TMAC Resources Inc.

DRAFT ENVIRONMENTAL IMPACT STATEMENT
Plain Language Summary








December 2016

Contents

1. Project Summary

TMAC Resources Inc. (or **TMAC**) is proposing to build and operate gold mines at the Madrid North, Madrid South, and Boston areas in the Hope Bay Greenstone Belt, located in the Kitikmeot region of Nunavut, Canada. The company has already developed and is mining at the Doris deposit in the Greenstone Belt, so the new mines at Madrid and Boston locations are known as **Phase 2** of the Hope Bay Project.

To develop Phase 2, TMAC will need several kinds of permits and licenses from authorities. One important authorization is known as a Project Certificate. In order to receive this certificate, project developers must submit an application to the Nunavut Impact Review Board. The Nunavut Impact Review Board is an agency that reviews the potential impacts of proposed projects before deciding whether or not to recommend approval to Canada's Minister of Indigenous and Northern Affairs, who makes the final decision on whether to issue a certificate. As part of the environmental assessment process established for a project under the ***Nunavut Agreement***, the Nunavut Impact Review Board requires project developers to submit a draft Environmental Impact Statement, which provides detailed information about a proposed project and the potential environmental, social, and economic impacts that may be caused.

TMAC has prepared this Plain Language Summary as part of the draft Environmental Impact Statement for Phase 2 of the Hope Bay Project. This summary contains key information and findings from the Environmental Impact Statement, including impacts and benefits, written in non-technical language. More detailed information about the Phase 2 Project is available in the full Environmental Impact Statement report.

Map of Project area and surrounding communities.

1.1 The Proponent

TMAC is a Canadian mining company with offices at the Hope Bay Project site, in Iqaluktuuttiaq (Cambridge Bay), as well as in Yellowknife and Toronto. The company acquired the Hope Bay property from Newmont Mining Corporation in 2013; the property is TMAC's prime holding and the sole focus exploration, mining and gold production.

TMAC is guided by vision, values, and policies based on the principles of sustainable development and meaningful involvement of local communities. TMAC's Board of Directors is directly accountable for ensuring that all of the company's activities and personnel, including employees and contractors, adhere to the company's policies and to all applicable laws, regulations, and operating permits. TMAC's ***Code of Ethical Business Conduct***, ***Community Complaints Procedure*** and ***Mandate of the Safety, Health and Environmental Affairs Committee*** specify the mechanisms by which the policies and values are respected by employees, contractors, and suppliers, linking on-the-ground operations activities to corporate lines of accountability.

TMAC is well-positioned for exploring, constructing, operating, and closing known and future gold deposits of the Hope Bay Project. The Company's executive, engineering, and environmental teams have a wealth of Arctic development experience and are determined to continue to develop partnerships with local business and companies with northern experience.

1.2 The Project

The Hope Bay Project is located east of Bathurst Inlet, about 150 kilometres southwest of Iqaluktuuttiaq (Cambridge Bay) and 700 kilometres northeast of Yellowknife. The nearest settlements are Omingmaktok (Bay Chimo), 62 kilometres to the west, and Kingaok (Bathurst Inlet), 130 kilometres to the southwest.

Geological studies and mining exploration have been carried out in the Hope Bay Greenstone Belt since the mid-1990s. This work has identified three main gold deposit locations, known as Doris, Madrid, and Boston. While early work focused on the Boston deposit, later studies identified that Doris had higher-grade ore. Since 2012, when TMAC acquired the Hope Bay Project, ongoing exploration work has provided more detailed information about the Doris area and the other known deposits.

The first phase of TMAC's development of the Greenstone Belt is underway – the Doris site is built and mining has been ongoing since 2015. Production of gold will occur in early 2017. The existing facilities at the Doris site and Roberts Bay will remain a central part of belt-wide development for the foreseeable future and will be used for the Phase 2 Project.

