MADRID-BOSTON PROJECT
FINAL ENVIRONMENTAL IMPACT STATEMENT

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Glossary and Abbreviations

Terminology used in this document is defined where it is first used. The following list will assist readers who may choose to review only portions of the document.

EIS	Environmental Impact Statement
HTO	Hunters and Trappers Organization
ILUOS	Inuit Land Use and Occupancy Study
IQ	Inuit Qaujimajatuqangit
KIA	Kitikmeot Inuit Association
NIRB	Nunavut Impact Review Board
NTKP	Naonaiyaotit Traditional Knowledge Project
RSA	Regional Study Area
TK	Traditional Knowledge
TNP	Tuktu Nogait Project
VEC	Valued Ecosystem Component
VSEC	Valued Socio-economic Component

2. Traditional Knowledge

2.1 CONFORMITY WITH EIS GUIDELINES AND USE OF TRADITIONAL KNOWLEDGE IN THE EIS

TMAC has reviewed and incorporated available Traditional Knowledge (TK) in preparation of the Environmental Impact Statement (EIS) in conformance with the EIS Guidelines (NIRB). For each effects assessment chapter presented in Volumes 4 to 6, heading and sub-heading titles have been organized in such a way as to reflect specific guideline requirements and direct the reader's attention to areas where further details are provided. The remainder of this section provides TMAC's definition and description of TK, describes the ways in which Inuit Qaujimajatuqangit (IQ) values have been incorporated into the Phase 2 Project (the Project), summarizes the TK studies that were conducted for Madrid-Boston, and discusses the role of TK in Project planning and design.

Specific details on TMAC's use of TK in the EIS have been documented in Section 2.5. This table summarizes instances where TK was used (i.e., it provides a brief description of what information is presented), the purpose of TK use (e.g., source of baseline information, interpretation of results, development of mitigation or management plans), the source from which the TK was drawn (e.g., TK report, academic publication, government report, caribou workshop reports), and the EIS volume and section where it appears.

2.2 DEFINITION AND DESCRIPTION OF TRADITIONAL KNOWLEDGE

Traditional Knowledge (TK) is a term used to encompass the knowledge held by Indigenous peoples of local land and wildlife, the Earth's natural processes, and ways to ensure harmony and balance in life. TK 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, ethical and other matters. TK can be defined as a "accumulated body of knowledge, observations and understandings about the environment, and about the relationship of living beings with one another and with the environment, that is rooted in the traditional way of life of Inuit of the designated area" (NIRB 2014). For the purposes of the report, TK is treated as an inseparable part of IQ, which refers to "the traditional, current and evolving body of Inuit values, beliefs, experience, perceptions and knowledge regarding the environment, including land, water, wildlife and people, to the extent that people are part of the environment" (QIA 2009 in NIRB (2012), vi). For the purposes of the Project, traditional activity and traditional knowledge is inclusive of land use, food security, cultural activities, and commercial harvesting.

TK is acknowledged as having value in the management of local natural resources, and as being complementary to and applicable to scientific knowledge (Turner 2000). The advantages of incorporating TK into resource and environmental decision-making are numerous. For one, TK is often seen as 'holistic' as opposed to 'reductionist', a characterization often attributed to Western science (Usher 2000). A holistic perspective tends to see all life as a series of relationships among equals, whereas Western science traditionally has seen humans at the top of a hierarchical arrangement of living creatures (Bone 2003). The collection and inclusion of TK in environmental and resource decision-making also encourages local participation in decision-making. Participatory approaches, such as these, tend to improve decision-making, enhance the sense of legitimacy and fairness of decisions taken, and can assist in resolving conflict (Diduck 2004).

TK holders may also reveal detailed trends, information, and insight regarding the local environment that scientists might miss. Detailed knowledge such as this is often a result of close contact with the environment, and observation over various seasons and years (Mitchell 2002). In remote areas such as the Arctic, TK can also be used to obtain information where scientific data is lacking, and the information can often be collected more efficiently than through scientific procedures (Gilchrist 2005). TK is best used when decision-making affects an area where TK holders live and work (Mitchell 2002). Usher (2000: 187) notes: "It makes good sense to involve people who spend a lot of time on the land in environmental assessment and management, for the obvious reason that they get to see things more often, for longer, and at more different times and places than is normally the case for scientists." TK can thus contribute to a deeper understanding of local environmental processes and baseline conditions (Usher 2000).

