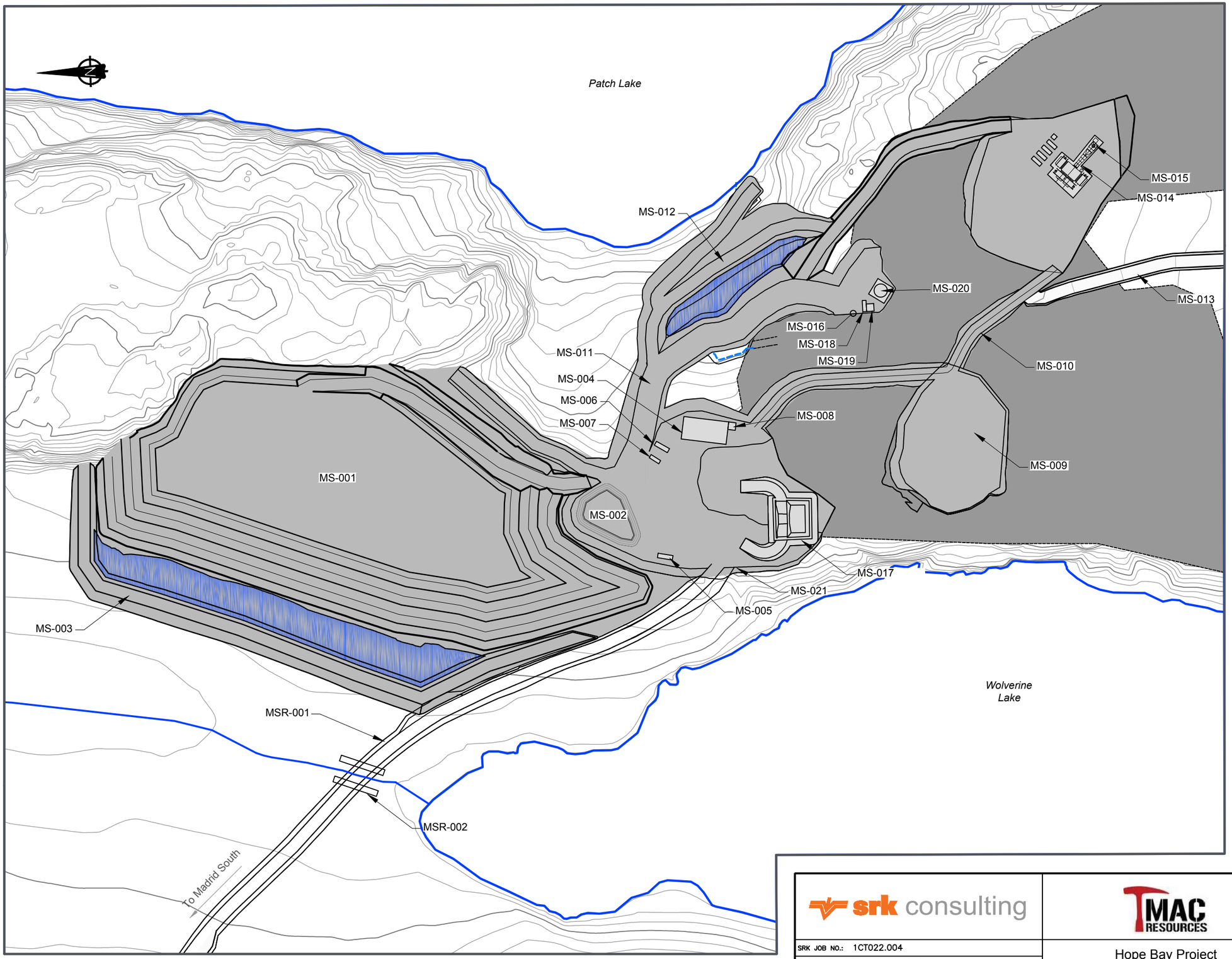

LEGEND

- Culvert Crossing
- Developed Areas (for regrading)
- Pond
- Quarry

NOTES

1. Contours are shown in 1m intervals.
2. All dimensions are in metric units, unless specifically mentioned.

REFERECE

NAD83 UTM Zone 13

Work Area	Facility	WBS Code
Madrid South Mine Area	Waste Rock Pile	MS-001
	Ore Stockpile	MS-002
	Primary Contact Water Pond Berm	MS-003
	Mining Equipment Shop	MS-004
	Emergency Shelter	MS-005
	Office Trailer	MS-006
	Diesel Generator	MS-007
	Compressor Building	MS-008
	Laydown Pad	MS-009
	Infrastructure Access Road	MS-010
	Portal Haul Road	MS-011
	Haul Road/Secondary Contact Water Pond Berm	MS-012
	Vent Raise Pad Access Road	MS-013
	Air Heating Facility	MS-014
	Vent Raise	MS-015
	Madrid South Portal	MS-016
	Fuel Storage Facility	MS-017
	Calcium Chloride Laydown	MS-018
	Brine Mixing Facility	MS-019
	Water Storage Tank with Containment	MS-020
	Developed Areas (for regrading)	MS-021
Madrid South Road	Madrid South All-Weather Road	MSR-001
	Culvert Crossing	MSR-002