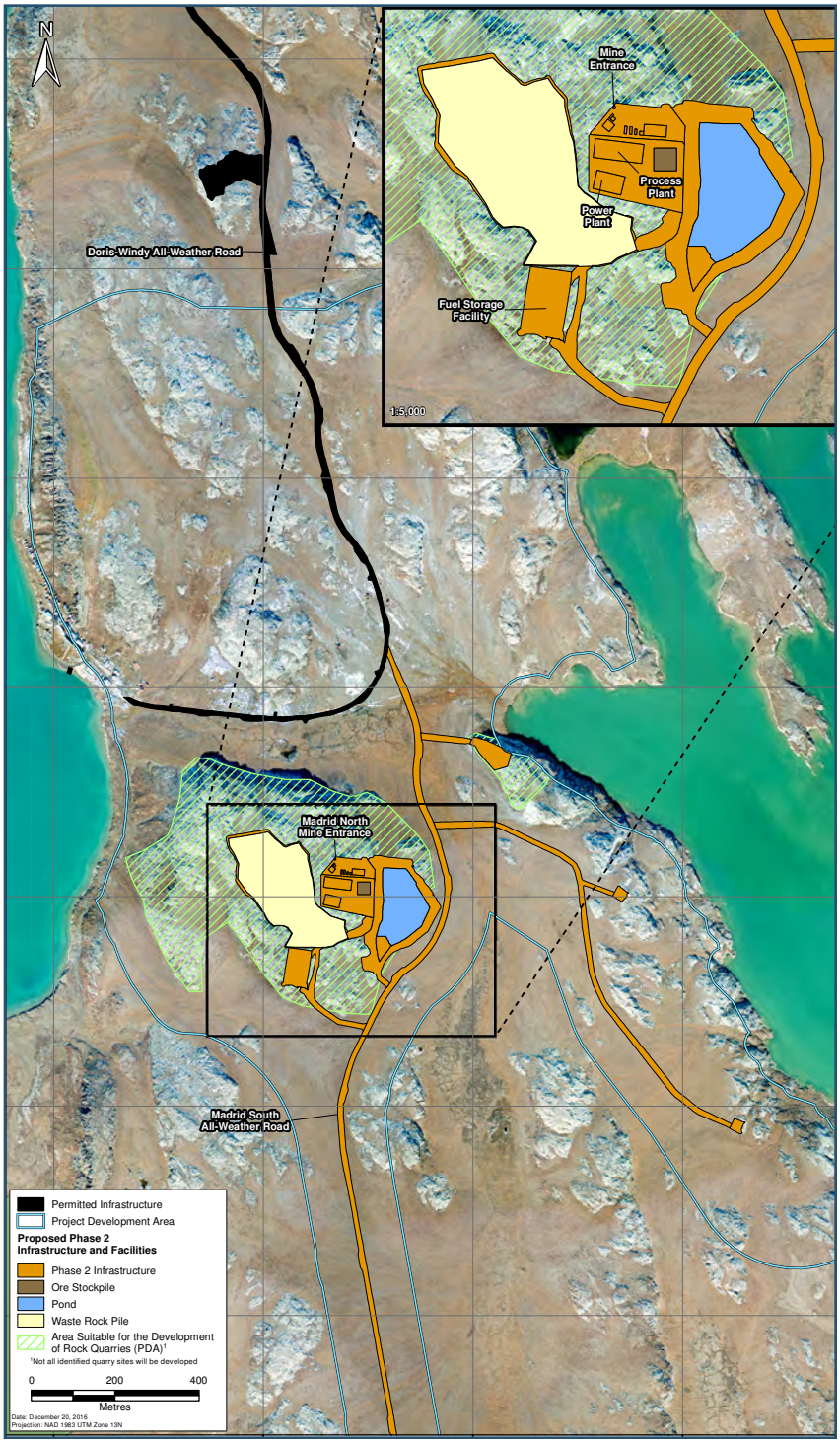
1.2.1 Roberts Bay

To allow fuel, equipment, and supplies for Phase 2 to be safely and efficiently delivered to the Project, TMAC will build a marine cargo dock at Roberts Bay, as well as an access road, a fuel storage area (similar to fuel storage in Nunavut communities), and a fuel pipeline. From the Roberts Bay tank farm, tanker trucks will distribute fuel to the Doris, Madrid, and Boston sites.

Locations of major project components.

Large-scale deliveries (called **sealifts**, like those that bring supplies to Nunavut communities) of construction material, equipment, and other supplies will occur during the open water season, from August through October annually. Three to four cargo vessels and up to three fuel deliveries every year are expected for construction and operations of Phase 2.

Layout of Madrid North facilities.



1.2.2 Doris

Gold mines generate **tailings**—the ground rock left over after the gold has been removed. To make room for tailings generated from ore (the rock containing gold) processed from Madrid North and Madrid South mines, TMAC will expand the capacity of the Doris tailings impoundment area. This work will involve building a new road to the tailings impoundment area from Madrid North, raising the south dam by eight metres and creating a five metre high dam to the west.

TMAC will also expand the Doris Camp so that it can house up to 400 people.

1.2.3 Madrid North and South Sites

TMAC plans to crush and concentrate gold from the ore at Madrid North. **Concentration** is the process by which most of the rock not containing gold is removed from the crushed ore, leaving the gold-rich components behind. The new 1,200 tonnes-per-day concentrator at Madrid North will produce concentrate that is less than 10 percent of the ore that is crushed and processed. The concentrate will be trucked to Doris for final gold extraction. The remaining 90 percent of the crushed ore (called **tailings**, which look like wet sand) will be transported by pipeline to the tailings impoundment area along a new access road. TMAC will also build a diesel power plant (similar to power plants

in Nunavut communities) to provide power to the site.

Construction and buildings both the Madrid North and South sites have already been applied for as part of TMAC's advanced exploration work in the area, including waste rock stockpiles and ponds for storing water used in mining processes or that falls as precipitation on the mine site (known as **contact water**). TMAC will expand both the stockpiles and the ponds to accommodate larger volumes of material for Phase 2.

1.2.4 All-weather Road

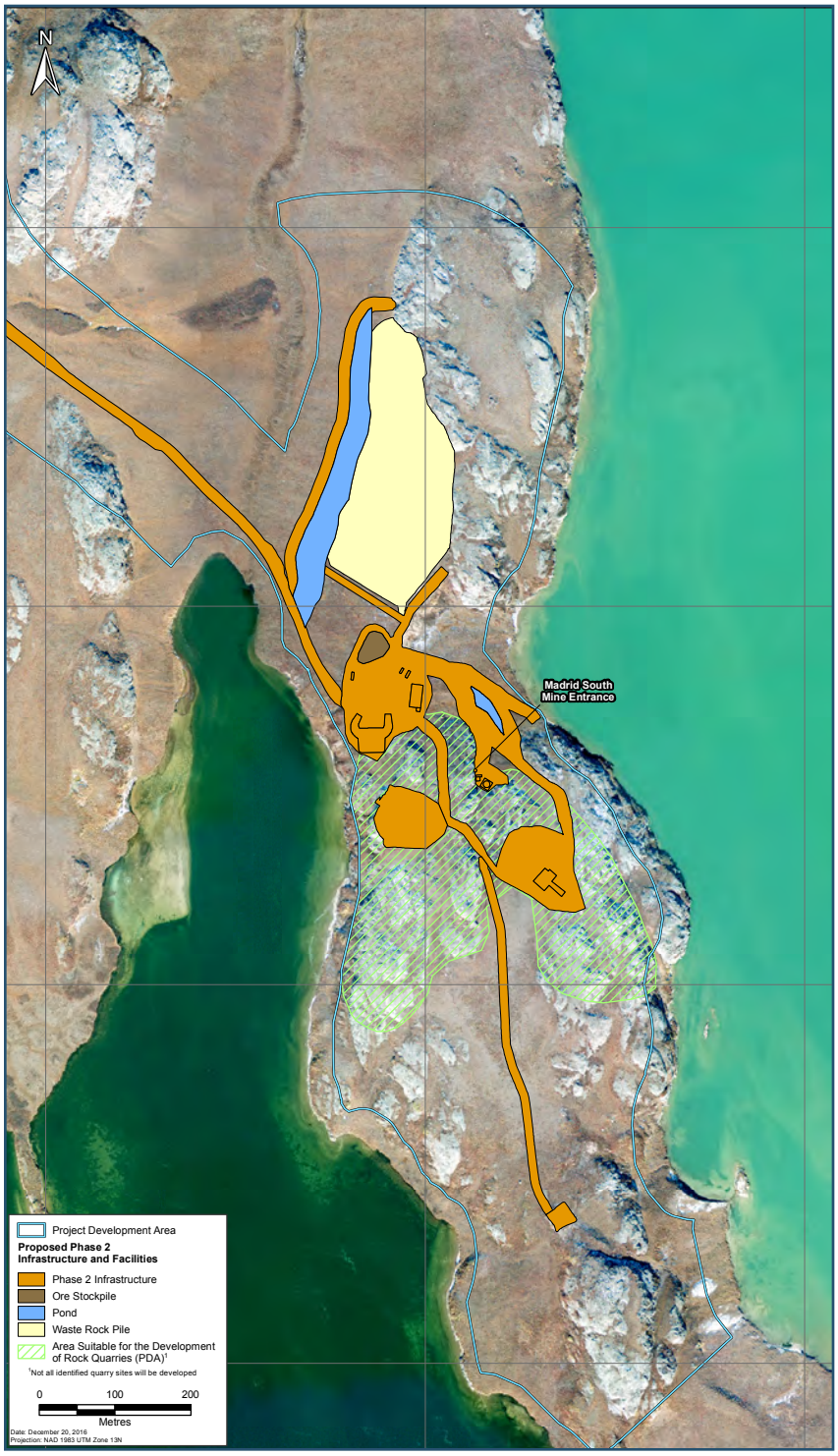
TMAC will build a single-lane all-weather road between the Madrid and Boston sites, with turn-outs to allow vehicles to pass. Haul trucks will both be used to construct the road and to carry loads of ore and gold concentrate down this road during operations. Culverts and bridges will be used wherever the road crosses streams. An already approved winter road will be used for construction until the all-weather-road is complete.