TMAC recognizes the value of TK and the importance local communities place on its use in the environmental assessment of proposed developments. As such, TMAC has made significant efforts to engage local communities through incorporation of their TK into the Project planning and design. Many of these efforts have been made in partnership with the Kitikmeot Inuit Association (KIA), who administers the Naonaiyaotit Traditional Knowledge Project (NTKP) database and has assisted TMAC in conducting a comprehensive TK study for the Project (see Section 2.4.1). The remainder of this section describes TMAC's use of TK in more detail.

2.3 INCORPORATING INUIT QAUJIMAJATUQANGIT VALUES INTO THE HOPE BAY PROJECT

From the outset, overarching IQ values have been incorporated into the approach to Madrid-Boston and the Hope Bay Project overall. The concordance of these values with the approach to the Project is outlined in Table 2.3-1. Further, all TMAC employees will participate in TMAC's Cross Cultural Awareness training program, which the company has already commenced delivering. This training program assists in developing an understanding of IQ values and practices among all workers on the Hope Bay Project. TMAC's corporate culture and approach to development is aligned with IQ principles as demonstrated in the Table 2.3-1.

Table 2.3-1. Incorporation of Inuit Qaujimajatuqangit Values into the Hope Bay Project

Inuit Quajimajatuqangit Values	How TMAC has Incorporated Each Value into the Hope Bay Project
Inuuqatigiitsiarn: Respecting others, relationships and caring for people.	TMAC values respect and carefully recruits employees who share this value.
Tunnganarniq: Fostering good spirit by being open, welcoming and inclusive.	TMAC values a positive attitude and the enjoyment of work and recruits employees who share these values.
Pijitsirniq: Serving and providing for family and/or community.	TMAC's vision is to be the responsible and economically sustainable operator of the Hope Bay Project. TMAC endeavors to have the Madrid-Boston development provide long term benefits to Nunavut and the Kitikmeot region.
Aajiiqatigiinniq: Decision making through discussion and consensus.	TMAC values teamwork and carefully recruits employees who share this value.
Pilimmaksarniq/Pijariuqsarniq: Development of skills through practice, effort and action.	TMAC recruits employees based on their ability to learn and adapt.

Inuit Quajimajatuqangit Values	How TMAC has Incorporated Each Value into the Hope Bay Project
Piliriqatigiinniq/Ikajuqtigiinniq: Working together for a common cause.	As above, TMAC values teamwork and carefully recruits employees who share this value.
Qanuqtuurniq: Being innovative and resourceful.	TMAC values initiative and growth are and recruits employees who share this value.
Avatittinnik Kamatsiarniq: Respect and care for the land, animals and the environment.	TMAC maintains a Zero Harm approach to people and promotes environmental stewardship.

2.4 TRADITIONAL KNOWLEDGE SOURCES

TMAC utilized four primary sources of TK in preparation of the EIS: a NTKP database report (Banci and Spicker 2016), theme-based workshops on caribou, the results of public consultation and engagement activities (Volume 2, Section 3), and other available sources. The background, methods, and findings of these TK sources are summarized in the sections below.

It is also important to highlight that TMAC partnered with the KIA in preparation of the NTKP database report for use in the EIS. The basis of this partnership was a TK Agreement signed between TMAC and the KIA. Signing of this agreement provided TMAC with access to TK held by the KIA in the NTKP database. The agreement also outlines the terms and conditions pertaining to TMAC's use of the TK.

2.4.1 Naonaiyaotit Traditional Knowledge Project Database Report

A significant amount of TK collected for the Project has been sourced from the NTKP. The NTKP is the foundation for recorded and geo-referenced Inuit TK in the western Kitikmeot region. The NTKP covers Inuit land use, and fish and wildlife ecological data within a 750,000 km² study area, the Slave Geological Province. As well as being a repository of Kitikmeot Inuit TK, the NTKP was designed as a land use planning tool, to inform and improve the quality of environmental assessments for proposed developments in the Kitikmeot region (Banci and Spicker 2016).

The NTKP database is administered by the KIA and requires the negotiation of a TK Agreement before access is granted. The KIA and its team of consultants have led all NTKP-oriented work for the Project, with TMAC providing input and direction as necessary. The KIA has been responsible for reviewing information requests, preparing work plans, and developing a database summary report, and final reporting, amongst other items. TMAC worked closely with the KIA throughout this process and was the source of all funding for the TK study.