0m 20 40 60 80

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SRK JOB NO.: 1CT022.004

FILE NAME: 1CT022.004_Madrid_S_Closure.dwg

MAC RESOURCES

Hope Bay Project

Doris - Madrid Interim Closure and Reclamation Plan

Madrid South Portal Area
Work Breakdown Structure

DATE: 2017/12/12 | APPROVED: IM | FIGURE: 9

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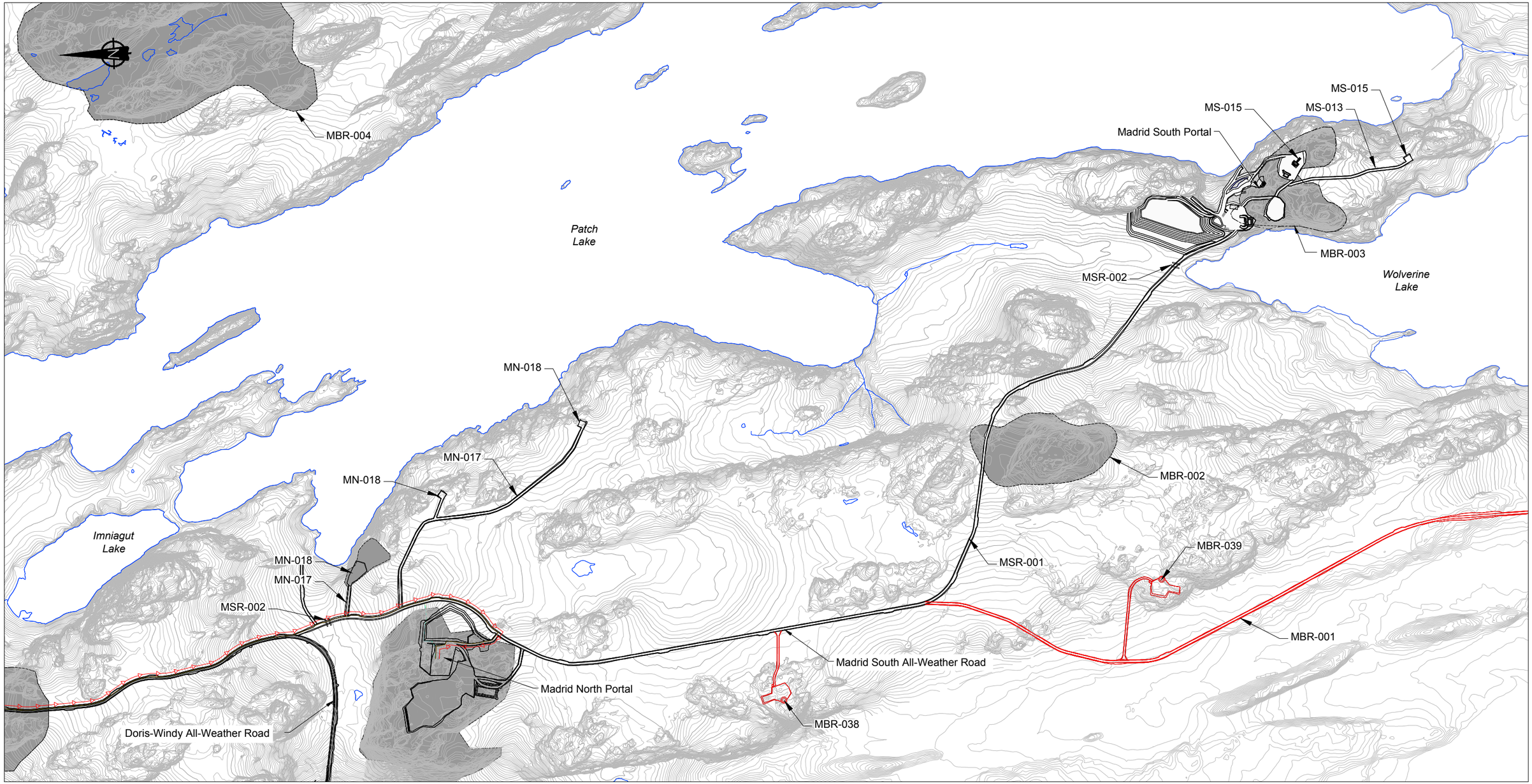

LEGEND

- Exsising/Approved Infrastructure
- Furture Infrastructure
- Proposed Pipeline
- Vent Raise
- Quarry

REFERECE

NAD83 UTM Zone 13

NOTES

1. Contours are shown in 1m intervals.
2. All dimensions are in metric units, unless specifically mentioned.

Work Area	Facility	WBS Code
Madrid South Road	All-Weather Road	MSR-001
	Culvert Crossings	MSR-002
Madrid North	Vent Raise Access Road	MN-017
	Vent Raises	MN-018
Madrid South	Vent Raise Access Road	MS-013
	Vent Raise	MS-015
Madrid-Boston All-Weather Road	All-Weather Road	MBR-001
	Quarry G	MBR-002
	Quarry H	MBR-003
	Quarry J	MBR-004
Madrid-Boston All-Weather Road	Turbine Pad # 3	MBR-038
	Turbine Pad # 4	MSBR-039

