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.

AANDC	Aboriginal Affairs and Northern Development Canada
ALTS	Adult Learning and Training Supports
ASETS	Aboriginal Skills and Employment Training Strategy
ATV	All-terrain vehicle
CBoC	Conference Board of Canada
CDO	Career Development Officer
CEA	Cumulative Environmental Effect
CHR	Community Health Representative
CHARS	Canadian High Arctic Research Station
CPI	Consumer Price Index
CRI	Community Readiness Initiative
CWB	Community Well-being
EDO	Economic Development Officer
EFAP	Employee and Family Assistance Program
EIS	Environmental Impact Statement
FANS	Financial Assistance for Nunavut Students
GDP	Gross Domestic Product
GN	Government of Nunavut
IQ	Inuit Qaujimajatuqangit
ITK	Inuit Tapiriit Kanatami
KIA	Kitikmeot Inuit Association
km^2	Square Kilometers
LHO	Local Housing Organization
LSA	Local Study Area
NAC	Nunavut Arctic College

NBCC	Nunavut Business Credit Corporation
NBS	Nunavut Bureau of Statistics
NDEDT	Nunavut Department of Economic Development and Transportation
NEAS	Nunavut Eastern Arctic Shipping
NGO	Non-governmental Organization
NHC	Nunavut Housing Corporation
NHS	National Household Survey
NIRB	Nunavut Impact Review Board
NSA	Nunavut Settlement Area
NSSI	Nunavut Sealift and Supply Inc.
NTCL	Northern Transportation Company Ltd.
NTI	Nunavut Tunngavik Incorporated
NWT	Northwest Territories
PHRS	Public Housing Rent Scale
QEC	Qulliq Energy Corporation
RCMP	Royal Canadian Mounted Police
RIA	Regional Inuit Association
RNFB	Revised Northern Food Basket
RRSP	Registered Retirement Savings Plan
RSA	Regional Study Area
SAO	Senior Administrative Officer
SEMP	Socio-economic Monitoring Program
SME	Small to Medium Enterprise
SPF	Skills and Partnership Fund
SIDS	Sudden Infant Death Syndrome
SUDI	Sudden Unexpected Death in Infancy

3. Socio-economics

The Madrid-Boston Project (the Project) has the potential to have both positive and adverse effects on socio-economic conditions. The interactions with socio-economics are due to the employment of a labour force and the procurement of goods and services for the Project, which in turn may result in changes to households and communities. This chapter evaluates the potential effects of the Project on: economic development; business opportunities; employment; education and training; migration, housing, and infrastructure and services; and community health and well-being. The assessment focuses on the communities of the Kitikmeot Region, Nunavut, but also considers economic impacts across the territory and Canada. Mitigation and socio-economic monitoring is described to minimize adverse socio-economic effects of the Project and enhance benefits to the Kitikmeot communities. Key mitigation includes measures defined in the Human Resources Plan, and Community Involvement Plan, as well as an Inuit Impact and Benefit Agreement (IIBA) between the Kitikmeot Inuit Association (KIA) and TMAC that is currently in place.

3.1 INCORPORATION OF TRADITIONAL KNOWLEDGE

3.1.1 Incorporation of Traditional Knowledge for Existing Environment and Baseline Information

The primary source of Inuit Traditional Knowledge (TK), or *Inuit Qaujimajatuqangit* (IQ), that was accessed for incorporation into the socio-economic effects assessment was the proposed Hope Bay Project, Naonaiyaotit Traditional Knowledge Project (NTKP) report (Banci & Spicker 2016). The report provides contextual information that promotes a deeper understanding of the socio-economic environment; however, the information is not directly applicable to the characterization of the current socio-economic setting. Rather, this information provides a context that informs an understanding of current conditions and trends. Enforcement of acceptable behaviour by individuals within the community and views on parenting are two examples of where traditional beliefs and practices influence the current socio-economic environment.

In traditional Inuit culture, there was no formal authority to decide whether behaviours were acceptable. Within the community there was general agreement on what was expected of individual in terms of their behaviour, how they conducted their lives, and what the commonly held values were. For example, the behaviours most commonly considered improper were lying, stealing, laziness, excessive mocking or gossiping, being unpredictable or jealous, and bragging excessively. Methods of social control included ignoring, ostracising, ridiculing, or shaming the person. More formalized methods of social control, or way through which to resolve disputes or conflicts included fist fights, wrestling, and song duels (Pauktuutit Inuit Women of Canada 2006a). While approaches to decision making and local values have changed over time, information describing their origin facilitates the conceptualization of their evolution leading up to current conditions. Knowledge of this evolution informs the projection of future trends and changes likely to occur going forward.

Inuit believe that when a child is born, the soul or spirit of a recently decease relative is taken on by the newborn (Pauktuutit Inuit Women of Canada 2006a). The naming of children played a focal role in societal development and children were named after and took on the social role of the deceased. That is, a child named after an uncle would then be called uncle by the family of the deceased. This practiced ensured that children were supported by the broadest possible network and were parented by many. Approaches to parenting an discipline were also informed by this custom, as the desire to

correct an undesirable behaviour was tempered with respect for the decreased person whose soul was carried by the child given that name (Tagalik 2010). This content contributes to an understanding of relationships within the family today and is essential in making informed predictions about the potential future changes within family relationships.