The geographic scope of the study was defined by KIA in consultation with TMAC and is described as the Regional Study Area (RSA). The RSA is based on KIA's understanding and extent of how Inuit use the land in the vicinity of the Hope Bay Project, and on the study areas used for wildlife, marine and terrestrial studies as provided by TMAC. The Project Area refers to the immediate and surrounding area that will be affected by the proposed development by TMAC. The RSA encompasses broad regional-scale information in the NTKP data base that may be relevant to the Project (e.g., animal migration patterns, regional Inuit land use activities and travel routes). The RSA included Omingmaktok, the settlement which is the closest to the Project (Banci and Spicker 2016).

The NTKP oral data has come from five sources. The first and major source is data from the original NTKP interviews conducted in 1995 and 1996. The second source is the data from the Tuktu Nogait Project (TNP) which focused on Kiligiktokmik (Bathurst Inlet) and caribou. The TNP interviews were conducted between 1997 and 2000. Both of these studies are regional and reflect information that was

collected at a 1:250,000 map scale. As of 2011, the TNP was fully integrated into the NTKP and is not treated as a separate project (Banci and Spicker 2016).

On behalf of TMAC, data from three other regional and site-specific studies were integrated into the NTKP. These included the 1970s Inuit Land Use and Occupancy Study (ILUOP) that provided spatial data at land-scales of 1:500,000. The remaining work involved linking the text and map data for Kugluktuk and Cambridge Bay. Both communities have information for the RSA. Two more studies came from focused workshops held in Kugluktuk and Cambridge Bay by the KIA in 2013. The workshops addressed a number of data gaps including those rated to marine environment. Lastly, a study incorporated the NTKP spatial data collected on anadromous trout by Dr. Heidi Swanson of the University of Waterloo (Banci and Spicker 2016).

The NTKP contains the collective knowledge of 267 individual Elders and land users residing in the communities of Cambridge Bay (Ekaluktutiak), Kugluktuk, Kingaok (Bathurst Inlet) and Omingmaktok (Bay Chimo) at the time of interviews. The information holders of the NTKP are called consultants, to respectfully acknowledge the value of their contributions. Their identities are protected in the report, as per the original NTKP agreement. The use and release of all the information contained in the report is guided by the TK Agreement TMAC signed with the KIA (Banci and Spicker 2016).

The report begins with presenting introductory information about the report and NTKP, and about Inuit and how they are seen through their own eyes. The 'Kitikmiut Heritage and Lifeways' section of the report discusses where people were born and where their camps, travel routes, and important harvesting areas were located. The sections that follow include 'Caribou,' 'Land Mammals,' 'Marine Life,' 'Birds,' 'Fish and Fishing,' 'Ocean Fish,' 'Environment', 'Water Sources and Quality,' 'Changes in Animal Health' and 'the Arrival of Insects.' These sections include textual summaries about those topics, quotes from NTKP participants, and maps detailing environmental information and where related land use activities have occurred. The last section of the report describes data gaps that broadly relate to Inuit land use, mammals, birds and fish, and the environment. The section also provides recommendations for addressing data gaps that include consulting with Elders and knowledgeable land users (Banci and Spicker 2016).

In general, the report uncovered a number of potential Project interactions with regional wildlife, environmental components, and Inuit land use. It is evident the Project is located in an area that has seen considerable historic use by Inuit, as demonstrated by the large number of gathering places and travel routes identified in the RSA. This is likely due to the abundance of terrestrial, freshwater, and marine wildlife resources that have traditionally been found in the region and harvested by Inuit. Banci and Spicker (2016) also note "the map of Inuit travel and gathering places essentially is also a map of important harvesting areas."

The NTKP database report has provided valuable land use, wildlife, and other environmental information at a regional scale. However, the report identifies the need for more local scale information as an important data gap that needs to be filled. This is because data for this report was collected at a 1:250,000 map scale, which does not provide an accurate portrayal of site-specific information. Data on some particular wildlife species (e.g., marine mammals, some land mammals and birds, some fish species) was also noted to be lacking in the NTKP database. TMAC will continue to work with the KIA to develop an approach to address remaining data gaps relevant to the development of mitigation or management plans for the Project, which may consist of additional workshops with knowledge holders and other methods for data verification.