1.2.5 Boston Site

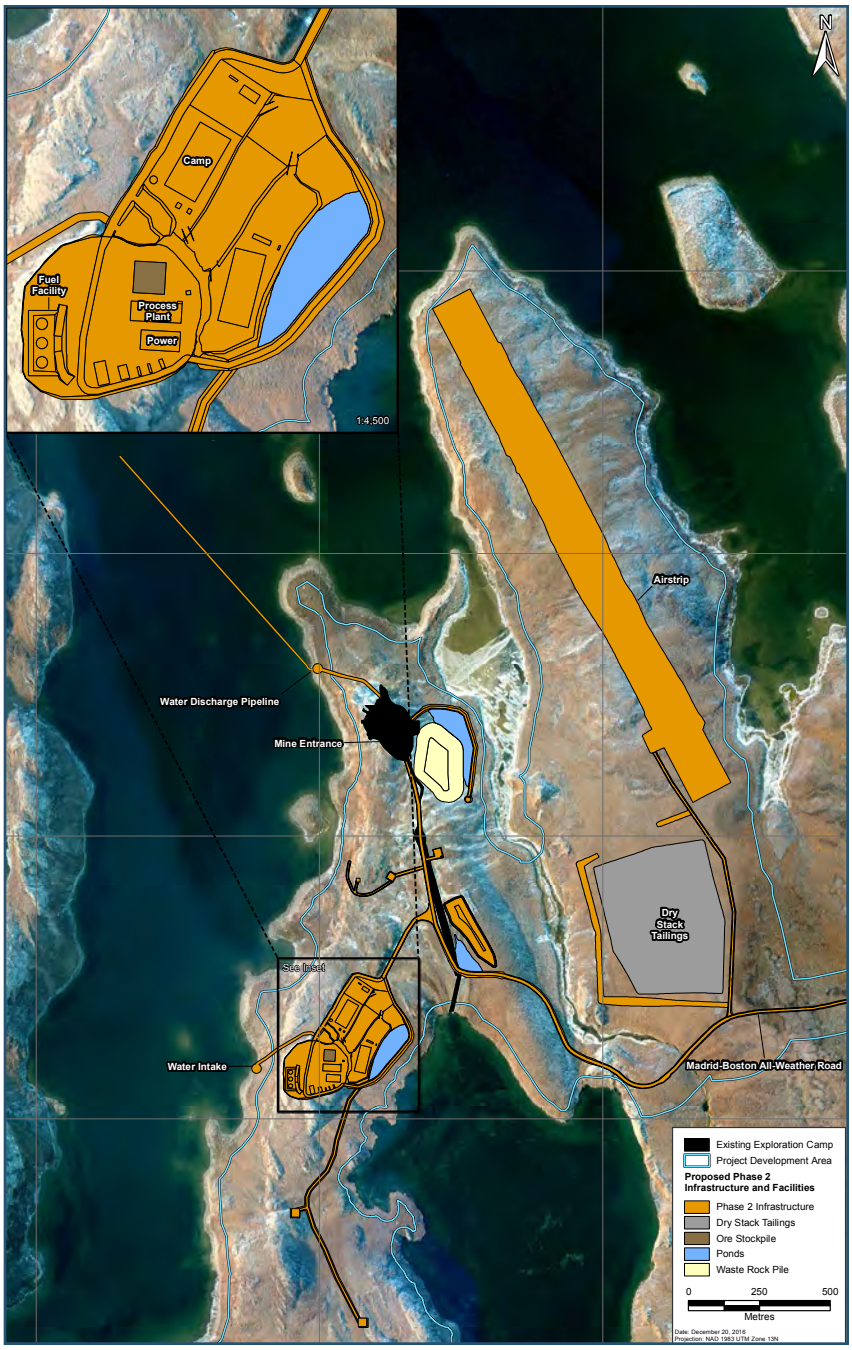
TMAC will build a mine and many other buildings in the approximate location as the existing Boston exploration camp. Buildings and areas will include the gold concentrating building, fuel storage, a diesel power plant, ore and temporary waste rock stock piles, water treatment plants, and living space for workers. A new filtered tailings management area will be built about a kilometre east of the gold concentrating building. Dry stacked tailings will be built up gradually in thin layers (about half a metre thick) during mining operations.

Before the gold concentration building is built, ore from Boston will be trucked to Doris for gold extraction. Once gold concentration is possible at Boston,

Layout of Madrid South facilities.



Layout of Boston facilities.



only the small amount of concentrate will be trucked to Doris for final gold extraction and production of gold bars.

The Boston site will need reliable year-round air access that cannot be achieved with the existing 500-metre airstrip. TMAC will construct a 2,000metrelong gravel airstrip for propeller, jet and Hercules aircraft.

The existing exploration camp can house up to 65 people. This camp will be used during the initial construction phase until a new 200-person camp is built for the remainder of construction and operation.

1.2.6 Quarries

Crushed rock from quarries will be needed to build pads that will protect permafrost and maintain the roads described in the above sections. This aggregate will be sourced from nearby quarries.

1.2.7 Project Operations

Mining will take place in permafrost conditions (at the Boston deposit) and in areas that are partially beneath lakes (at the Madrid North and South deposits), and therefore not entirely in permafrost. In locations where permafrost does not exist, water will seep into the mine, as happens at other mines all around the world. This water will be recycled for drilling in the mine and excess water will be removed and discharged to the environment once it meets standards developed by Environment and Climate Change Canada and the Nunavut Water Board.

Ramps will be built to the surface to haul ore and waste out of the mines. TMAC will use mining methods that reduce the amount of waste rock that needs to be brought to the surface. Waste rock will be stored near the mines and used to fill in the mines prior to closure.

Ore will be temporarily stored at Doris, Madrid North, Madrid South and Boston and the gold removed at Doris, Madrid North and Boston. TMAC will pump tailings from Madrid North to the Doris tailings impoundment area, while tailings from the Boston mine will be dry-stacked at the Boston site.

During construction and operations, any surface or mine water released to streams, lakes and the ocean must be at or below levels that are set by the Nunavut Water Board and Environment and Climate Change Canada. This ensures that water from TMAC's mines and other facilities, such as treated sewage effluent, does not negatively affect fish or the people and animals that depend on water and fish for food. The concentration and production of gold will use freshwater from lakes. Most of this water will be recycled from the tailings impoundment area and tailings management area to greatly reduce the amount of fresh water taken from Doris and Aimaokatalok Lake. When water meets the requirements of TMAC's water license, it will be released from the tailings impoundment area to the ocean at Roberts Bay and from the TMA at Boston to Aimaokatalok Lake.