In Nunavut, TK is encompassed by the concept of IQ, which is described as "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" (Qikigtani Inuit Association 2009) or literally translates to 'that which the Inuit know and have always known'. Because TK provides a foundational understanding of the events and activities that have shaped Inuit society (e.g., social and gender roles, parental roles, and others) and Inuit relationships to each other and their communities, the review of TK material was an integral aspect of the assessment of the potential effects of the Project on VSECs.

3.1.2 Incorporation of Traditional Knowledge for VSEC Selection

The NTKP report provides information about Inuit culture and society that is essential to the development of a foundational understanding of current socio-economic conditions and the local socio-cultural values of Inuit which identified elements for consideration in the process of scoping VSECs for the Project assessment. Other sources informing that process included consultation with local communities, regional Inuit organizations, and other stakeholders, as well as previous engagement with Inuit and local communities as part of the Doris North Project.

Situating current socio-economic values within their traditional context facilitates an informed analysis of baseline information and current socio-economic trends and enables an insightful effects assessment. The NTKP report describes Inuit culture and traditional ways of life tied to traditional economy and education, social and gender roles, and Inuit well-being. This information was used to analyze current trends, infer potential future changes, and establish measures that promote positive outcomes related to the Project. Consideration of these valued aspects and their potential to interact with the proposed Project informed the section of VSECs employed for the Project assessment.

3.1.3 Incorporation of Traditional Knowledge for Spatial and Temporal Boundaries

The Inuit are people of place and were often called by the name of the land where they were from, as denoted by the suffix *'miut'* (Kral 2009). The spatial boundaries of the Project have been defined by the location of the Project and the predicted distribution of benefits and effects. Understanding how Inuit came to be at those locations and the circumstances surrounding the settlement of Inuit in communities provides context contributing to the effects assessment and development of measures to maximize Project benefits. Placing spatial boundaries within their historical context also highlights the nature of current socio-economic realities for Inuit.

Project temporal boundaries are defined by the planned phases of the Project and the information provided in the NTKP Report is not directly applicable to their characterization for the assessment of potential socio-economic Project effects.

3.1.4 Incorporation of Traditional Knowledge for Project Effects Assessment

The Project effect assessment draws on information collected through desktop research and baseline studies and is grounded within the historical context provided in the NTKP report. Without the context provided in the NTKP report, the interpretation of current conditions would be considerably more narrow. Situating current conditions within IQ and the context of the NTKP report informs the effects assessment by allowing for a socially and culturally appropriate interpretation of potential effects.

3.1.5 Incorporation of Traditional Knowledge for Mitigation and Adaptive Management

Similar to how it contributes to a deeper understanding of socio-economic conditions and the evaluation of Project effects, the TK information facilitated the development of socially and culturally appropriate mitigation and benefit enhancement measures, including the design of meaningful adaptive management processes. This is demonstrated in the participatory design of the Socio-economic Monitoring Program (SEMP) and the various management plans developed for the Project described later in this chapter, including the Community Involvement Plan and Human Resources Plan. For all management plans, an understanding of IQ and Inuit traditions and customs allowed the processes, practices and procedures defined within each management plan to be appropriate within the socio-cultural context of the Project. This will help ensure effective implementation and the efficacy of the defined mitigation and benefit enhancement measures. In addition, the KIA, by negotiating specific provisions in the 2015 Hope Bay Inuit IIBA applicable to this development, provided direction to TMAC on specific mitigation and adaptive management measures that are protective of Inuit culture and well-being, while seeking to support Inuit in taking full advantage of opportunities this Project will create.

3.2 EXISTING ENVIRONMENT AND BASELINE INFORMATION

This section provides a summary of the existing socio-economic characteristics and conditions of the Kitikmeot communities, including information obtained during the 2017 community research program. Secondary data is also presented including statistics from the 2016 Census of Canada, and quantitative and qualitative information from other literature. Where relevant, this section also draws on community-level research and secondary data collection conducted for the Project in 2011. Overall, desk-based research began in 2011 was subsequently updated in 2015 and 2017, and community-based research (including interviews) was conducted in 2011 and 2017.

3.2.1 Data Sources

Primary data collection for the Project occurred in October 2017 including 59 key informant interviews with government representatives (hamlet and territorial), business leaders, local service providers (health, education, etc.), land users, Hunter and Trapper Organizations (HTOs), and other community representatives. The result of interviews with local land users and HTOs is provided Volume 6, Chapter 4 Land Use.

Secondary data was obtained through desk-based research and literature review. Information from Statistics Canada, the Nunavut Bureau of Statistics, Government of Nunavut (GN) departments, and other sources were compiled and analyzed. The literature review targeted publications of the Government of Canada, the GN, Inuit organizations and other co-management organizations, the private sector, and non-government organizations (NGOs), as well as academic literature and internet publications. Statistics from the 2016 Census of Canada were published in 2017 and are included in this report.

Primary data sources included information obtained through community-level research conducted for the Project in 2017, as summarized in the *Madrid-Boston Project: 2017 Community Research Report* (Appendix V6-3B). In addition, the *Hope Bay Belt Project 2011 Socio-economic and Land Use Baseline Report* provides information on the methods and results for socio-economics studies conducted in 2011 (Appendix V6-3A; Rescan 2012).

3.2.2 Methods

The 2017 community research program collected data on key socio-economic characteristics in the Kitikmeot region. This involved interviews with individuals employed in strategic roles whose services or mandate link to the potential effects of the Project (e.g., service providers from government administration, health services, wellness and social services, safety and protection services, business and economic development, and education and training). Desk-based research focused on publically available statistics compiled and analyzed at the regional and community levels. To further investigate themes and trends, an additional literature review of recently published material was conducted.