2.4.2 Caribou Workshop Series

Caribou workshops were developed to engage with and understand the interests and knowledge of Elders and harvesters, and to consider this information in developing caribou protection measures. One of the methods employed for the workshops was consensus-based decision-making which reflects the Inuit traditional form of decision-making and has continued to be preferred in modern-day Nunavut. The workshops facilitated the exchange of IQ and western science on the topics of potential Project impacts and risks to caribou, mitigation measures, cumulative impacts, and monitoring. The workshops provided a platform for Elders and harvesters to share information about caribou and the environment and contribute to the development of protection measures to reduce or avoid impacts to caribou and other wildlife species. To facilitate reciprocal communication that incorporates two worldviews or 'ways of knowing' (i.e., western science and IQ), the review of protection measures occurred in-person, through group discussions, facilitated activities, and site visits. TMAC was in a unique position to offer the caribou workshops and to demonstrate the caribou protection measures to Elders and harvesters as the Doris mine, which began operation in early 2017, provides a real demonstration of how many the same protection measures are being implemented.

The workshops brought together Inuit Elders and harvesters, wildlife experts, and TMAC representatives to work together and share knowledge to ensure the protection measures proposed for the development of Madrid-Boston were informed by IQ and acceptable to Inuit who know and use the land near the Project. TMAC has and will continue to involve Inuit harvesters and Elders to confirm and improve on the protection measures developed for the Project, so that the interests, knowledge, and perspectives on risk are reflected in how impacts on caribou are avoided or minimized.

The multi-day workshops were held in November 2016, April 2017, and August 2017, with the second workshop including a site visit to Doris, and the third workshop including a visit to the Doris and Boston sites. The first workshop was held in September 2016, to formally begin this dialogue and engage local knowledge holders in the development of the environmental assessment and design of mitigation and management measures for Madrid-Boston. The second workshop occurred in April 2017 during the review period for the Draft Environmental Impact Statement (EIS) for Madrid-Boston. This workshop was to obtain additional input on the potential effects of mining at Madrid-Boston on caribou, but with a focus on the protection measures needed to keep caribou safe. The third and final workshop was held in August 2017, as TMAC was beginning to prepare the Final EIS. The purpose of this workshop was to revisit, discuss, and consider the protection measures that have been developed to protect caribou and other wildlife. Additionally, the final workshop culminated in the agreement, by consensus, on concluding statements regarding the mitigation measures and monitoring planned for the Project. The protection measures are based on the best knowledge and information available from both IQ and western science.

Workshop participants were selected in consultation with the Kitikmeot Inuit Association (KIA). A number of the participants are members of the Inuit Environmental Advisory Committee (IEAC) formed under the Hope Bay Project's Inuit Impact and Benefit Agreement (IIBA) that applies to all TMAC activities within the Hope Bay Greenstone Belt, including the development of the Madrid and Boston mines. Knowledge holders were selected to be representative of the land users from Omingmaktok, Kingaok, and Cambridge Bay who are or have been active in the Project area, and who are recognized within the community as having considerable knowledge of land use and caribou. Participation in the workshop was designed to help ensure that group activities functioned optimally with equitable participation and sharing of information. Two wildlife biologists, a facilitator, an interpreter, and a project manager for TMAC were also in attendance.

Six Elders and two harvesters participated in the first workshop. Part of the discussion focused on the assessment of potential impacts on wildlife, how potential impacts were identified and considered, and the protection measures proposed. Participants identified and described risks to caribou, and the protection measures to reduce risks. The protection measures discussed included both those previously identified and currently in use by TMAC (e.g., water quality monitoring, vehicle speed limits, spill response), as well as some that had yet to be considered (e.g., use of Inuksuit to direct caribou away from the Tailings Impoundment Area). Ultimately, discussions were focused on the potential for the Project to coexist with caribou and important wildlife species.

Workshop participants described and discussed current land use activities (hunting locations, travel, seasonality and changes in hunting activities over time), knowledge of caribou (areas important for caribou, caribou locations and numbers, migrations and movements, caribou behaviour, changes and trends over time), and potential interactions between caribou and the Project (ways caribou may interacts with Madrid-Boston, issues and concerns, potential ways to avoid or mitigate potential effects). The group came to consensus on various statements on caribou baseline information and on consideration for evaluation the potential interactions between the Project and caribou. Participants identified a number of potential effects to caribou as a result of Madrid-Boston and grouped these effects according to level of perceived impact (high, medium, low). For each potential effect above workshop participants identified key caribou protection measures for TMAC's consideration. This information was brought forward to the technical specialists for consideration in preparing the effects assessment presented in the EIS. The full report of the first caribou workshop is provided in Appendix V2-2A.