0m 100 200 300 400 500 600

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SRK JOB NO.: 1CT022.013

FILE NAME: 1CT022.004_Madrid South Road_Closure.dwg

TMAC RESOURCES

Hope Bay Project

Doris - Madrid Interim Closure and Reclamation Plan

Madrid South Road Area
Work Breakdown Structure

DATE:	APPROVED:	FIGURE:
2017/12/12	IM	10

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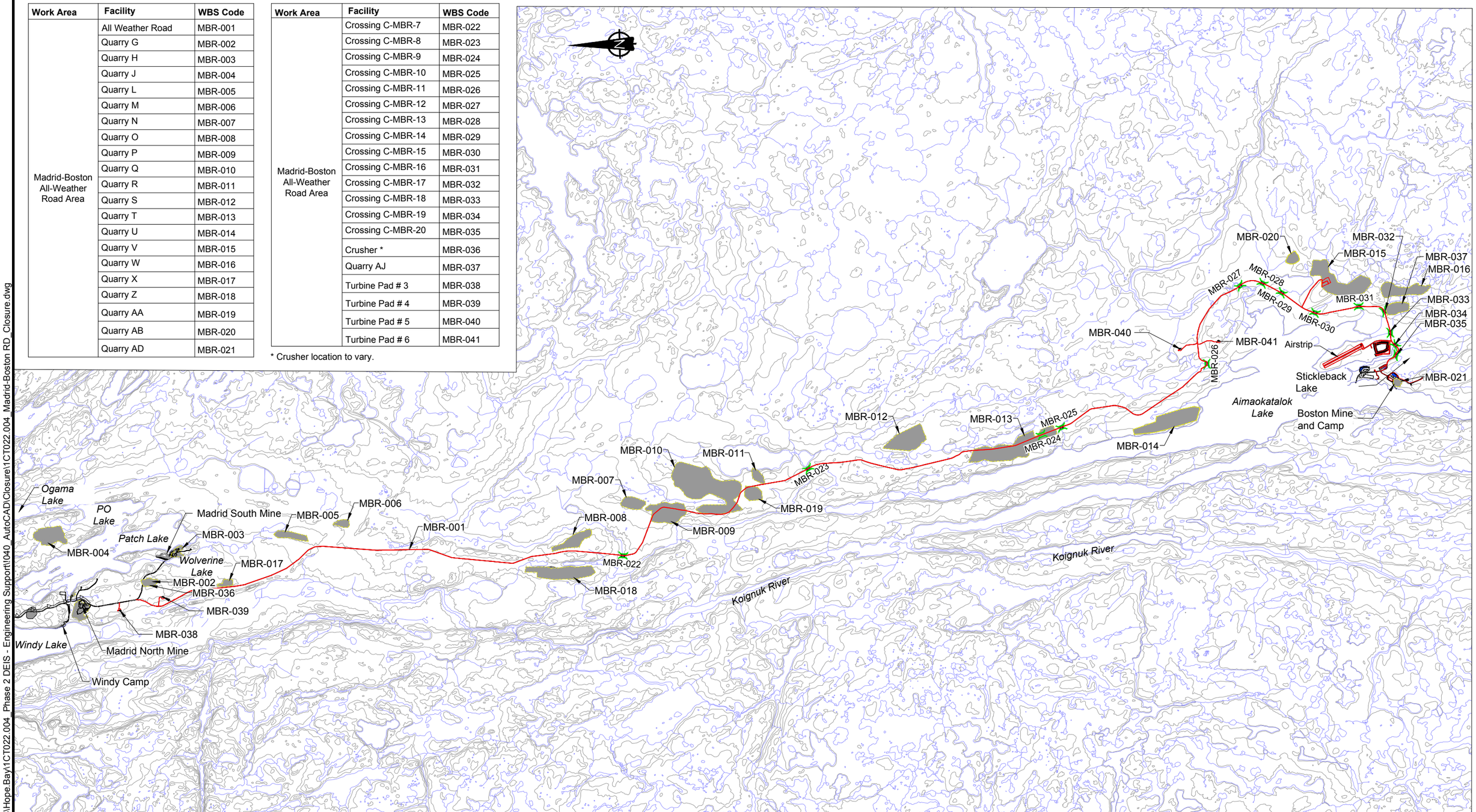
Work Area	Facility	WBS Code
Madrid-Boston All-Weather Road Area	All Weather Road	MBR-001
	Quarry G	MBR-002
	Quarry H	MBR-003
	Quarry J	MBR-004
	Quarry L	MBR-005
	Quarry M	MBR-006
	Quarry N	MBR-007
	Quarry O	MBR-008
	Quarry P	MBR-009
	Quarry Q	MBR-010
	Quarry R	MBR-011
	Quarry S	MBR-012
	Quarry T	MBR-013
	Quarry U	MBR-014
	Quarry V	MBR-015
	Quarry W	MBR-016
	Quarry X	MBR-017
	Quarry Z	MBR-018
	Quarry AA	MBR-019
	Quarry AB	MBR-020
	Quarry AD	MBR-021

Work Area	Facility	WBS Code
Madrid-Boston All-Weather Road Area	Crossing C-MBR-7	MBR-022
	Crossing C-MBR-8	MBR-023
	Crossing C-MBR-9	MBR-024
	Crossing C-MBR-10	MBR-025
	Crossing C-MBR-11	MBR-026
	Crossing C-MBR-12	MBR-027
	Crossing C-MBR-13	MBR-028
	Crossing C-MBR-14	MBR-029
	Crossing C-MBR-15	MBR-030
	Crossing C-MBR-16	MBR-031
	Crossing C-MBR-17	MBR-032
	Crossing C-MBR-18	MBR-033
	Crossing C-MBR-19	MBR-034
	Crossing C-MBR-20	MBR-035
	Crusher *	MBR-036
	Quarry AJ	MBR-037
	Turbine Pad # 3	MBR-038
	Turbine Pad # 4	MBR-039
	Turbine Pad # 5	MBR-040
	Turbine Pad # 6	MBR-041

* Crusher location to vary.



LEGEND

- Proposed Rock Quarry
- Proposed Stream Crossing Location
- Exisiting/ Approved Infrastructure
- Future Infrastructure
- Future Infrastructure

NOTES

1. All dimensions are in metric units, unless otherwise specified.
2. Topographic contour data shown is from NTS maps, 1:50,000 scale. Contour intervals are 10m.

REFERECE

NAD83 UTM Zone 13

0m 1000 2000 3000 4000

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SRK JOB NO.: 1CT022.013

FILE NAME: 1CT022.004_Madrid-Boston RD_Closure.dwg

TMAC RESOURCES

Hope Bay Project

Doris - Madrid Interim Closure and Reclamation Plan

Madrid-Boston Road
Work Breakdown Structure

DATE:	APPROVED:	FIGURE:
2017/12/12	IM	11

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Appendix A: Facilities Listing