Similarly, the collection of baseline information in 2011 focused on key socio-economic characteristics for the Kitikmeot region and involved community-level and desk-based research. Community-level completed in 2011 included interviews with approximately 70 key informants in the Kitikmeot Region. A similar process was followed for desk-based research as well.

Regional-level information is presented for the Kitikmeot Region, while community-level information is presented for individual Kitikmeot communities: Cambridge Bay (also known as Iqaluktuuttiaq), Kugluktuk (previously known as Coppermine), Gjoa Haven (also known as Uqsuqtuuq), Taloyoak (previously known as Spence Bay), and Kugaaruk (previously known as Pelly Bay). Territorial and regional level information and data is also provided for Nunavut; date relating to the Kivalliq and Baffin regions may also be presented to facilitate comparison and the analysis of data. Data characterizing the territory and other regions in Nunavut are provided to contextualize and enable comparison of socio-economic circumstances.

3.2.3 Socio-economic Study Areas

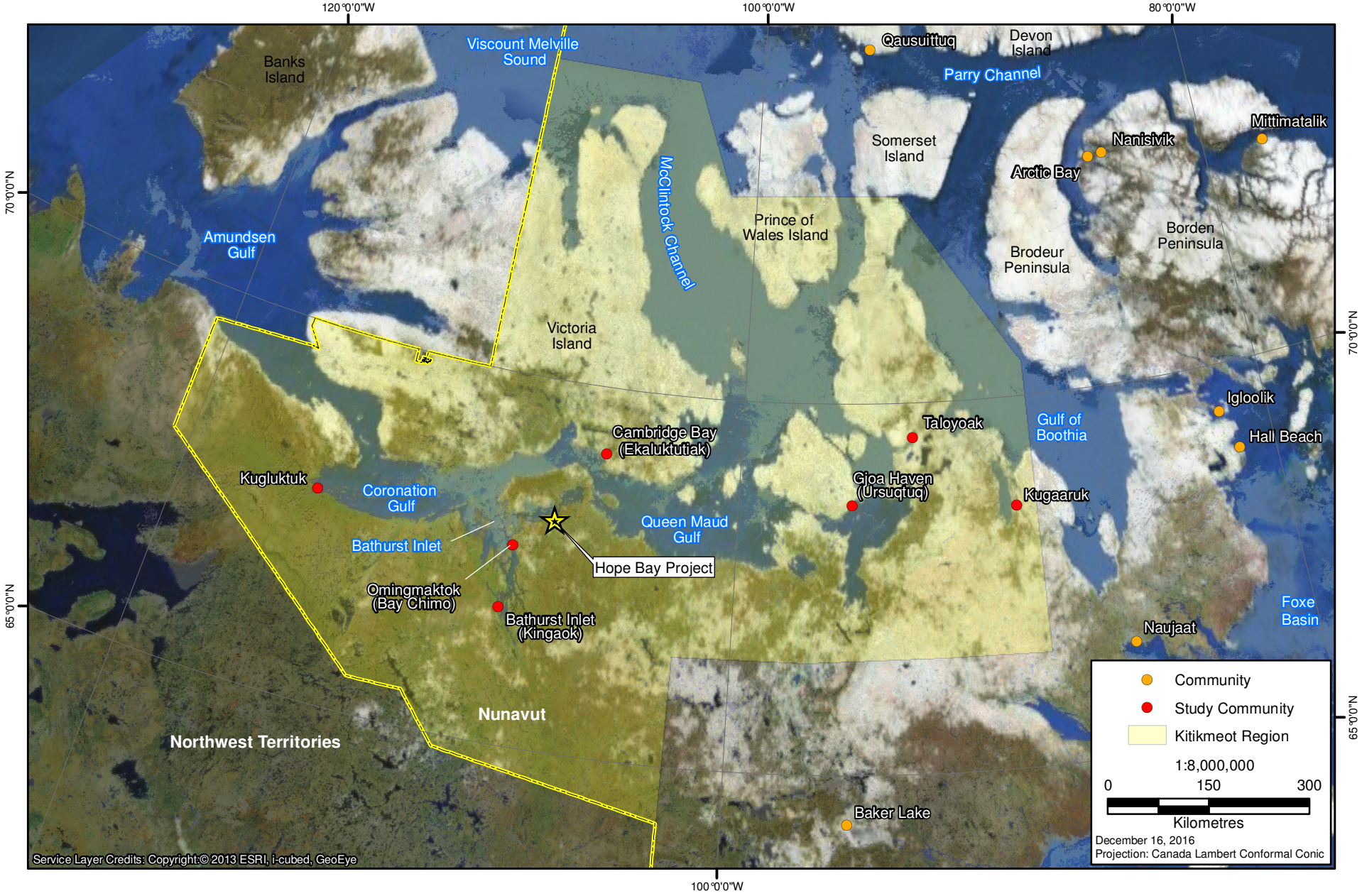
The western Kitikmeot communities of Cambridge Bay (~130 km from the Project) and Kugluktuk (~350 km) are the closest major population centres and comprise the socio-economic Local Study Area (LSA). Cambridge Bay is the largest community and the main economic and transportation hub for the Kitikmeot region.