In April 2017, the second workshop was held, attended by five Elders and two harvesters. The second workshop aimed to demonstrate and review existing caribou protection measures, including a number that are in place at the Doris mine and are also proposed for Madrid-Boston. Participants were able to see the application of many of the proposed caribou protection measures during a visit to Doris. For example, during a trip to site workshop participants viewed markers at 250 m and 300 m from the airstrip, with 250 m indicating the distance within which caribou may not be present in order for aircraft to land or take-off, and 300 m being the minimum height from caribou that helicopters must operate. The second workshop included further discussion of knowledge about caribou (i.e., behaviour, predation, habitat, and migration), reflections about the past impacts of mines on caribou, and caribou protection measures.

During the second workshop, participants confirmed established protection measures and suggested additional measures to ensure that caribou can be protected during the construction and operation of the Project. For example, participants suggested that workers stay in their vehicles during a wildlife encounter. Participants also noted that line-of-sight should be considered when deciding to pause blasting because caribou are the in the vicinity; participants indicated that caribou are only disturbed by noise if they can see the source of the noise. Additionally, workshop participants indicated that caribou are more likely to be distributed by a sudden, loud, and irregular noise as opposed to a constant regular noise that is not in view. TMAC's monitoring plans were also discussed during this second workshop. The full report of the second caribou workshop is provided in Appendix V2-2B.

In August 2017, a third workshop was held. The purpose of this workshop was to revisit, discuss, and consider the mitigation measures and monitoring that have been developed to protect caribou and other wildlife. It was attended by five Elders and one harvester. The third workshop included presentations, group discussion, facilitated activities, and site visits to support discussions on the following topics: cumulative impacts, caribou protection measures, protection measures for other wildlife, and monitoring.

The final workshop in the series of three focused on confirming the results of the past workshops and continuing to develop ideas and reach consensus on risk, caribou protection measures, cumulative impacts, and caribou monitoring. TMAC hosted visits to the Doris and Boston sites and requested that Elders and harvesters consider the information shared and share their experiences and knowledge on the proposed caribou protection measures.

The workshop was brought to close with a facilitated activity through which participants decided whether they were able to support and confirm the caribou protection measures proposed by TMAC for Madrid-Boston. The group reached consensus on the workshop conclusions, with participants agreeing that the TMAC's proposed caribou protection measures would keep caribou safe. A full account of the results of the third workshop is provided in Appendix V2-3C.

A summary of the results of all three caribou workshops is provided in Appendix V2-3D.

2.4.3 Other Relevant Sources

Additional sources of TK have also been used when appropriate. For example, the results of the Nunavut Wildlife Harvest Survey conducted on Inuit subsistence harvesting activities between 1996 and 2001 were summarized in the Project land use baseline report (Appendix V6-3A), in addition to other relevant government and academic research studies. The survey collected data on non-commercial hunting, trapping, gathering, and fishing of mammals, birds (and their eggs and feathers), fish, and shellfish. Hunters were categorized based on hunting frequency.

The Project land use baseline report also included textual and mapped information on contemporary Inuit land use, hunting and trapping, fishing, plant gathering, cabins and camping, travel routes, and changes in wildlife. This information was obtained through a land use focus group conducted in 2011 and interviews with representatives of local Hunters and Trappers Organizations (HTOs). The focus group (November 2011) was attended by five Elders and one younger hunter active in areas near the Project, specifically Omingmaktok. Interviews included both structured and semi-structured questions, as well as resource mapping, to gather additional information on current use of land and resources to supplement the information collected from the focus group. Additional research was completed in the Kitikmeot communities in September and October 2017. Interviews were conducted with HTO representatives from Cambridge Bay, Gjoa Haven, Taloyoak, and Kugaaruk. This updated information was incorporated into the Final EIS and supplements the results of the 2011 baseline research (Appendix V6-3A) and the caribou workshops held with Elders and harvesters in 2016 and 2017 (Section 2.4.2).