TMAC will separate non-hazardous waste from other waste and dispose of it in either an incinerator or a landfill. TMAC will transport, handle, and store hazardous substances using methods required by the ***Transportation of Dangerous Goods Act***. No hazardous waste disposal will occur on-site. Instead, hazardous waste will be stored using standard industry best practice methods and then shipped off-site by sea or air for safe disposal.

Diesel will be transported to Roberts Bay using established marine travel routes in double-hull ships, as required by Transport Canada regulations. Fuel will be transferred to the land-based tank farm for storage at Roberts Bay using established procedures that minimize any chance of spill. Transport Canada reviews TMAC's procedures and will sometimes come to site to inspect fuel offloading, to make sure it is safe and protective of the environment. Fuel trucks will be used to transport diesel fuel between Roberts Bay, Doris, Madrid, and Boston sites.

Over 90 kilometres of roads will be needed at the Phase 2 Project during the Operation phase. This road network

will be maintained following standard road grading procedures for gravel-topped roads. TMAC will enforce speed limits to ensure the safety of workers, minimize dust, and help protect wildlife, and will apply water or other dust suppressants as required for safe visibility.

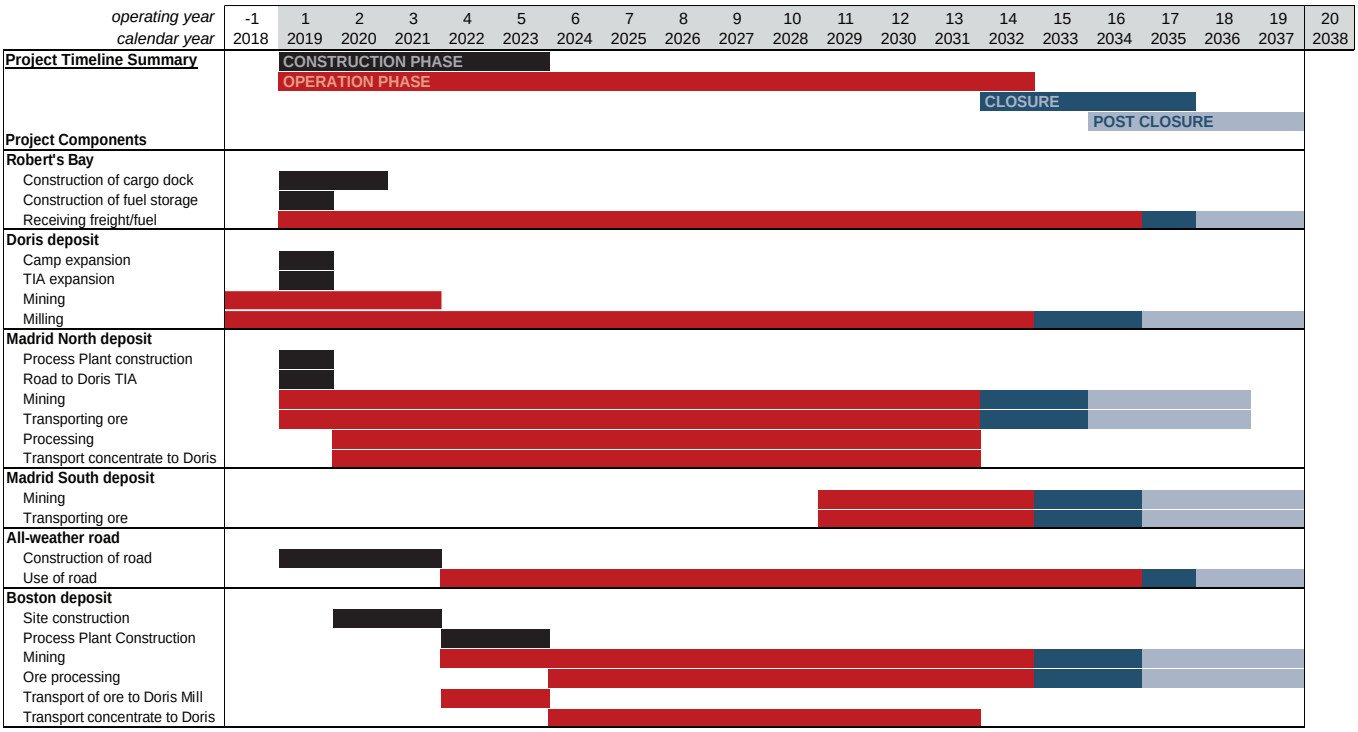
1.2.8 Project Phases and Schedule

The life of the Phase 2 Project, including Construction, Operation, and Reclamation and Closure, is expected to be 17 years. Construction (Years 1 to 5) will overlap with mining (Years 1 to 14), since Phase 2 will use existing facilities at Doris and the mines developed at Madrid North and South under the expected exploration Type B Water Licence. Reclamation (Years 15 to 17) is expected to take three years and will begin once mining is completed.

1.2.9 Alternatives

TMAC and all mining companies consider many alternative ways of developing a project in order to minimize cost, build a project that is technically possible, protect people and the environment, and ensure a return of profits that are used to pay Inuit partners and companies, investors and shareholders, employees, and government taxes and to support future development and investment. The Nunavut Impact Review Board requires that, as part of the Environmental Impact Statement, TMAC explains the option of proceeding with a project to that of not building it (called a **go/nogo analysis**), and to consider alternative ways of carrying out components of the project.

Project schedule.



TMAC's go/nogo analysis concluded that the Phase 2 Project should proceed, since it is an important opportunity for the development of a new mine in the Canadian Arctic. The Hope Bay property represents significant mineral exploration potential, and the Phase 2 Project already has much of its on-site infrastructure in place, lowering potential risks and cost of development. The predicted benefits to local communities include supporting traditional lifestyles and pursuits, as well as lifestyles that integrate wage-based employment in Inuit communities.

The location of the deposits lowers the number of potential alternatives for the development of Phase 2 components. Developing each site will require a minimum amount of infrastructure, and the design for each site has already considered a wide range of options to determine the optimal layout of this infrastructure.

Other alternative means of executing the Phase 2 Project deal with the larger development of the Hope Bay Belt. Alternatives have been evaluated for the location of the cargo dock; access to the Boston Site; open pit versus underground mining methods; number and location of processing facilities; options for tailings management; and ways to generate and supply power.

Ultimately, the various alternatives were evaluated based on technical and economic feasibility, environmental effects, reclamation potential, community acceptability, and socio-economic effects and benefits. TMAC is confident that the Phase 2 Project proposed and assessed in the Environmental Impact Statement is the result of extensive studies that will ensure that the Project succeeds.