Appendix A, Table 1: Facilities Organized Geographycally			
Area	**WBS Code**	**Facility Name**	**Category**
Roberts Bay	RB_001	Jetty	Roads and Transportation
	RB_002	20 ML Tank Farm	Fuel Storage Facilities
	RB_003	Quarry 1 - 5 ML Tank Farm	Fuel Storage Facilities
	RB_004	Mechanical Shop Complex	Buildings and Facilities
	RB_005	Waste Management Facility	Buildings and Facilities
	RB_006	Laydown Area	Rock Fill Pads
	RB_007	Overburden Pile	Stockpiles and Waste Rock Dumps
	RB_008	Fuel Transfer Access Road	Roads and Transportation
	RB_009	Communications Tower	Buildings and Facilities
	RB_011	Developed Areas (for regrading)	Rock Fill Pads
	RB_012	Cargo Dock	Roads and Transportation
	RB_013	10ML Fuel Storage Facility	Fuel Storage Facilities
	RB_014	10ML Fuel Storage Facility Access Road	Roads and Transportation
	RB_015	10ML Fuel Storage Facility Access Road Culvert	Roads and Transportation
Cargo Dock Access Road	CDR_001	All-Weather Road	Roads and Transportation
	CDR_002	Culverts	Roads and Transportation
	CDR_003	Bridge Crossing	Roads and Transportation
	CDR_004	Fuel Transfer Pipeline	Pipelines
Doris Phase 1	DC_001	Waste Rock Pile	Stockpiles and Waste Rock Dumps
	DC_002	Expanded Waste Rock Storage (Pad T)	Stockpiles and Waste Rock Dumps
Doris	DM_001	Accommodation Complex	Buildings and Facilities
	DM_002	Backup Power generator	Buildings and Facilities
	DM_004	Communications Tower	Buildings and Facilities
	DM_005	Fire Water Storage Tank	Buildings and Facilities
	DM_006	Fresh Water Pipelines	Pipelines
	DM_007	Helicopter Support Facilities	Roads and Transportation
	DM_008	Muster Station	Buildings and Facilities
	DM_009	Offices & Mine Dry Complex	Buildings and Facilities
	DM_010	Ore Pile	Stockpiles and Waste Rock Dumps
	DM_011	Permanent Power Generator	Buildings and Facilities
	DM_012	Portal and Underground Works	Underground Workings
	DM_013	Run-off Diversion Berm	Water Management
	DM_014	Sedimentation Berm	Water Management
	DM_015	Sedimentation/Pollution Control Pond	Water Management
	DM_016	Sewage Discharge Line	Pipelines
	DM_017	Sewage Treatment Plant	Buildings and Facilities
	DM_018	Sumps	Water Management
	DM_019	Swick Shop	Buildings and Facilities
	DM_020	Tank Farm	Fuel Storage Facilities
	DM_021	Process Plant	Buildings and Facilities
	DM_022	Underground Support Mechanical Shop	Buildings and Facilities
	DM_023	Underground Wash Bay	Buildings and Facilities
	DM_024	Warehouse / Core Shack	Buildings and Facilities
	DM_025	Waste Rock Pile	Stockpiles and Waste Rock Dumps
	DM_026	Water Intake Structure and Pumping Facility	Water Management
	DM_027	Airstrip	Roads and Transportation
	DM_028	Airstrip Aprons	Roads and Transportation
	DM_029	Airstrip Lighting	Roads and Transportation
	DM_030	Primary Vent Raise	Underground Workings
	DM_031	Primary Road	Roads and Transportation
	DM_032	Developed Areas (for regrading)	Rock Fill Pads
	DM_033	Connector Vent Raise	Underground Workings
	DM_034	Central Vent Raise	Underground Workings
	DM_035	Pad U Sedimentation/Pollution Control Pond	Water Management
Doris-Windy All Weather Road	DW_001	All weather road	Roads and Transportation
	DW_002	Quarry A	Quarry
	DW_003	Quarry B	Quarry
	DW_004	Clear-span crossings	Roads and Transportation
	DW_005	Arched Culvert Crossing	Roads and Transportation
	DW_007	Quarry D	Quarry
	DW_008	Core Storage Area	Rock Fill Pads
	DW_009	Quarry D Overburden Pile	Stockpiles and Waste Rock Dumps
	DW_010	Explosives Storage Facility	Buildings and Facilities
	DW_011	Turbine Pad #1	Buildings and Facilities
	DW_012	Turbine Pad #2	Buildings and Facilities
Madrid North - TIA Road	MNT_001	All-Weather Road	Roads and Transportation
	MNT_002	Culvert crossings	Roads and Transportation
	MNT_003	Bridge crossing	Roads and Transportation
	MNT_004	Quarry AG	Quarry
	MN_001	Waste Rock Pile	Stockpiles and Waste Rock Dumps
	MN_002	Ore Stockpile	Stockpiles and Waste Rock Dumps
	MN_003	Contact Water Pond Berm	Water Management
	MN_004	Emergency Shelter	Buildings and Facilities
	MN_005	Office Trailer	Buildings and Facilities
	MN_006	Portal Pad	Rock Fill Pads

Madrid North	MN_007	Mine Equipment Shop	Buildings and Facilities
	MN_008	Compressor Building	Buildings and Facilities
	MN_009	Diesel Generator	Buildings and Facilities
	MN_010	Laydown Area	Rock Fill Pads
	MN_011	Fuel Storage Facility	Fuel Storage Facilities
	MN_012	Portal and Underground Works	Underground Workings
	MN_013	Water Storage Tank with Containment	Buildings and Facilities
	MN_014	Calcium Chloride Laydown	Rock Fill Pads
	MN_015	Brine Mixing Facility	Buildings and Facilities
	MN_016	Developed Areas (for regrading)	Rock Fill Pads
	MN_017	Vent Raise Access Road	Roads and Transportation
	MN_018	Vent Raises	Underground Workings
	MN_019	Power Plant	Buildings and Facilities
	MN_020	Culverts	Roads and Transportation
	MN_021	Concentrator	Buildings and Facilities
	MN_022	Diversion Berm	Water Management
	MN_023	Sump	Water Management
	MN_024	Fuel Storage Facility Access Road	Roads and Transportation
	MN_025	Fuel Storage Facility Bypass Road	Roads and Transportation
Madrid South All Weather Road	MSR_001	All-Weather Road	Roads and Transportation
	MSR_002	Culvert crossings	Roads and Transportation
Madrid South	MS_001	Waste Rock Pile	Stockpiles and Waste Rock Dumps
	MS_002	Ore Stockpile	Stockpiles and Waste Rock Dumps
	MS_003	Primary Contact Water Pond Berm	Water Management
	MS_004	Mine Equipment Shop	Buildings and Facilities
	MS_005	Emergency Shelter	Buildings and Facilities
	MS_006	Office Trailer	Buildings and Facilities
	MS_007	Diesel Generator	Buildings and Facilities
	MS_008	Compressor Building	Buildings and Facilities
	MS_009	Laydown Pad	Rock Fill Pads
	MS_010	Infrastructure Access Road	Roads and Transportation
	MS_011	Portal Haul Road	Roads and Transportation
	MS_012	Haul Road / Secondary Contact Water Pond Berm	Water Management
	MS_013	Vent Raise Pad Access Road	Roads and Transportation
	MS_015	Vent Raises	Underground Workings
	MS_016	Madrid South Portal and Underground Works	Underground Workings
	MS_017	Fuel Storage Facility	Fuel Storage Facilities
	MS_018	Calcium Chloride Laydown	Rock Fill Pads
	MS_019	Brine Mixing Facility	Buildings and Facilities
	MS_020	Water Storage Tank with Containment	Buildings and Facilities
	MS_021	Developed Areas (for regrading)	Rock Fill Pads
	MS_014	Air Heating Facility	Underground Workings
Madrid-Boston All Weather Road	MBR_001	All-Weather Road	Roads and Transportation
	MBR_002	Quarry G	Quarry
	MBR_003	Quarry H	Quarry
	MBR_004	Quarry J	Quarry
	MBR_005	Quarry L	Quarry
	MBR_006	Quarry M	Quarry
	MBR_007	Quarry N	Quarry
	MBR_008	Quarry O	Quarry
	MBR_009	Quarry P	Quarry
	MBR_010	Quarry Q	Quarry
	MBR_011	Quarry R	Quarry
	MBR_012	Quarry S	Quarry
	MBR_013	Quarry T	Quarry
	MBR_014	Quarry U	Quarry
	MBR_015	Quarry V	Quarry
	MBR_016	Quarry W	Quarry
	MBR_017	Quarry X	Quarry
	MBR_018	Quarry Z	Quarry
	MBR_019	Quarry AA	Quarry
	MBR_020	Quarry AB	Quarry
	MBR_021	Quarry AD	Quarry
	MBR_022	Crossing C-MBR-7	Roads and Transportation
	MBR_023	Crossing C-MBR-8	Roads and Transportation
	MBR_024	Crossing C-MBR-9	Roads and Transportation
	MBR_025	Crossing C-MBR-10	Roads and Transportation
	MBR_026	Crossing C-MBR-11	Roads and Transportation
	MBR_027	Crossing C-MBR-12	Roads and Transportation
	MBR_028	Crossing C-MBR-13	Roads and Transportation
	MBR_029	Crossing C-MBR-14	Roads and Transportation
	MBR_030	Crossing C-MBR-15	Roads and Transportation
	MBR_031	Crossing C-MBR-16	Roads and Transportation
	MBR_032	Crossing C-MBR-17	Roads and Transportation
	MBR_033	Crossing C-MBR-18	Roads and Transportation
	MBR_034	Crossing C-MBR-19	Roads and Transportation
	MBR_035	Crossing C-MBR-20	Roads and Transportation