The eastern Kitikmeot communities—including Gjoa Haven (~445 km), Taloyoak (~550 km), and Kugaaruk (~690 km)—are at a greater distance from the Project. Together with Cambridge Bay and Kugluktuk, these communities comprise the socio-economic Regional Study Area (RSA). Although the focus of the LSA is on Cambridge Bay and Kugluktuk, the inclusion of all five permanent communities within the Kitikmeot region as part of the RSA is reflective of the goal of having Project-related employment and business benefits distributed amongst Nunavummiut throughout the Kitikmeot region. At the community level, baseline information is presented for all five communities in support of a fulsome assessment of the potential socio-economic effects of the Project.

Kingaok (Bathurst Inlet) and Omingmaktok (Bay Chimo) are settlements situated on the shores of Bathurst Inlet, and are excluded from the socio-economic baseline. These settlements are no longer occupied year-round (residents of Bathurst Inlet relocated in 2006, and residents of Omingmaktok relocated in the fall of 2011, the majority to Cambridge Bay and others to Yellowknife and Kugluktuk). Bathurst Inlet and Omingmaktok are now used primarily as seasonal camps and former residents return at select times throughout the year. Government sources reflect this change and no longer report information for these settlements. As a result, there is no recent statistical or other data for Bathurst Inlet and Omingmaktok and, therefore, the baseline profile focuses on the five permanent Kitikmeot communities.

Figure 3.2-1 illustrates the study communities, as well as the Kitikmeot region and the settlements of Kingaok and Omingmaktok.

Figure 3.2-1
Socio-Economic Study Area



3.2.4 Information Caveats and Limitations

Primary data collection is based on key informant interviews that were conducted during a three week community-based research program in September and October 2017. While best efforts were made to meet with each individual employed in a strategic role in each of the five Kitikmeot communities, availability, timing, scheduling, staffing, and program continuity each play a role in the defining the content obtained through primary data collection.

The interviews used a semi-structured interview method and posed similarly focused questions to all interviewees. Best practices in social analysis (e.g., triangulation of information, and confirmation of data through discussion with multiple informants) were used to minimize bias and to ensure that information collected in each community was thorough and comprehensive.

The limitations of the baseline information are dependent on the data collection, analysis, and presentation methods. Community research for primary data collection occurred in 2011 and 2017. Community research was based on interviews with knowledgeable persons in the communities, focusing on collecting both local quantitative data and perception-based qualitative information. Perception-based information may be subject to biases or strategic responses; in order to minimize such errors, standard qualitative research methodology was employed and information was triangulated among sources, where feasible.

For secondary information, limitations vary by source. For example, Statistics Canada releases data on a variety of topics (such as population, housing, and employment) obtained from the Census of Canada (Census) conducted every five years. The scope and content of the census can vary based on the year, as highlighted below:

- **2016 Census**: Changes to the Census of Canada in 2016 are mostly considered improvements to the 2011 census, and include 1) the return to the long-form census; 2) income data was retrieved from personal income tax and benefit files, replacing the income-related questions included on pervious censuses; 3) the 2016 census did not include questions about religion, as these questions are included every 10 years and were asked in 2011; and 4) fewer Canadians (one in four) received the mandatory long-form census, as compared to the voluntary NHS in 2011 (one in three) (Jackson 2016). Notwithstanding, the response rate to the 2016 Census was very strong at 98.4% (Statistics Canada 2017a).
- **2011 Census**: The 2011 Census provided a new product called the National Household Survey (NHS) that was established to replace the 'long-form' census used in earlier years. The NHS collected information similar to the previous long-form[1] census; however the census itself consisted of a 'short form' which included eight questions related to population, family characteristics, and language[2]. While participation in the census was mandatory, the NHS was a voluntary survey that provided demographic, social, and economic information. Generally, response rates for the voluntary NHS in 2011 were low in comparison to the previous long-form census. Specifically, the 2011 NHS had a response rate of 77% in comparison to the 93.5% response rate for the 2006 long-form census (Jackson 2016).
- Due to the changes in survey methodology and response rates, data from the 2011 NHS (Statistics Canada 2013c) should be considered with caution, particularly in making

[1] Prior to Census 2011, completion of the Canadian census was mandatory for all Canadians. For 2016 the mandatory Census long form was re-instated by the Government of Canada.

[2] As a result of changes to legislation that occurred prior to Census data collection in 2011, routinely collected data (employment, education, income, housing, etc.) was gathered as part of NHS.

comparisons with 2006 or earlier census years. Additional caution is required in comparing the results of the 2011 NHS to the data gathered as part of the 2016 Census for the same reason (survey methodology and response rates varied).

3.2.5 Characterization of Baseline Conditions

Social and economic conditions in Nunavut are unique within Canada and have undergone a significant transformation over the last 50 years. The transition from a semi-nomadic existence to a predominantly permanent or settled communities occurred in the late 1950s and early 1960s. Following the collapse of pelt prices in the 1950s and a series of epidemics (e.g., TB) that killed many Inuit, the family allowance program was introduced in 1947 and became a primary source of income for many Inuit who had relocated to settlements in the 1950s and 1960s. The societal transformation that occurred with the transition from a semi-nomadic hunter-gatherer existence was substantial. Previously, gathering among Inuit was seasonal and kinship based. The introduction of settlements was characterized by the aggregation of a large number of Inuit from different kin groups, described by some as usual and bizarre (Kral 2009).