1.3 Need for the Project

Mining has historically been important to the economy of the Kitikmeot. Mines have provided direct employment for Nunavummiut, contracts for Inuit-owned businesses, and support for community development projects. Economic support from mining projects in the Kitikmeot region has risen and fallen because of changes in global economic conditions and the absence of long-term sustainable operating mines.

The Phase 2 Project is a timely opportunity to develop the well-established Hope Bay Belt gold deposits into a long-term mining operation, operated in an environmentally sound manner, which can provide sustained economic stability and benefits for the Kitikmeot region. The Property may be the largest undeveloped gold mining region in Canada. The existing known deposits can provide approximately 14 years of mining benefits to the Kitikmeot region and the potential is strong for additional mineable gold reserves to be identified.

1.4 Inuit Benefits

TMAC and the Kitikmeot Inuit Association have made an Inuit Impact Benefit Agreement. This agreement sets out ways to maximize Inuit training, employment, and business opportunities at the Project, and sets up a system for effective communication and cooperation between TMAC and the Kitikmeot Inuit Association. Key features of the agreement include:

- Setting annual and long-term Inuit training targets;

- Setting annual Inuit employment targets;
- First opportunity to resident Kitikmeot Inuit for employment, followed by non-resident Inuit;
- Establishment and administration of a Training and Education Fund;
- Promotion of Inuit content in procurement, including requirement to engage Kitikmeot Qualified Businesses for certain types of goods and services; and
- Establishment of a Business Development Fund.

Phase 2 provides an excellent opportunity to ensure that longer-term benefits are realized under the Inuit Impact Benefit Agreement and TMAC is looking forward to a longterm success of exploration, permitting and mining on the Hope Bay Belt.

1.5 Project Development Approach

TMAC is committed to acting in a socially and environmentally responsible manner to ensure the safety of its employees, the well-being of the residents of Nunavut, and the protection of the natural environment. The company recognizes sound environmental management as a corporate priority. In developing the Phase 2 Project, TMAC will be respectful of the needs and values of others, particularly those in the nearby communities. TMAC will comply and, where it is economically and technically possible, exceed the requirements of government authorities. The company will continuously improve and quickly adapt its management actions to changing conditions, and will involve communities in decision-making at each stage of the Phase 2 Project.

TMAC has committed to hiring and sourcing services locally, creating opportunities for Inuit employees and businesses. The company has developed plans to promote local employment, training, and skills development. TMAC will give priority to Inuit job candidates, particularly those from the Kitikmeot region, including the communities of Kugluktuk (Coppermine), Iqaluktuuttiaq (Cambridge Bay), Uqsuqtuuq (Gjoa Haven), Taloyoak (Spence Bay), Kugaaruk (Pelly Bay), Kingaok (Bathurst Inlet), and Omingmaktok (Bay Chimo). In addition, certain contracts at the Project will only be open to Kitikmeot businesses.

The Phase 2 Project will directly employ about 70 people in the first year of construction, growing to more than 300 people by the end of the third year of construction. During the 14 years of mining operations, approximately 800 people will be employed.

1.6 Closure and Post-closure

TMAC will plan and act in a manner designed to return the Phase 2 Project site to a safe and environmentally stable condition. TMAC will aim to restore land no longer required by the Project, a process known as reclamation. When Project facilities—such as camps, quarries, and other infrastructure—are no longer needed, they will be reclaimed. Environmental and safety monitoring will continue as long as necessary.

2. Community Involvement

2.1 Public Consultation and Engagement

TMAC has used a variety of methods to explain Phase 2 Project information to the public and seek public input. These methods include community meetings and one-on-one meetings with hamlet representatives, the Kitikmeot Inuit Association, and Nunavut Tunngavik Inc., and other groups, as well as a wildlife workshop with local Elders and harvesters. TMAC's outreach materials are written in non-technical, accessible languages. The Phase 2 Project information booklet was translated into Inuktitut and Inuinnaqtun and printed copies were distributed at community meetings.

To support its ongoing public consultation efforts, TMAC intends to continue to update, expand, and translate key public outreach materials through the Nunavut Impact Review Board and Nunavut Water Board review processes.

The level of community support for the Phase 2 Project was formally measured at community meetings held in the Kitikmeot region in early May 2016. Of those participants who returned a completed feedback form, a clear majority (73%) indicated that they are supportive of the Phase 2 Project.

Information provided through the public consultation and engagement program helped to shape the planning and design of the Phase 2 Project in a number of ways, such as

collection of data about the region, prediction of environmental, social and economic impacts, and development of environmental mitigation and monitoring programs. TMAC will continue its public consultation and engagement efforts as the Phase 2 Project advances.

2.2 Government Engagement

TMAC's engagement efforts focus on providing agencies—including the Kitikmeot Inuit Association and territorial, and federal governments—with detailed information about the Phase 2 Project. Timelines and milestones are routinely communicated to these agencies so they can more effectively plan their workloads and be sufficiently prepared to participate in the environmental assessment process.

In September 2016, TMAC extended an invitation to these agencies to tour the Phase 2 Project site and existing facilities in order to familiarize reviewers with the proposed Project and its local environment.

TMAC recognizes the ongoing need for both formal and informal government engagement activities. Project-related correspondence with government agencies is sent to the Nunavut Impact Review Board to be made part of the public record, as required by the Nunavut Impact Review Board review process.

3. Traditional Knowledge

Traditional Knowledge is a term used to describe the knowledge held by Inuit about the local land and wildlife, the Earth's natural processes, and ways to ensure harmony and balance in life. Traditional Knowledge studies provide a valuable way of documenting spatial and temporal patterns of hunting, harvesting, fishing, habitation, and travel in a given area. They can also provide detailed information on local ecological processes, socio-cultural patterns and institutions, spirituality, and ethical and other matters. TMAC has considered Inuit Traditional Knowledge, also known as **Inuit Qaujimajatuqangit**, in the Phase 2 Project design and in various stages of the environmental assessment.

TMAC recognizes the value of Traditional Knowledge and Inuit Qaujimajatuqangit and the importance local communities place on its use in the environmental assessment of proposed developments. As such, TMAC has made significant efforts to make Traditional Knowledge and Inuit Qaujimajatuqangit part of Project design decisions. Many of these efforts have been in partnership with the Kitikmeot Inuit Association, which

administers the Naonaiyaotit Traditional Knowledge Project, which has been the foundation for recorded and geo-referenced Inuit Qaujimajatuqangit in the western Kitikmeot region. This resource has provided valuable land use, wildlife, and other environmental information used in planning for the Phase 2 Project.

For example, Inuit Qaujimajatuqangit describes the historical travel routes where Inuit cross Coronation Gulf as they travel south to the mainland to hunt, trap, and generally travel on the land. TMAC is keenly aware of the importance caribou and other wildlife for maintaining Inuit identity, livelihood, and food sources. As such, TMAC has consulted and gathered information and perspectives from community representatives on how the Phase 2 Project can be designed and operated in a way that avoids or minimized impacts on caribou and other wildlife and the people who rely on them. TMAC is committed to continuing this dialog during the review process so that local perspectives and knowledge are heard, respected and implemented where needed.