	MBR_036	Crusher	Quarry
	MBR_037	Quarry AJ	Quarry
	MBR_038	Turbine Pad #3	Buildings and Facilities
	MBR_039	Turbine Pad #4	Buildings and Facilities
	MBR_040	Turbine Pad #5	Buildings and Facilities
	MBR_041	Turbine Pad #6	Buildings and Facilities
TIA	TIA_001	Subaerial Tailings Area	Tailings
	TIA_002	South Dam	Tailings
	TIA_003	North Dam	Tailings
	TIA_004	West Dam	Tailings
	TIA_005	Shoreline Protection	Tailings
	TIA_006	Interim Dyke	Tailings
Pipeline	PL_001	Roberts Bay Discharge System	Marine Environment Reclamation
	PL_002	Madrid North Reclaim Pipeline	Pipelines
	PL_003	Madrid South Groundwater Pipeline	Pipelines
Reagent Pads	RP_001	Equipment Laydown Area	Rock Fill Pads
	RP_002	Materials Laydown Area	Rock Fill Pads
	RP_003	Ammonium Nitrate Storage Area	Rock Fill Pads
	RP_004	Exploration Drilling Support Shop	Buildings and Facilities
Waste Management Area	WM_001	Land Farm	Rock Fill Pads
	WM_002	Batch Plant Pad	Rock Fill Pads
	WM_003	Burn Pan	Rock Fill Pads
	WM_004	Core Storage Area	Rock Fill Pads
Quarry 2	Q2_001	Quarry	Quarry
	Q2_002	Overburden Pile	Stockpiles and Waste Rock Dumps
	Q2_003	Treated Sewage Discharge Areas	Water Management
Secondary Road	SR_001	Secondary Road	Roads and Transportation
	SR_002	Tailings and Reclaim Water Pipelines	Pipelines
	SR_003	Tail Lake Access Road	Roads and Transportation
Quarry 3	Q3_001	Quarry # 3	Quarry
	Q3_002	Access Road	Roads and Transportation
	Q3_003	Landfill	Waste and Landfills
Patch Lake	PLA_001	Tank Farm	Fuel Storage Facilities
	PLA_002	Roads and Trails	Roads and Transportation
	PLA_003	Developed Areas (for regrading)	Rock Fill Pads
	PLA_004	Disposal of demolition waste	Waste and Landfills
Windy	WC_001	Tank Farm	Fuel Storage Facilities
	WC_002	Accomodation Camp Buildings	Buildings and Facilities
	WC_004	Winter Road to Patch	Roads and Transportation
	WC_006	Potable Water Supply System	Buildings and Facilities
	WC_007	Waste Incinerator	Buildings and Facilities
	WC_008	Disposal of demolition waste	Waste and Landfills
	WC_009	Hazardous Waste Disposal Cost	Waste and Landfills
	WC_010	Summer Debris Collection	Rock Fill Pads
	WC_011	Developed Areas (for regrading)	Rock Fill Pads
	WC_012	Reclaim Drill Holes	Rock Fill Pads

Appendix A, Table 2: Facilties Organized by Type			
Category	**Facility Name**	**Area**	**WBS Code**
Underground Workings	Portal and Underground Works	Doris	DM_012
	Primary Vent Raise	Doris	DM_030
	Connector Vent Raise	Doris	DM_033
	Central Vent Raise	Doris	DM_034
	Portal and Underground Works	Madrid North	MN_012
	Vent Raises	Madrid North	MN_018
	Vent Raises	Madrid South	MS_015
	Madrid South Portal and Underground Works	Madrid South	MS_016
	Air Heating Facility	Madrid South	MS_014
Stockpiles and Waste Rock Dumps	Overburden Pile	Roberts Bay	RB_007
	Waste Rock Pile	Doris Phase 1	DC_001
	Expanded Waste Rock Storage (Pad T)	Doris Phase 2	DC_002
	Ore Pile	Doris	DM_010
	Waste Rock Pile	Doris	DM_025
	Quarry D Overburden Pile	Doris-Windy All Weather Road	DW_009
	Waste Rock Pile	Madrid North	MN_001
	Ore Stockpile	Madrid North	MN_002
	Waste Rock Pile	Madrid South	MS_001
	Ore Stockpile	Madrid South	MS_002
	Overburden Pile	Quarry 3	Q2_002
Tailings	Subaerial Tailings Area	TIA	TIA_001
	South Dam	TIA	TIA_002
	North Dam	TIA	TIA_003
	West Dam	TIA	TIA_004
	Shoreline Protection	TIA	TIA_005
	Interim Dyke	TIA	TIA_006
Buildings and Facilities	Mechanical Shop Complex	Roberts Bay	RB_004
	Waste Management Facility	Roberts Bay	RB_005
	Communications Tower	Roberts Bay	RB_009
	Accommodation Complex	Doris	DM_001
	Backup Power generator	Doris	DM_002
	Communications Tower	Doris	DM_004
	Fire Water Storage Tank	Doris	DM_005
	Muster Station	Doris	DM_008
	Offices & Mine Dry Complex	Doris	DM_009
	Permanent Power Generator	Doris	DM_011
	Sewage Treatment Plant	Doris	DM_017
	Swick Shop	Doris	DM_019
	Process Plant	Doris	DM_021
	Underground Support Mechanical Shop	Doris	DM_022
	Underground Wash Bay	Doris	DM_023
	Warehouse / Core Shack	Doris	DM_024
	Explosives Storage Facility	Doris-Windy All Weather Road	DW_010
	Turbine Pad #1	Doris-Windy All Weather Road	DW_011
	Turbine Pad #2	Doris-Windy All Weather Road	DW_012
	Emergency Shelter	Madrid North	MN_004
	Office Trailer	Madrid North	MN_005
	Mine Equipment Shop	Madrid North	MN_007
	Compressor Building	Madrid North	MN_008
	Diesel Generator	Madrid North	MN_009
	Water Storage Tank with Containment	Madrid North	MN_013
	Brine Mixing Facility	Madrid North	MN_015
	Power Plant	Madrid North	MN_019
	Concentrator	Madrid North	MN_021
	Mine Equipment Shop	Madrid South	MS_004
	Emergency Shelter	Madrid South	MS_005
	Office Trailer	Madrid South	MS_006
	Diesel Generator	Madrid South	MS_007
	Compressor Building	Madrid South	MS_008
	Brine Mixing Facility	Madrid South	MS_019
	Water Storage Tank with Containment	Madrid South	MS_020
	Turbine Pad #3	Madrid-Boston All Weather Road	MBR_038
	Turbine Pad #4	Madrid-Boston All Weather Road	MBR_039
	Turbine Pad #5	Madrid-Boston All Weather Road	MBR_040
	Turbine Pad #6	Madrid-Boston All Weather Road	MBR_041
	Exploration Drilling Support Shop	Reagent Pads	RP_004
	Accomodation Camp Buildings	Windy	WC_002
	Potable Water Supply System	Windy	WC_006
	Waste Incinerator	Windy	WC_007
Fuel Storage Facilities	20 ML Tank Farm	Roberts Bay	RB_002
	Quarry 1 - 5 ML Tank Farm	Roberts Bay	RB_003
	10ML Fuel Storage Facility	Roberts Bay	RB_013
	Tank Farm	Doris	DM_020
	Fuel Storage Facility	Madrid North	MN_011
	Fuel Storage Facility	Madrid South	MS_017