The transition to the wage economy was majorly disruptive to social roles within Inuit culture. Hunters, who were the most highly respected leaders with considerable prestige and superiority within the group, took on employment with varying degrees of success. Once Inuit relocated to settlements, economic inequality became prevalent due to large discrepancies in income and material possessions. As a result there was a decline of cooperation between households. The transition to settlements was also marked by a shift in authority from the Elders to the government and an increase in births linked in part to improved medical care and additional government payments provided by government with each child (Kral 2009).

Sedentary life also brought about a shift in how prestige was allocated by Inuit; traditionally linked to land-based mastery and the ability to provide, prestige became increasingly associated with what money could buy. Hunting has been described as the ‘cultural core’ of Inuit society and subsistence as a “highly complex activity linking kinship, ecology, economy, ideology, and larger social relations” (Kral 2009).

The social and economic change caused by the influence of modern culture and the wage economy on Inuit is currently underway. The result is not one of ‘old ways’ and ‘new ways’ but rather is a dynamic hybrid created by Inuit to navigate their current realities and the continuously changing elements of social and economic life. These realities form the context within which the proposed Project might be developed and contribute to further social and economic change.

The purpose of this section is to provide a baseline description of current social and economic conditions to inform the analysis of how conditions may change with the introduction of the Project. Socio-economic components for the study have been identified through a review of government environmental assessment guidelines, completed environmental assessments of other mine projects in Nunavut (i.e., Back River, Doris North, Mary River, and Meadowbank), the values and concerns local community stakeholders expressed during field studies, consideration of the existing socio-economic conditions within the Kitikmeot Region, and professional judgement. Moreover, the characterization of baseline conditions is consistent with the requirements of the Nunavut Impact Review Board (NIRB) as detailed in the Environmental Impact Statement (EIS) guidelines for the Hope Bay Project. The components include:

- Governance and Government Revenues;
- Community Demographics;

- Education and Training;
- Labour Force and Employment;
- Economic Development;
- Business Opportunities;
- Community Infrastructure and Public Services; and
- Health and Well-being.

Communities in Nunavut are remote and isolated from one another and from southern Canada. Transportation and communication options are limited. There are no roads into Nunavut or roads connecting the communities within Nunavut. Air travel is the main means of inter-community travel. Communities can also be reached by sea during a limited summer window and, for those communities nearest to each other, by snowmobile during winter months. The Kitikmeot region is the most western of the three administrative regions within Nunavut and covers approximately 446,728 km^2.

Within the Kitikmeot region there are five communities: Cambridge Bay, Kugluktuk, Gjoa Haven, Taloyoak, and Kugaaruk. Cambridge Bay is the largest community, acting as a regional hub for government and business, as well as transportation to and from the region. Kugluktuk and Gjoa Haven have smaller but growing populations, with economic growth primarily attributed to opportunities in the government and mining sectors. The easternmost hamlets of Taloyoak and Kugaaruk are typified by traditional lifestyles and local economies based on government services. Traditional subsistence land-based activities, as well as construction, retail, education and public administration create the base of local economies. Labour force statistics for the communities of Cambridge Bay and Kugluktuk show local employment in mining and transportation (Statistics Canada 2013b, 2017d).

3.2.5.1 Governance and Government Revenues

Nunavut was formally established on April 1, 1999 when the Nunavut Settlement Area (NSA) was formed as separate from the Northwest Territories, in accordance with the provision of the *Nunavut Land Claims Agreement Act* (1993b) and the *Nunavut Act* (1993a). The Nunavut Agreement comprised the surrendering of Aboriginal claims, rights, and title to lands and waters in exchange for a set of collective rights and benefits for Inuit.

<u>The Government of Nunavut</u>

When Nunavut was created the government began a process of decentralization to ensure that Nunavummiut benefit from government employment at the community level. The hub or largest concentration of government is Iqaluit, Nunavut's capital. Government decentralization occurred over a number of years to 10 communities including Cambridge Bay, Gjoa Haven, and Kugluktuk (Sponagle 2015b).

Nunavut's legislative assembly governs its own proceedings and is based on a consensus style of government, rather than the more common style of party politics. In Nunavut, all Members of the Legislative Assembly are elected as independent candidates in their constituency. The consensus style is similar to traditional Inuit decision making; however, unanimous agreement is not required in most cases. Instead, a majority vote is sufficient. Unlike most jurisdictions in Canada, the Premier and Cabinet Ministers are chosen by the Members of the Legislative Assembly as whole. The Premier can assign portfolios to Ministers and designates a Deputy Premier (GN 2015).

The functions of the GN are carried out by a number of departments including: Community and Government Services; Culture and Heritage; Economic Development and Transportation; Education; Environment; Executive and Intergovernmental Affairs; Family Services; Finance; Health; and Justice (see Appendix V6-3A for further details).

Inuit Organizations

In addition to GN governance structures, Regional Inuit Associations (RIAs) and Nunavut Tunngavik Incorporated (NTI) have responsibilities related to the exercise of Inuit rights under the Nunavut Agreement and use of Inuit-owned Lands (IOL). Within the Kitikmeot Region, the RIA is the KIA with head offices in Cambridge Bay. The Socio-economic and Land Use Baseline Report provides a further description of the roles of responsibilities of RIAs, NTI, and HTOs (Appendix V6-3A).

Hamlet Governance

Community governance in Nunavut is organized by hamlets, headed by a mayor, deputy mayor, and council. A Senior Administrative Officer (SAO) has overall responsibility for hamlet operations. A key senior member of the staff is the Economic Development Officer (EDO), who is responsible for economic development programming. Hamlets have a number of departments that typically include public works, operations and maintenance, water and sewer, waste management, fire protection, wellness, recreation, justice, Elders' programs/services, planning and lands, and economic development (including tourism). To facilitate the oversight of municipal policies and programs, committees are established to address specific portfolios (e.g., justice, finance, recreation, and health and wellness; Appendix V6-3B).