TMAC has entered into an Inuit Qaujimajatuqangit agreement with the Kitikmeot Inuit Association, committing to assist the Kitikmeot Inuit Association in the collection and preservation of Inuit Qaujimajatuqangit. The company will consider Inuit Qaujimajatuqangit in all phases of the Hope Bay Project. TMAC is certain that all Phase 2 operations can coexist with and maintain Inuit interests including wildlife and habitat.

4. Project Setting

4.1 Physical Setting

The climate in the Phase 2 Project area is one of extremes. There is relatively little precipitation, and temperatures stay below freezing for most of the year, reaching over 20 degrees for short periods in the summer. Summer is a season of nearly constant light, while darkness, twilight, and extreme cold dominate winter.

Inuit groups 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 a 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 human 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.

The Phase 2 Project is located on the Canadian Shield, a huge geological

formation made up of ancient volcanic rock scraped level by glaciers. Exposed bedrock outcrops are common. Sediment deposited by glaciers and rivers have collected to form long, winding ridges known as eskers. Phase 2 is within the continuous permafrost region of western Nunavut, where a layer of soil and rock stays frozen year-round.

4.2 Biological Setting

Where rock outcrops, water and cliffs are absent on the landscape, trees and summer flowers are numerous and dense in the tundra of the Phase 2 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 moist areas. More than 870 plant species grow in the Phase 2 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 Phase 2

4.3 Human Setting

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 Phase 2 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, Broad Whitefish, Arctic Flounder, Fourhorn Sculpin, Greenland Cod, and Starry Flounder. The latter four species were captured at the downstream ends of outflows leading to Roberts Bay.

Marine fish species include Saffron Cod, Capelin, Arctic Flounder, Pacific Herring, Fourhorn Sculpin, Arctic Char, and Greenland Cod. Ringed seals are sometimes seen in Roberts Bay.

Social and economic conditions in Nunavut are unique within Canada and have changed significantly over the last 50 years. In the late 1950s and early 1960s, many people transitioned from a semi-nomadic hunter-gatherer existence to live in predominantly permanent or settled communities. Following the collapse of pelt prices in the 1950s and a series of epidemics that killed many Inuit, the family allowance program was introduced in 1947 and became a primary source of income for many who had relocated to settlements. Previously, gathering among Inuit was seasonal and kinship-based, but the settlements gathered together a large number of Inuit from different kin groups.

Moving to a wage economy was disruptive to social roles within Inuit culture. Hunters, who had been the most highly respected leaders, started to take on employment, with varying degrees of success. Prestige became increasingly associated with what money could buy. In the settlements, economic inequality was common, and households cooperated with each other less frequently. Authority that used to belong to elders shifted to the government. Improved medical care and government payments contributed to an increase in birth rates.

The resulting social and economic conditions are not a matter of 'old ways' and 'new ways', but rather a blend created by Inuit to navigate their current realities and the continuously changing elements of social and economic life, forming the context within which the proposed Phase 2 Project might be developed and contribute to further social and economic change. Kitikmeot communities continue to face a number of social and economic challenges, such as high unemployment rates, low levels of education, and the need to improve health outcomes.

Nunavut is being explored for uranium, diamonds, gold and precious metals, base metals, iron, coal, and gemstones. Within the Kitikmeot region there are no operating mines, but there are three advanced exploration projects and 14 active mineral exploration projects.

There are local and commercial land uses in the area. Commercial land use is minor, consisting of sport hunting, guideoutfitting and lodges, and tourism (e.g., nature tourism, recreation, and cruise ships). One lodge offers tourism activities (e.g., hiking, wildlife observation, and photography). Sport hunters and harvesters rely upon muskox, caribou, wolf, and wolverine. Land uses consist of hunting, trapping, fishing, camping and travel. Harvested game is used for personal consumption and shared throughout the community.

5. Project Interactions and Effects

5.1 Valued Ecosystem Components

Valued Ecosystem Components and **Valued Socio-economic Components** are components of the natural and human environment considered to be of scientific, ecological, economic, social, cultural, or heritage importance. Valued Ecosystem Components may be identified based on public or scientific concerns regarding their value and their potential to be affected by Phase 2. The value of a component not only relates to its role in the ecosystem, but also to the value placed on it by humans.

TMAC's consultation efforts have helped to identify the key interests and concerns of communities and stakeholders. Scientific studies carried out to establish current conditions added to understanding of the natural and human environment surrounding the Phase 2 Project. Traditional Knowledge studies also provided valuable insights. Using these information sources, and in consultation with government agencies, TMAC was able to clearly identify the following Valued Ecosystem Components and Valued Socio-economic Components for the Phase 2 Project:

- Atmospheric and Terrestrial Environment:
    - climate;
    - air quality;
    - noise and vibration;
    - geology;
    - geochemistry;
    - permafrost;
    - landforms and; soils;
    - vegetation and special landscape features; and
    - terrestrial wildlife and wildlife habitat.
- Freshwater and Marine Environments:
    - surface hydrology;
    - groundwater;
    - limnology and bathymetry;
    - freshwater water quality;
    - freshwater sediment quality;
    - freshwater fish;
    - marine physical processes;
    - marine water quality;
    - marine sediment quality;
    - marine fish; and
    - marine wildlife.
- Human environment:
    - archaeology;
    - socio-economic;
    - land use;
    - human health; and
    - environmental risk.

TMAC designed the Phase 2 Project to minimize interactions with the natural environment and to implement measures to minimize any negative effects of interactions that do occur. The following sections summarize key Phase 2 Project interactions and mitigation measures that will be implemented.

5.1.1 Atmospheric and Terrestrial Environment

Phase 2 Project activities such as vehicle use and power generation will produce air emissions, which have the potential to affect ambient air quality. However, as the Project is in a remote location far from the nearest community, it is unlikely that members of the public will be inside the affected area for any extended period of time.

The Phase 2 Project will emit greenhouse gas emissions throughout its lifetime due to power generation and vehicle use and other activities (for example, incinerating waste and use of explosives). These emissions will take place during the Construction and Operation phases. The estimated greenhouse gas emissions are comparable to other mine projects in Nunavut and Northwest Territories, but low in comparison to national and global greenhouse gas inventories.

Construction of the Phase 2 Project components will involve clearing vegetation. TMAC has designed the Project to avoid sensitive areas, protecting sensitive habitats wherever possible, and reducing the amount of dust Phase 2 activities deposit on plant life. At closure TMAC will reclaim the area ensuring that vegetation can naturally regenerate.

The Dolphin and Union (Island) caribou herd migrates across the sea ice between Victoria Island and the mainland in the spring and fall. Shipping will be conducted during the open water season to protect this herd.