	Tank Farm	Patch Lake	PLA_001
	Tank Farm	Windy	WC_001
Quarry	Quarry A	Doris-Windy All Weather Road	DW_002
	Quarry B	Doris-Windy All Weather Road	DW_003
	Quarry D	Doris-Windy All Weather Road	DW_007
	Quarry AG	Madrid North - TIA Road	MNT_004
	Quarry G	Madrid-Boston All Weather Road	MBR_002
	Quarry H	Madrid-Boston All Weather Road	MBR_003
	Quarry J	Madrid-Boston All Weather Road	MBR_004
	Quarry L	Madrid-Boston All Weather Road	MBR_005
	Quarry M	Madrid-Boston All Weather Road	MBR_006
	Quarry N	Madrid-Boston All Weather Road	MBR_007
	Quarry O	Madrid-Boston All Weather Road	MBR_008
	Quarry P	Madrid-Boston All Weather Road	MBR_009
	Quarry Q	Madrid-Boston All Weather Road	MBR_010
	Quarry R	Madrid-Boston All Weather Road	MBR_011
	Quarry S	Madrid-Boston All Weather Road	MBR_012
	Quarry T	Madrid-Boston All Weather Road	MBR_013
	Quarry U	Madrid-Boston All Weather Road	MBR_014
	Quarry V	Madrid-Boston All Weather Road	MBR_015
	Quarry W	Madrid-Boston All Weather Road	MBR_016
	Quarry X	Madrid-Boston All Weather Road	MBR_017
	Quarry Z	Madrid-Boston All Weather Road	MBR_018
	Quarry AA	Madrid-Boston All Weather Road	MBR_019
	Quarry AB	Madrid-Boston All Weather Road	MBR_020
	Quarry AD	Madrid-Boston All Weather Road	MBR_021
	Crusher	Madrid-Boston All Weather Road	MBR_036
	Quarry AJ	Madrid-Boston All Weather Road	MBR_037
	Quarry	Quarry 2	Q2_001
	Quarry # 3	Quarry 3	Q3_001
Roads and Transportation	Jetty	Roberts Bay	RB_001
	Fuel Transfer Access Road	Roberts Bay	RB_008
	Cargo Dock	Roberts Bay	RB_012
	10ML Fuel Storage Facility Access Road	Roberts Bay	RB_014
	10ML Fuel Storage Facility Access Road Culvert	Roberts Bay	RB_015
	All-Weather Road	Cargo Dock Access Road	CDR_001
	Culverts	Cargo Dock Access Road	CDR_002
	Bridge Crossing	Cargo Dock Access Road	CDR_003
	Helicopter Support Facilities	Doris	DM_007
	Airstrip	Doris	DM_027
	Airstrip Aprons	Doris	DM_028
	Airstrip Lighting	Doris	DM_029
	Primary Road	Doris	DM_031
	All weather road	Doris-Windy All Weather Road	DW_001
	Clear-span crossings	Doris-Windy All Weather Road	DW_004
	Arched Culvert Crossing	Doris-Windy All Weather Road	DW_005
	All-Weather Road	Madrid North - TIA Road	MNT_001
	Culvert crossings	Madrid North - TIA Road	MNT_002
	Bridge crossing	Madrid North - TIA Road	MNT_003
	Vent Raise Access Road	Madrid North	MN_017
	Culverts	Madrid North	MN_020
	Fuel Storage Facility Access Road	Madrid North	MN_024
	Fuel Storage Facility Bypass Road	Madrid North	MN_025
	All-Weather Road	Madrid South All Weather Road	MSR_001
	Culvert crossings	Madrid South All Weather Road	MSR_002
	Infrastructure Access Road	Madrid South	MS_010
	Portal Haul Road	Madrid South	MS_011
	Vent Raise Pad Access Road	Madrid South	MS_013
	All-Weather Road	Madrid-Boston All Weather Road	MBR_001
	Crossing C-MBR-7	Madrid-Boston All Weather Road	MBR_022
	Crossing C-MBR-8	Madrid-Boston All Weather Road	MBR_023
	Crossing C-MBR-9	Madrid-Boston All Weather Road	MBR_024
	Crossing C-MBR-10	Madrid-Boston All Weather Road	MBR_025
	Crossing C-MBR-11	Madrid-Boston All Weather Road	MBR_026
	Crossing C-MBR-12	Madrid-Boston All Weather Road	MBR_027
	Crossing C-MBR-13	Madrid-Boston All Weather Road	MBR_028
	Crossing C-MBR-14	Madrid-Boston All Weather Road	MBR_029
	Crossing C-MBR-15	Madrid-Boston All Weather Road	MBR_030
	Crossing C-MBR-16	Madrid-Boston All Weather Road	MBR_031
	Crossing C-MBR-17	Madrid-Boston All Weather Road	MBR_032
	Crossing C-MBR-18	Madrid-Boston All Weather Road	MBR_033
	Crossing C-MBR-19	Madrid-Boston All Weather Road	MBR_034
	Crossing C-MBR-20	Madrid-Boston All Weather Road	MBR_035
	Secondary Road	Secondary Road	SR_001
	Tail Lake Access Road	Secondary Road	SR_003
	Access Road	Quarry 4	Q3_002
	Roads and Trails	Patch Lake	PLA_002