The hamlets maintain a strong relationship with the GN and, to a lesser extent the federal government, as the hamlet is responsible for implementing territorial and federal programs at the community level (Appendix V6-3B). Hamlet governments in the Kitikmeot region face a number of challenges including staff hiring and retention, housing for staff (Appendix V6-3A), a deficit of business skills (such as accounting and bookkeeping, other infrastructure challenges[3], and challenging relationships with the GN (Appendix V6-3A.). Hamlets may also be called upon by residents to address community issues that are outside the purview of local government. It is important for hamlets to manage the local expectations.

Some hamlets (e.g., Cambridge Bay and Kugluktuk) have established Youth Advisory Councils, which intend to support understanding the views and needs of youth, and engage them in the community. In Kugluktuk, the youth council review council meeting minutes and provide their opinion; they also have led their own initiatives, such as fundraising for Kugaaruk after the school burned (Appendix V6-3B).

The Cambridge Bay Mayor's Youth Advisory Council (MYAC)

In 2016, the Cambridge Bay council announced that 2017 would be the 'Year of Youth' and initiated the Mayor's Youth Advisory Council. The youth council meets regularly and has a treasurer, secretary and other council roles. The youth council serves to build capacity and empower local youth. A focus in 2017 was a 'youth needs assessment', which identified six pillars for youth needs in the community: sports, socio-economic (including issues related to mental health, alcohol, drugs, suicide prevention, and addictions), cultural (e.g., hunting, fishing, language and sewing), fine arts (with a focus on music), performing arts, and 'science, technology, engineering and mathematics' (Appendix V6-3B).

[3] In general, there is limited space available for meetings or gatherings in the communities, and many community halls and recreation centres need to be upgraded. There is also a short construction season, and one sealift per year, which constrains the development of new spaces for businesses to operate/expand (J. MacEachern, *pers. comm.*).

3.2.5.2 Community Demographics

Population

The Kitikmeot is the smallest of Nunavut's three regional areas and represents 18.2% of Nunavut's population (6,543 residents of 35,944 in 2016). There has been an increase in regional population of about 10% between each census period from 2001 to 2016. Overall, the Kitikmeot region has grown by 35.9% over the 15-year time period (Table 3.2-1; Statistics Canada 2017b). Most residents of Nunavut are Inuit (approximately 86%). From 2001 to 2016, the Inuit population increased by 36.9% while the non-Inuit population increased by 31.3% (NBS 2016d).

Table 3.2-1. Population and Growth in the Kitikmeot Region and Communities, 2001-2016

	Population				Population Change (%)			
Region/Community	**2001**	**2006**	**2011**	**2016**	**2001-2006**	**2006-2011**	**2011-2016**	**2001-2016**
Kitikmeot Region	4816	5361	6012	6543	11.3%	12.1%	8.8%	35.9%
Kugluktuk	1212	1302	1450	1491	7.4%	11.4%	2.8%	23.0%
Cambridge Bay	1309	1477	1608	1766	12.8%	8.9%	9.8%	34.9%
Gjoa Haven	960	1064	1279	1324	10.8%	20.2%	3.5%	37.9%
Taloyoak	720	809	899	1029	12.4%	11.1%	14.5%	42.9%
Kugaaruk	605	688	771	933	13.7%	12.1%	21.0%	54.2%

Source: Statistics Canada (2007, 2012c, 2017b)

Communities in the Kitikmeot region have increased in population between 2001 and 2016. The largest population increases took place in Kugaaruk (54.2%) and Taloyoak (42.9%) while the populations in Cambridge Bay, Kugluktuk and Gjoa Haven increased by 35.9%, 34.9%, and 23.0%, respectively (Statistics Canada 2017b). In 2016, Cambridge Bay was the largest community (1,766) and Kugaaruk was smallest (933). Kugluktuk and Gjoa Haven had populations of 1,491 and 1,324, respectively, and Taloyoak had a population of 1,029 (Table 3.2-1).

For Nunavut as a whole, population increase is driven by strong natural population growth and net in-migration from other areas of Canada. Nunavut's birth rates are generally more than double the Canadian rate. In 2013/14, the latest year for which the data is available, the crude birth rate[4] in Canada was 10.9, while it was 24.8 for Nunavut as a whole, and 17.5 for Kitikmeot (NBS 2015a). On the contrary, net immigration has been typically negative implying that interprovincial in-migration is less then interprovincial out-migration. In 2016, there were 1,152 interprovincial in-migrants and 1,351 interprovincial out-migrants resulting in an interprovincial net-migration of -199 (NBS 2016c).

Over the next decade, Nunavut's population is projected to continue growing, but the rate of growth is expected to decline from 1.5% in 2018, to about 1.2% in 2027. Within Nunavut, the Kivalliq Region is expected to have the largest annual growth of 1.8% in 2018, falling to 1.7% annual growth by 2027, whereas the Kitikmeot Region is predicted to have the slowest annual growth (1.2% in 2018, to 0.8% in 2027. Of the communities in the Kitikmeot region, Kugaaruk is expected to have the largest population growth rate (1.4% in 2018, to 1.1% in 2027) and Kugluktuk is expected to have the smallest (0.9% in 2018 to 0.6% in 2027) (NBS 2014c).