The Project does not overlap with caribou calving or post-calving areas, and occupies much less than a tenth of a percent of the Dolphin and Union herd's winter range and less than a tenth of a percent of the Beverly/ Ahiak herd's summer range. TMAC has designed the Phase 2 Project to disturb the smallest possible area, and facilities will not interfere with migratory paths or freshwater crossings. TMAC will pause blasting when caribou are near quarries, instruct pilots to avoid caribou, set and enforce speed limits, give all wildlife the right-of-way on roads, control dust, and burn all kitchen waste so as not to attract wildlife. The Phase 2 Project will have a strict no-hunting policy for workers.

Overall, Phase 2 is expected to disturb less than a hundredth of a percent of goodquality grizzly bear home range. Studies show that the bears do not avoid mining projects, and this has been seen at the Ekati and Diavik mines in the Northwest Territories. Thus grizzly bears are not predicted to be disturbed by Phase 2 Project activities: TMAC will discourage grizzly bears from being attracted to Project components by managing waste, keeping camps clean, bear-proofing facilities, and having a policy against feeding wildlife.

The same measures TMAC plans to use to protect caribou and grizzly bear—such as blasting restrictions, a no-hunting policy, roadway speed limits, and wildlife right-of-way—will also protect muskox, wolverine, and grey wolf.

The layout of the Phase 2 Project has been designed to avoid raptor nests. A single nest, in a rough-legged hawk territory with multiple nests, is found adjacent to Project facilities, and it is predicted that this pair will use a different nest location in their territory. Some Arctic mining projects have reported that the rock walls of quarries and open pits attract nesting raptors. However, these projects are in areas where there are few naturally occurring cliffs, which is not true in the Phase 2 Project area. No raptors have been observed attempting to nest at the Doris Project's quarries, which are similar to those planned for Phase 2.

Upland breeding birds have the potential to be attracted to project lights or structures that provide habitat, and wildlife that prey on the birds may be attracted to the Phase 2 Project site. TMAC will construct new footprint areas outside of the breeding season for upland birds and waterbirds. If construction must occur during summer, TMAC will survey the area to identify active bird nests, and wherever possible, avoid them until the chicks are fledged. Speed limits on roadways will also reduce the risk of vehicle strikes on birds.

Water quality and dust will be controlled so that wildlife are protected. Fuels and hazardous chemicals will be strictly managed and any spills will be cleaned up immediately.

TMAC's design for the Phase 2 Project, together with its mitigation and management measures, will prevent significant effects to the Atmospheric and Terrestrial Environment.

5.1.2 Freshwater and Marine Environment

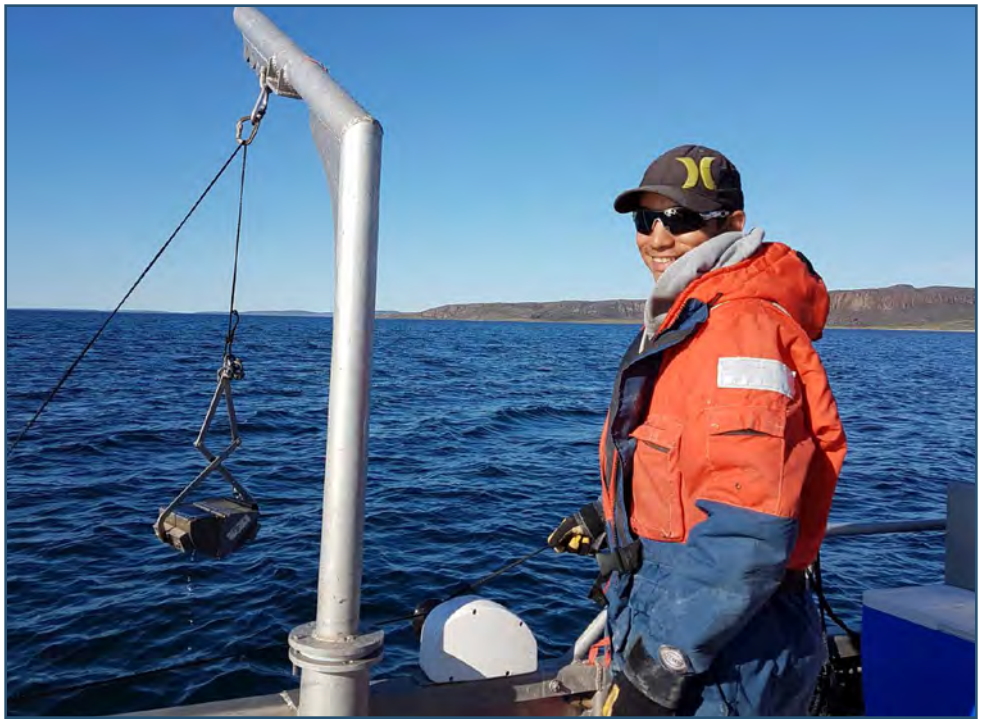
TMAC plans to use a number of methods to reduce the Phase 2 Project's potential effects on water quality, freshwater and marine fish communities, and fish habitat.

The Project will use the minimum water necessary, and TMAC will test and treat all water before releasing it back to the environment. Sewage treatment facilities will ensure that all discharged water meets or exceeds established limits made by the Nunavut Water Board, Fisheries and Oceans Canada, and Environment and Climate Change Canada. Water that comes into contact with fuel storage and maintenance facility areas, and wastewater from truck maintenance facilities, will meet established standards before being released.

The Phase 2 Project's potential to generate acidic drainage from waste rock, ore stockpiles, or quarries is low, but will be carefully managed, treated, and monitored through the life of the Project.

Fish habitat will be protected during the construction of water crossings and the cargo dock in Roberts Bay according to standards developed by Fisheries and Oceans Canada. TMAC has designed the Project to avoid fish habitat to the extent possible. Where fish habitat cannot be avoided, the loss of habitat will be offset through a plan agreeable to Fisheries and Oceans Canada. The Kitikmeot Inuit Association and members of the public will be engaged throughout the process and have several opportunities to provide input.

Fuel transfers in Roberts Bay will meet Transport Canada regulations. The discharge from the tailings impoundment area into Roberts Bay will need to meet the metal mine effluent regulations imposed by Environment and Climate Change Canada, similar to all mines in Canada. In addition, TMAC will be required to monitor the environment in Roberts Bay to ensure that the discharge is not having an impact on aquatic life.



For the construction of the cargo dock in Roberts Bay, TMAC will limit impacts to marine fish using Fisheries and Oceans Canada's measures to avoid causing serious harm to fish and fish habitat, in addition to other measures to minimize noise, pressure, and vibration (for example, from pile driving, blasting, or shipping). Work in marine waters will be done during times that pose the least risk to fish, and the area disturbed as part of the marine cargo dock will be minimized to the extent possible. For the remaining habitat losses, offsetting will allow for fisheries productivity to remain stable or be enhanced over time.