	Winter Road to Patch	Windy	WC_004
Rock Fill Pads	Laydown Area	Roberts Bay	RB_006
	Developed Areas (for regrading)	Roberts Bay	RB_011
	Developed Areas (for regrading)	Doris	DM_032
	Core Storage Area	Doris-Windy All Weather Road	DW_008
	Portal Pad	Madrid North	MN_006
	Laydown Area	Madrid North	MN_010
	Calcium Chloride Laydown	Madrid North	MN_014
	Developed Areas (for regrading)	Madrid North	MN_016
	Laydown Pad	Madrid South	MS_009
	Calcium Chloride Laydown	Madrid South	MS_018
	Developed Areas (for regrading)	Madrid South	MS_021
	Equipment Laydown Area	Reagent Pads	RP_001
	Materials Laydown Area	Reagent Pads	RP_002
	Ammonium Nitrate Storage Area	Reagent Pads	RP_003
	Land Farm	Waste Management Area	WM_001
	Batch Plant Pad	Waste Management Area	WM_002
	Burn Pan	Waste Management Area	WM_003
	Core Storage Area	Waste Management Area	WM_004
	Developed Areas (for regrading)	Patch Lake	PLA_003
	Summer Debris Collection	Windy	WC_010
	Developed Areas (for regrading)	Windy	WC_011
	Reclaim Drill Holes	Windy	WC_012
Waste and Landfills	Landfill	Quarry 5	Q3_003
	Disposal of demolition waste	Patch Lake	PLA_004
	Disposal of demolition waste	Windy	WC_008
	Hazardous Waste Disposal Cost	Windy	WC_009
Marine Environment Reclamation	Roberts Bay Discharge System	Pipeline	PL_001
Pipelines	Fuel Transfer Pipeline	Cargo Dock Access Road	CDR_004
	Fresh Water Pipelines	Doris	DM_006
	Sewage Discharge Line	Doris	DM_016
	Madrid North Reclaim Pipeline	Pipeline	PL_002
	Madrid South Groundwater Pipeline	Pipeline	PL_003
	Tailings and Reclaim Water Pipelines	Secondary Road	SR_002
Water Management	Run-off Diversion Berm	Doris	DM_013
	Sedimentation Berm	Doris	DM_014
	Sedimentation/Pollution Control Pond	Doris	DM_015
	Sumps	Doris	DM_018
	Water Intake Structure and Pumping Facility	Doris	DM_026
	Pad U Sedimentation/Pollution Control Pond	Doris	DM_035
	Contact Water Pond Berm	Madrid North	MN_003
	Diversion Berm	Madrid North	MN_022
	Sump	Madrid North	MN_023
	Primary Contact Water Pond Berm	Madrid South	MS_003
	Haul Road / Secondary Contact Water Pond Berm	Madrid South	MS_012
	Treated Sewage Discharge Areas	Quarry 4	Q2_003

Appendix B: Phase 1-Phase 2 Comparison Table

Roberts Bay Facilities, Infrastructure and Activities				
	Approved under Type A W.L. 2AM-DOH1323 Amendment No.1		**Request for Amendment No.2 Type A Water Licence 2AM-DOH1323**	**Comments**
	Existing	**Permitted**		
Life of Facilities	2022		Year 1 (2019) to Year 14 (2032)	Amendment
Site Development	Site largely developed		Minimal footprint extension for cargo dock and access	N/A
Marine Facilities	Jetty		Cargo dock	Not subject to Water Licensing Application
Fuel storage - Diesel	4 @ 5 ML	1 @ 5ML	Diesel - 2 @ 5 ML Total storage: 35 ML	Amendment Expansion of Roberts Bay Fuel Storage Capacity
Fuel storage – Jet fuel	drums within Sea-Can	500,000 L	No additional storage	No change
Site infrastructure	Access roads, laydown areas, weather havens		Extension of access roads to Boston	Amendment
Outfall	Outfall pipeline and berm		No additional requirements	No change
Waste management	Storage facilities, incinerators, work area		No additional requirements	No change
Expected shipping traffic			Freight – up to 4 per year (40 kt/year) Fuel – up to 3 tankers per year (35 ML total)	Not subject to Water Licensing Application
Shipping season	August 1 to 15 September		August 1 to 15 September	Not subject to Water Licensing Application
Doris Infrastructure, Facilities and Activities				
	Approved under Project Certificate 003 and Type A W.L. 2AM-DOH1323		**Request for Amendment No.2 Type A Water Licence 2AM-DOH1323**	**Comments**
Ore processed during Phase 2 Life of Mine Mining method Processing facilities			2,579,000 t Year 1 (2019) to Year 14 (2032) Underground / daylighting Year 1 (2019) to Year 14 (2032)	Amendment
Site Development	Site largely developed		Minimal footprint extension related to TIA expansion	Amendment
Airstrip	All-weather air strip Ice air strip on Windy Lake/Doris		No change	No change
Fuel Storage - Diesel	5 @ 1.5 ML		No change	No change
Power house	8 gen-set @ 1.2 MW Modularized building with day tanks. Back-up power supply.		Two wind turbines Nominal capacity of 4.2 MW each	Not subject to Water Licencing Application
Processing Facility	2,400 tpd		No change	No change