[4] Live births per 1,000 population.

Aboriginal Population

A high proportion of the Kitikmeot population is Aboriginal (92% of the population, 5,960). Almost all Aboriginal people in the Kitikmeot region are Inuit (5,900 or 99% of all Aboriginal people). For Cambridge Bay, 84.2% self-identified as Aboriginal, an increase from 81% in 2011. This proportion was higher in the other communities, with 91% or more identifying as Aboriginal (91.6% in Kugluktuk, 95.8% in Gjoa Haven, 96.1% in Taloyoak, 95.7% in Kugaaruk (Statistics Canada 2017b).

Age Distribution

The Kitikmeot region has an exceptionally young population compared to the rest of Canada. In 2016, the median age in the Kitikmeot Region was 24.6, with 33.2% of population under 15 years of age. To compare, Canada as a whole has an older median age of 41.2 and only 16.6% of population under the age of 15. With respect to the Kitikmeot communities, the median age ranged from 28.4 years in Cambridge Bay to 20.2 years in Kugaaruk (Table 3.2-2) (Statistics Canada 2017b). This points to a slightly older population in the region as compared to 2001, when the median age in the region was 21.5, with median ages of 24.8 in Cambridge Bay and 17.0 in Kugaaruk (Statistics Canada 2002).

Table 3.2-2. Population Characteristics – Age, Gender, Family Structure and Language, 2016

Region/ Community	Median age	Population under 15 (%)	Males (% of total)	Married or common-law (% of total families)	Lone parent families (% of total families)	Mother Tongue (%)		
						Inuinnaqtun	Inuktitut	English
Kitikmeot Region	24.6	33.2%	51.4%	67.4%	32.1%	7.4%	22.2%	65.6%
Kugluktuk	26.6	30.9%	52.0%	66.7%	33.3%	16.2%	3.0%	74.1%
Cambridge Bay	28.4	26.9%	50.7%	66.7%	32.3%	13.3%	5.6%	76.5%
Gjoa Haven	22.7	36.6%	52.5%	63.6%	34.8%	0.4%	35.0%	58.2%
Taloyoak	21	37.4%	50.0%	66.7%	33.3%	0.0%	42.7%	54.4%
Kugaaruk	20.2	39.0%	51.3%	76.6%	23.4%	0.0%	43.5%	54.3%
Canada	41.2	16.6%	49.1%	83.6%	16.4%	0.0%	0.1%	56.0%

Source: Statistics Canada (2017b)

In the Kitikmeot communities in 2016, the proportion of the population under 15 years of age ranged from 26.9% in Cambridge Bay to 39.0% in Kugaaruk (Table 3.2-2). The GN projects that the population will age moderately by 2036, although it will remain a substantially younger than the rest of Canada (Government of Nunavut 2016).

Gender

Kitikmeot communities tend to have a slightly higher proportion of males to females with the most notable differences in Gjoa Haven and Kugluktuk where 52% of the population is male. In comparison, Canada as a whole has more females (50.9%) (Statistics Canada 2017b).

Family Structure and Traditional Gender Roles

In Inuit culture, family groups are the most important social unit. Prior to the 1950s, Inuit lived in small, family based groups that traveled seasonally in pursuit of food and depended on each other for survival. The transition to permanent communities caused a disruption to traditional Inuit culture and values

including changes to the roles of men and women within the family. Traditional gender roles were based on the ability to perform the tasks required to obtain food and to survive on the land (Pauktuutit Inuit Women of Canada 2006b).

Traditionally, marriage took place when a girl was approximately 14 years of age and when a man entered early adulthood. Men were providers and had primary authority outside the home, while women had primary authority within the home with responsibility for childrearing and other domestic duties. Modern marriages typically take place in late adolescence or early adulthood. Young couples often continue to live with relatives as there is a shortage of housing in most Inuit communities (see Section 3.2.3.8; (Pauktuutit Inuit Women of Canada 2006b).

Family marital status in the Kitikmeot region differs from the rest of the Canadian population. Family couples (married and common-law) account for 67.6% of all families in the Kitikmeot region, with the remaining being lone parent families. In comparison, 83.6% of families in Canada are either married or common-law. Kugaaruk has the highest proportion of couple families (76.6%) followed by Kugluktuk, Cambridge Bay, and Taloyoak (66.7% each), while 63.6% of families were married or common-law in Gjoa Haven (Table 3.2-2). The most notable difference in family marital status is seen in the proportion of married couples in the region (27.3%) as compared to Canada as a whole (65.8%), while common law status is more common in Nunavut (Statistics Canada 2017b).

Language

There are two Inuit languages in the Kitikmeot: Inuinnaqtun and Inuktitut. Inuinnaqtun is spoken primarily in Kugluktuk and Cambridge Bay, and Inuktitut is spoken across other parts of Nunavut. However, there is enough commonality between the languages for the Inuit to understand each other in either tongue, much of the time. A majority of residents in Cambridge Bay, Kugluktuk, Gjoa Haven, Taloyoak, and Kugaaruk identified English as their mother tongue. Additionally, 97% of Kitikmeot residents speak English. Notably, Inuinnaqtun language is mandatory in grades seven through eleven and is an elective for grade twelve at the Cambridge Bay high school (Appendix V6-3B).

The Inuit Tapiriit Kanatami, a national Inuit organization, is currently undertaking a review of writing systems and orthography in order to make recommendations regarding a unified Inuit language writing system, which may affect the use of Inuit languages in the future (Inuit Tapiriit Kanatami 2017).