Surveys indicate that there are no places for ringed seals to haul out (or rest on the shore or ice) during the summer in Roberts Bay. In winter, the density of breathing holes in the ice in Roberts Bay and adjoining Melville Sound is much lower than in Bathurst Inlet, probably because ringed seals prefer to avoid land-based predators such as grizzly bears and wolverine. TMAC will conduct shipping only in the open-water season, outside of the periods when ringed seals and caribou are using the ice.

No seabird colonies have been found in Melville Sound and Roberts Bay, though low densities of seabirds nest on the beach and ground. The closest seabird colonies to the Phase 2 Project are on small islands and bays in northern Bathurst Inlet and Elu Inlet at the east end of Melville Sound. Because of the small size of the existing Roberts Bay facility and proposed new Project facilities, as well as the low numbers of birds nesting on the mainland shore, the Project's effects on seabirds are anticipated to be low.

TMAC's design for the Phase 2 Project, together with its mitigation and management measures, will prevent significant effects to the Freshwater and Marine Environment.

5.1.3 Human Environment

About 50 archaeological sites are known to be present in the area of the Phase 2 Project. TMAC plans to prevent impacts to sites by screening areas before starting any Project activity and educating field personnel on how to identify archaeological sites, as well as the correct procedures to follow if they unexpectedly discover one. Once a new site is identified, TMAC will create a protective buffer zone around the site. If archaeological sites cannot be avoided by the footprint of the Phase 2 Project, the site will be mitigated; this means that a permit needs to be obtained from the Government of Nunavut, all information from the site needs to be documented, and artifacts are catalogued and preserved for future generations of Nunavummiut. Although the site is removed, it is thought that the information collected and preserved is of great cultural importance. No significant impacts to archaeological resources are expected to occur from Phase 2.

The Phase 2 Project is expected to have beneficial effects on economic growth and development through contributions to Canada's Gross Domestic Product and to federal and provincial government tax revenues. These effects are expected to be felt in the local area, the region, Nunavut, and Canada as a whole during the Construction and Operation phases. The Project has the potential to contribute to the economy of the Kitikmeot in a positive and meaningful way, making it able to support diverse development types. Local business capacity will be increased through contracts to Kitikmeot Qualified Businesses as well as other Inuit and non-Inuit businesses in the Kitikmeot region. The Phase 2 Project will increase employment and income levels across the Kitikmeot region and Nunavut, as well as elsewhere in Canada.

The Phase 2 Project has the potential to cause greater competition for workers with higher, more specialized skills; however, this effect is not expected to be widespread. While on-the-job

training will be provided, demand for local education and training programs is expected to increase. The partnerships that have been established between industry, the Kitikmeot Inuit Association, the other institutions to provide education and training programs will be critical to the TMAC's ability to meet these training needs.

The Phase 2 Project is predicted to result in changes to family spending and changes to family stability associated with the influence of increased household incomes and the change in family roles and relationships associated with Project work. TMAC has identified ways to enhance the positive and reduce the negative impacts associated with these changes. For example, communications facilities to help maintain connections between employees and their families will also be available on site. In addition, a TMAC liaison will be responsible for ongoing consultation with Inuit employees to identify specific employee needs and provide support for any issues that arise.

It is anticipated that Phase 2 will create significant positive effects for people in the Kitikmeot region and that any negative effects can be managed by TMAC. The Inuit Impact and Benefit Agreement with the Kitikmeot Inuit Association will help ensure that the Project benefits Inuit.

5.2 Accidents and Malfunctions

Accidents and malfunctions may occur during any phase of the Phase 2 Project. The primary environmental concern resulting from accidents and malfunctions is the possibility for spills or the release of materials such as chemicals or petroleum products onto the land or water. Fire presents another risk resulting from vehicle accidents, damage to electrical systems, or accidental explosions.

TMAC's approach is to make management of risks and contingency planning its priority. The company will undergo a comprehensive evaluation of the potential risks both to meet regulations and its own health, safety, and environmental objectives. While the possibility of accidents and malfunctions exists, TMAC's goal is to minimize the likelihood of such events and the associated consequences to people and the environment. TMAC's strategies include personnel training, education, regular inspections, monitoring and maintenance of equipment, and learning from experience to improve performance.

5.3 Effects of the Environment on the Project

Severe extreme events, such as storms, heavy rainfall or snowfall, very low temperatures, seismic activity, or ground and slope instability have the potential to affect Phase 2 Project infrastructure and in turn affect human safety and the environment. Furthermore, climate change has the potential to affect the Project.

The design of Phase 2 Project components and the planning of activities have considered the effects of the environment. Studies have been carried out and will continue during detailed design to help identify events that could affect Project infrastructure. Potential impacts include changes to permafrost structure and drainage patterns. In general, Phase 2 facility locations have been chosen to take advantage of stable bedrock and to avoid potential problems. Infrastructure will also make use of permafrost protection measures and thermal barriers.

5.4 Transboundary and Cumulative Effects

Consideration was given to potential **cumulative effects** arising the Project's effects combining with those of other projects, as well as to effects that may cross jurisdictional boundaries into other parts of Canada (known as **transboundary effects**). No significant cumulative or transboundary effects were identified, partly because the Phase 2 Project is not expected to have significant effects nearby or in combination with projects or activities that are hundreds of kilometres away.

6. Environmental, Health, and Safety Management

TMAC recognizes sound environmental management as a corporate priority. The company's ***Commitment to Ethical Business Conduct*** includes ongoing and independent examination of its environmental performance, continually evaluating the design and implementation of its environmental management systems, comparing against industry best practice, and making the resources available for TMAC personnel to meet their environmental management obligations. TMAC has a Safety, Health, and Environmental Affairs Committee assessing environmental risks, reviewing and amending the company's environmental policies and standards, and responding to specific environmental matters as directed. In addition, under the Inuit Impact and Benefit Agreement, an Inuit Environmental Advisory Committee reviews environmental management and monitoring plans, discusses Project-related environmental issues, and provides advice to TMAC.

Specific management plans are already in place for the previous phases of development of the Hope Bay Belt Project. During the review of Phase 2 all affected communities, the Kitikmeot Inuit Association and relevant government agencies will be reviewing management and mitigation measures. As required, existing management plans will be updated to account for new or unique aspects of Phase 2 not already covered under the existing plans.

7. Conclusions of the Draft Environmental Impact Statement

TMAC's draft Environmental Impact Statement concludes that the Phase 2 Project is not likely to cause significant negative impacts to the environment, socio-economic conditions, or communities.

TMAC has designed the Project to minimize effects to the environment. The company is committed to developing the Phase 2 Project in a sustainable manner that is respectful of local communities and the environment. Through careful mitigation and management, the Project is anticipated to have no significant environmental effects, while providing economic benefits to Inuit communities, the region, and Nunavut as a whole.