2.5 INCORPORATION OF TRADITIONAL KNOWLEDGE IN THE EIS

TK from the sources discussed in Section 2.4 was used to inform the EIS for the Project. Information helped to inform studies regarding the existing environment and baseline information, identified and/or help in the selection of valued ecosystem components (VECs) and valued socio-economic components (VSECs), helped to define spatial and temporal boundaries for the EIS, was considered for the effects assessment and, when available, help in the formulation of mitigation and adaptive management measures. Table 2.5-1 outlines how TK was used for studies presented in Volumes 4, 5, and 6 of the EIS and the instances in which it was used. Sections 2.5.1 through 2.5.4 summarize how TK was incorporated for the EIS.

2.5.1 Baseline and Existing Environment Data Collection

TK presented in the sources discussed in Section 2.4 was used to inform existing environment and baseline information for studies included in the EIS, as outlined in Table 2.5-1. This information ranged

from observed conditions, both past and present, important habitat/places, important resources and cultural significance. In some cases, studies were also informed by direct participation of Inuit Elders and/or specialists who assisted in data collection and/or the identification of specific places where data collection should take place (i.e., important habitat locations, areas likely to contain cultural heritage resources, etc.).

2.5.2 Impact Prediction and Significance Assessment

Information presented in the sources discussed in Section 2.4 aided in the selected of VECs and VSECs for many of the studies included in the EIS, as outlined in Table 2.5-1. This information ranged from observations and concern about particular topics (e.g., airborne particulates), wildlife or plant species utilized as resources by Inuit, and wildlife, plants or important places which are culturally significant to Inuit.

TK data was also considered during the effects assessment for a number of subject matters, as outlined in Table 2.5-1. In these cases, TK was used in the assessment of effects through consideration of identified VECs and VSECs, compared against baseline and existing environment data which was established through a combination of TK and scientific information, and how potential effects may result in changes to Inuit use. TK also aided in defining the spatial and temporal boundaries for the assessment. As such, significance determinations were also informed by TK and efforts made to consider TK and scientific data equally in the conclusions that were drawn.

2.5.3 Development of Mitigation and Monitoring Programs

Information presented in the sources discussed in Section 2.4 help to inform the development of mitigation measures, monitoring programs and adaptive management strategies, as outlined in Table 2.5-1. Such mitigation measures largely pertained to reducing the potential for adverse effects on habitat/ecosystems for resources utilized by Inuit and/or places and resources considered to have cultural significance by Inuit. In addition, TK will be utilized for monitoring potential Project effects going forward. TMAC is committed to incorporating TK into a number of management plans for Madrid-Boston and the Hope Bay Project (i.e., Wildlife Mitigation and Monitoring Plan).

2.5.4 How Discrepancies Were Addressed

TK was acknowledged as being of value for the EIS and aided in the comprehensive approach to assessment which was carried out. However, differences can arise between TK and scientific knowledge. Differences can also arise between TK informants regarding information on particular topics. Identification of these types of differences was sought throughout the course of the EIS. In addition, not all TK holders possess the same information or possess comprehensive knowledge about the Hope Bay Project area. As such, a variety of TK data sources, outlined in Section 2.4, were consulted from a range of TK holders. Workshops and meetings, particularly with those individuals who have knowledge about the Project area, and the inclusion of knowledgeable individuals in aspects of baseline and existing environment data collection, were particularly useful in identifying data gaps within the NTKP dataset and adding value to the TK considered for the Project.

Table 2.5-1. Uses of Traditional Knowledge in TMAC's Environmental Impact Statement for the Proposed Hope Bay Project