Miscellaneous buildings and infrastructure	Maintenance shops, workshops, core storage areas, batch plant, brine mixing facility, laydown areas, warehouses, water treatment, vent raise (3), air heating units, reagent storage, power station, processing plant, site service roads	No change	No change
Overburden stockpile	Located west of the Doris Camp area	No change	No change
Waste rock stockpile (used for backfill of mine)	In use and located to the east and north of the mill building	No change	No change
Ore stockpile	In use and located to the east and south of the mill building	No change	No change
Quarries	Four active quarries permitted	Two additional quarries	Amendment
Tailing	Tailings Impoundment Area (TIA) Capacity of 2.5 Mt	Expansion of TIA, service roads and quarries Capacity of 18 Mt	Amendment
Waste management	Landfill (permitted), landfarm and handling/temporary storage of hazardous waste, incineration and open burning for combustible waste	No change	No change
Accommodations	280-person accommodations Mine dry, administration buildings, security, emergency	400-person accommodations; extension to mine dry and administration building	Amendment
Potable Water Supply (Windy lake)	22,995 m^3 (with potable treatment plant)	43,800 m^3 (expansion to water treatment plant)	Amendment
Industrial (Doris Lake)	480,000 m^3 (including pump house)	1,930,000 m^3 (inclusive of Madrid Operations)	Amendment
Fire protection tank	500,000 m^3	No change	No change

Water management and treatment	Cyanide destruction at mill and placement of cyanide destruct tailings underground. Mill water pumped to TIA and water recycled to mill. Excess TIA water discharged to Roberts Bay via mixing box. Mine water (saline) discharged to Roberts Bay via mixing box. Site contact water and domestic waste water pumped to TIA.	No change Retain existing water management approach	No change
Contact water ponds	Two contact water ponds, sediment control berm, diversion berm	No change	No Change
Sewage treatment	Accommodate 280-persons Discharge to tundra or TIA	Accommodate 400-persons Discharge to tundra or TIA	Amendment
Heliport	Heli pad and building	No change	No change
Explosives	Explosives storage	Explosives Manufacturing Facility	Subject to NRCan Permitting
Madrid North Facilities, Infrastructure and Activities			
Components	**Request for Approval under Advanced Exploration Madrid Bulk Sample**	**Request for Amendment No.2 Type A Water Licence 2AM-DOH1323**	**Comments**
Ore mined Life of Mine Mining method Processing facilities	Approximately 50,000 t bulk sample from Madrid North	12,501,000 t Year 1 (2019) to Year 13 (2031) Underground / daylighting (crown pillar) Year 2 (2020) to Year 13 (2031)	Amendment
Fuel Storage (Portal, vent raise and power station)	75,000 L/60,000 L	3 @ 1.5 ML	Amendment
Power Generation	2 self-contained units at 750 MW (within Sea-Can)	3.6 MW (3 units @ 1.2 MW each) Two wind turbines Nominal capacity of 4.2 MW each	Not subject to Water Licencing Application
Waste rock stockpile	285,000 t 158,000 m^3	646,000 t 359,000 m^3	Amendment
Ore stockpile	50,000 t 28,000 m^3	50,000 t 28,000 m^3	No change
Explosives use	Not specified	4,700 kg/day	NRCan permits
Miscellaneous buildings and infrastructure	Maintenance shops, compressor building, office trailer, emergency trailer, brine mixing facility, laydown areas, air heating units	Additional infrastructure: Vent raise and access road Process plant buildings	Amendment

Water management	Surface water collected in contact water pond and discharged to tundra	Surface water – contact water ponds and reuse in mine /process plant operation. Mine water (saline) pumped to Doris mixing box and discharged to Roberts Bay.	Amendment
Contact water pond	7,900 m^3 8,350 m^2	15,100 m^3 13,900 m^2	Amendment
Concentrator	No plant	Concentrator capacity of 1,200 tpd Mill maintenance shop Warehouse/reagent storage	Amendment
Tailings	No tailings	Tailings pipeline and service road from Madrid North concentrator to Doris TIA	Amendment
Ore haulage to Doris Concentrate haulage Backhaul of cyanide leached tailings	All bulk sample ore trucked to Doris	Year 2 to Year 13 – 50 trucks/day Year 2 to Year 13 – 3 trucks/day Year 2 to 12 – 3 trucks/day	Amendment
Madrid South Facilities, Infrastructure and Activities			
Components	**Request for Approval under Advanced Exploration Madrid Bulk Sample**	**Request for Amendment No.2 Type A Water Licence 2AM-DOH1323**	**Comments**
Ore mined Life of Mine Mining methods	Approximately 50,000 t bulk sample from Madrid South	991,000 t Year 12 (2030) to Year 14 (2032) Underground/Daylighting	Amendment
Waste rock stockpile (used for backfill of mine)	500,000 t 276,000 m^3	826,000 t 459,000 m^3	Amendment
Ore stockpile	55,000 t 31,000 m^3	55,000 t 31,000 m^3	No change
Explosives use		4,500 kg/day	NRCan permits
Contact water pond 1	15,000 m^3 12,300 m^2	No change	No change
Water management	Surface water collected in contact water pond and discharged to tundra	Surface water – contact water ponds and reuse in mine /process plant operation Mine water (saline) trucked to Doris mixing box and discharged to Roberts Bay	Amendment
Contact water pond 2	900 m^3 920 m^2	2,300 m^3 1,720 m^2	Amendment
Fuel Storage - Diesel	60,000 L	75,000 L	Amendment
Power generation	3 self-contained units at 750 KW (within Sea-Can)	No additional units	No change

Miscellaneous buildings and infrastructure	Mine equipment shops, compressor building, office trailer, emergency trailer, brine mixing facility, laydown areas, air heating units	Vent raise and access road	Amendment
Ore haulage to Doris	All bulk sample ore trucked to Doris	Year 12 to Year 14 – 3 trucks/day	Not subject to Water Licencing Application
Proposed All-Weather Road and Winter Roads – Construction and Activities			
Components	**Approval**	**Request for Amendment No.2 Type A Water Licence 2AM-DOH1323**	**Comments**
Road	Winter road	All-weather road construction. Multiple (14) water crossings including 8 bridges and 6 culverts. Continued use of permitted winter road.	Amendment
Quarries	Four quarries along Doris-Windy Road	Nine quarry sites identified along AWR Four quarries expected to be used	Amendment
Transportation	Not specified	Daily haulage of ore, fuel and operating supplies	Amendment
Ore haulage to Doris	N/A	Year 5 to Year 7 – 42 trucks/day Year 7 to Year 14 – 4 trucks/day	N/A
Concentrate haulage	N/A	Year 7 to Year 14 – 4 trucks/day	N/A