EIS Volume	Section	Section	Summary of How Traditional Knowledge Was Used	Purpose of Traditional Knowledge Use
4	1 - Climate and Meteorology	1.1	Observations related to changes in climate over the past few decades, including: changes in weather, shallower lakes and rivers that drain to the ocean, reduction in river flow, and an increase in the length of time for the Arctic Ocean to freeze were considered.	Used to inform existing environment and baseline information, selection of VEC and Subject of Note, spatial and temporal boundaries, and the effects assessment.
	2 - Air Quality	2.1	The NTKP report suggests that the current baseline ambient air quality environment has already been impacted by anthropogenic air emission sources, which in turn are attributed to impacts in snowfall and snowpack consistency. These factors were considered along with observations regarding particulate contamination of snow and concerns regarding airborne pollutants on humans, animals, plants, and water.	Used to inform existing environment and baseline information, VEC selection, spatial and temporal boundaries, the effects assessment, and mitigation and adaptive management.
	3 - Noise and Vibration	3.1	No direct references relevant to noise and vibration were made in the NTKP report.	None included.
	4 - Geology		No direct references relevant to geology were made in the NTKP report.	None included.
	5 - Geochemistry		No direct references relevant to geochemistry were made in the NTKP report.	None included.
	6 - Permafrost		Information was provided that changes in water quality were attributed to, among other factors, the melting of permafrost because of global warming has affected water quality. Changes in water on the land have occurred because of the melting of permafrost associated with climate change.	Used to inform existing environment and baseline information.
	7 - Terrestrial Environment: Soil and Special Landforms	7.1	Data in the NTKP report identifies landforms important for Inuit traditional lifestyles and highlights the importance of the land as a sacred space, habitat for plants and wildlife, a source for carving material and copper, and the interconnectedness between all aspects of environment and human activities.	Used to inform existing environment and baseline information, VEC selection, spatial and temporal boundaries, and the effects assessment.
	8 - Vegetation and Special Landscape Features	8.1	Data in the NTKP report provides descriptions of traditionally harvested terrestrial plant species and valued ecological resources within the Madrid-Boston area including a reference to locations where resources are harvested as well as cultural and other uses of plant species within the area surrounding the Project. This information helped to inform the collection of plant and lichen species and assisted in determining potential effects on harvestable plant resources.	Used to inform existing environment and baseline information, VEC selection, spatial and temporal boundaries, the effects assessment, and mitigation and adaptive management.

EIS Volume	Section	Section	Summary of How Traditional Knowledge Was Used	Purpose of Traditional Knowledge Use
4 *(cont'd)*	9 - Terrestrial Wildlife and Wildlife Habitat	9.1	Data presented in the NTKP report, including the cultural significance of wildlife species to Inuit, the valuation of wildlife habitat, and ecosystems of traditional and cultural importance, were considered.	Used to inform existing environment and baseline information, VEC selection, spatial boundaries, the effects assessment, and mitigation and adaptive management.
5	1 - Surface Hydrology	1.1	Observations about shallower water levels, lower water flows and decreases/changes in the amount of rain and snow the region receives were considered.	Used to inform existing environment and baseline information.
	2 - Groundwater	2.1	Information presented in the NTKP report reference changes in ground water and a reduction in freshwater springs. No other direct references relevant to groundwater were made in the NTKP report.	Used to inform existing environment and baseline information.
	3 - Limnology and Bathymetry	3.1	No direct references relevant to limnology and bathymetry were made in the NTKP report.	None included.
	4 - Freshwater Quality	4.1	Data presented in the NTKP report indicated that recent shallower water levels and lower water flows are attributed to affecting water quality with greater water quality changes being in coastal areas than inland.	Used to inform existing environment and baseline information.
	5 - Freshwater Sediment Quality	5.1.1	No direct references relevant to freshwater sediments were made in the NTKP report.	None included.
	6 - Freshwater Fish Community	6.1	Information presented in the NTKP report suggests that fish were, and continue to be, an important component of the Inuit seasonal diet and are essential during times of food shortage and for feeding dog teams. Important fishing places were also identified.	Used to inform existing environment and baseline information, VEC selection, spatial and temporal boundaries, the effects assessment, and mitigation and adaptive management.
	7 - Marine Physical Processes	7.1	Observations about the general decline of ocean levels and river estuaries as well as changes in sea ice thickness and surface characteristics were considered.	Used to inform existing environment and baseline information, and VEC selection.
	8 - Marine Water Quality	8.1	No direct references relevant to marine water quality were made in the NTKP report.	None included.
	9 - Marine Sediment Quality	9.1	No direct references relevant to marine sediments were made in the NTKP report.	None included.
	10 - Marine Fish Community	10.1	Information presented in the NTKP report suggests that fish were, and continue to be, an important component of the Inuit seasonal diet and are essential during times of food shortage and for feeding dog teams. Important fishing places were also identified.	Used to inform existing environment and baseline information, VEC selection, spatial and temporal boundaries, the effects assessment, and mitigation and adaptive management.

EIS Volume	Section	Section	Summary of How Traditional Knowledge Was Used	Purpose of Traditional Knowledge Use
5 *(cont'd)*	11 - Marine Wildlife	11.1	Data presented in the NTKP report, including cultural important marine wildlife species to Inuit and the identification of important marine wildlife habitat were considered. In addition, surveys were guided by local assistants in areas deemed to be important marine wildlife habitat.	Used to inform existing environment and baseline information, VEC selection, spatial and temporal boundaries, the effects assessment, and mitigation and adaptive management.
6	1 - Paleontology	1.1	No direct references relevant to paleontological resources were made in the NTKP report.	None included.
	2 - Archaeology	2.1	Information from the NTKP report, other historical reports containing TK for the region, and meetings between the Project Archaeologist and Inuit Elders assisted in determining important locations where archaeological surveys would be needed. This information also assisted with such tasks as identifying and/or confirming functions for some of the features and artifacts found and providing explanations on how those items were used in daily lives.	Used to inform existing environment and baseline information.
	3 - Socio-economics	3.1	Information outlined in the NTKP report provided a contextual perspective of the socio-economic environment for the region, which aided in the understanding of current conditions, trends, and predictions about future changes within Inuit culture and society.	Used to inform existing environment and baseline information, VSEC selection, spatial and temporal boundaries, the effects assessment, and mitigation and adaptive management.
	4 - Land Use	4.1	Data presented in the NTKP report provided information relating to land use activities, both past and present, and how such land use has evolved. Such land uses include the identification of seasonal camp locations, areas utilized for harvesting, and places which hold cultural significance for Inuit.	Used to inform existing environment and baseline information, VSEC selection, spatial and temporal boundaries, the effects assessment, and mitigation and adaptive management.
	5 - Human Health and Environmental Risk	5.3.2	Data presented in the NTKP report were considered, such as: traditional and current land use of the Project area; country food items consumed; locations of settlements and cabins; locations of hunting, fishing, and gathering areas; and locations of travel routes.	Used to inform existing environment and baseline information, spatial boundaries, the risk assessment, and mitigation and adaptive management.

Where differences and/or variations were identified, efforts were made to present and explain them. All information presented in the NTKP report and other pertinent TK data sources outlined in Section 2.4 was considered and presented in the effects assessment. Information was not removed if it did not match viewpoints held by other TK or scientific knowledge holders. Overall, TK utilized for the Project paired well with scientific approaches and enriched the EIS. As such, no irreconcilable differences were identified between TK and scientific information.

2.6 TRADITIONAL KNOWLEDGE IN PROJECT PLANNING AND DESIGN

The Project has considered the recommendations of industry experts that have reviewed TK in relation to their area of expertise and informed TMAC of adjustments to design (Volume 3, Section 2) based on the content provided in documentation.

TK content has been considered in relation to each topic of focus. Examples include, but are not limited to, the following:

- TK describes the historical travel routes that inform current land use activities, indicating where Inuit cross Coronation Gulf as they travel south to the mainland to hunt, trap, and gather. In this instance, TK provided information on the importance of using only open water shipping as there are numerous travel routes between Cambridge Bay and the mainland.
- TK informs wildlife experts of past trends, which speak to current trends in wildlife migration and specific mitigation and enhancement measures. Open water shipping removes any disruption of caribou movement from the mainland to Victoria Island. A caribou workshop series with local Elders and harvesters helped TMAC understand and discuss how other Madrid-Boston infrastructure, such as roads, can be built and operated in a way that minimizes potential impacts to wildlife.
- TK has informed the design and management of the TIA. TMAC will continue to monitor the TIA area using wildlife cameras and by recording incidental observations of caribou. If caribou are frequenting the area, then TMAC will engage with the IEAC and consider the use of Inuksuit to dissuade caribou from the TIA. Elders and harvesters indicated that they would like to be involved in setting up the Inuksuit and TMAC agreed to have Elders and harvesters lead the installation of Inuksuit.
- TK has informed road design and monitoring. For example, the presence of caribou will be monitored during migration, near roads including the use of crossings, and additional crossings will be added. Elders knowledgeable of the area will be consulted in determining the location and design of road crossings and monitoring locations. Dust will be controlled through the enforcement of speed limits.
- TK has informed the use of helicopters which will be limited during caribou migration, and flight height will be increased when caribou appear disturbed, and site activities will be minimized, to the extent feasible, during migration season.

2.7 REFERENCES

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