Religion

A majority of Kitikmeot residents are Christian (e.g., 73% in Cambridge Bay, 83% Kugluktuk, and over 90% in the remaining communities). In Kugaaruk, 95% of residents are Catholic, as are 46% of Gjoa Haven and 30% of Taloyoak. The Anglican Church has the largest membership in Cambridge Bay, Kugluktuk, and Taloyoak (50%, 68% and 65%, respectively). Traditional (Aboriginal) spirituality is practiced by 0.9% in Cambridge Bay and 1.4% in Kugluktuk. Some residents in Cambridge Bay, Kugluktuk, and Gjoa Haven report no religious affiliation (26%, 15%, and 9%, respectively), as well as less than 4% in Kugaaruk and Taloyoak (Statistics Canada 2013b). Statistics describing religion are collected once every 10 years in Canada and the next round of data collection will occur in 2021.

3.2.5.3 Education and Training

Education Facilities and Programs

Each Kitikmeot community has kindergarten, elementary, and secondary schooling. The larger communities have separate secondary and elementary schools (i.e., Cambridge Bay, Kugluktuk, and Gjoa Haven), while the smaller communities (i.e., Taloyoak and Kugaaruk) have a single school for all

grade levels. Students have the opportunity to obtain a high school certificate (or equivalent) in their home community. The school in Gjoa Haven was recently expanded to accommodate the growing student population. The school in Kugaaruk was destroyed by fire in early 2017 and is currently being re-built (Appendix V6-3B).

The GN implemented a "multiple-options" program in 2013. In addition to the core curriculum (including math and science), this program provides high school students with the opportunity to select one of six education streams as they enter grade ten:

- Introduction to trades and technology;
- History, heritage, and culture;
- Community caregiving and family studies;
- Entrepreneurship and small business studies;
- Fine arts and crafts; and
- Information technology.

The main limitation of this program is the capacity of Nunavut schools to provide each of the options, as expertise and space in schools is limited. Prior to implementation, an individual school was expected to provide only two or three of the listed six potential options (CBC News North 2012).

Another initiative is underway to promote literacy in Nunavut through the provision of 43 literacy coaches. The literacy coaches will help students with skills like reading, writing, speaking, and listening and will help fellow teachers develop additional literacy techniques (Sponagle 2015a).

Recent research indicates that the high schools have identified the need for a revitalization of cultural programs in the schools. Educators indicate that cultural identity is important and contributes to a sense of motivation and pride, and the ability of the schools to foster culture within the education system is linked to educational attainment. While the schools have incorporated the IQ principles, as mandated by the Education Act (2008), schools are encouraging teachers to modify course materials to the Inuit context. The IQ principles are present in schools and form a foundation of discipline. The principles are referenced when student learn about culture and elders are invited into the classroom to support with teaching (Appendix V6-3B).

Educational Attainment

Increases in educational attainment in the Kitikmeot region were evident in 2016 as the regional rate of individuals aged 25 to 64 without high school or other credentials has declined from 62% in 2011 to 45% in 2016 (Statistics Canada 2013e, 2017d) (Statistics Canada 2016c). Cambridge Bay continued to have higher levels of educational attainment, as only 36% of residents (aged 25 to 64) were without high school or other certificates/diplomas (a further improvement from 38% in 2011). Kugluktuk was slightly higher at 45%, while Gjoa Haven and Taloyoak continued to have a higher proportion of residents without high school or other credentials at 64% and 54%, respectively (Statistics Canada 2017d) (Statistics Canada 2016c).

Comparatively, in 2011 about two-thirds of those aged 25 to 64 in the eastern communities did not have high school or other certificates/diplomas[5] (Statistics Canada 2013e). Despite the improvement,

[5] In Kugaaruk, 45.8% were without high school or other credentials in 2016.

the proportion of the population without high school or other certificates/diplomas remains well above the Canadian average of 11.5% (Statistics Canada 2017d). The lower rates of high school completion and low levels of educational attainment in the region reflect the historic lack of formal education facilities, as many older individuals have never attended school. Further, school attendance rates in the Kitikmeot Region can be low (e.g., approximately 50 to 70% of registered students do not attend class; Appendices V6-3A and V6-3B). Western education continues to have varying levels of support among Inuit as a result of residential schools and social issues related to the settlement of communities in the 1960s. For Inuit who lived through these changes, obtaining a western education is not always highly valued (Pauktuutit Inuit Women of Canada 2006b; Inuit Tapiriit Kanatami 2007, 2014).

Notable gains were also seen in the proportion of post-secondary graduates with apprentice or trades certificates or diplomas[6]. In 2011, just over one-tenth of Gjoa Haven, Kugaaruk, and Kugluktuk, as well as 8 and 9% in Taloyoak and Cambridge Bay held apprenticeship/trades certificates (Statistics Canada 2013e). In 2016, the regional average of individuals aged 25 to 64 holding apprenticeship or trades certificates increased to 18%. At the community level, the proportion of individuals holding 'trades or apprenticeship' credentials increased to about one-fifth (16% in Kugluktuk, 18% in Cambridge Bay, and 18% in Gjoa Haven). Even greater increases were seen in Taloyoak (21%) and Kugaaruk (22%) in 2016 (Statistics Canada 2017d).

High schools in Cambridge Bay, Kugluktuk, and Gjoa Haven have trades-related programs available to students in grades 10 to 12. In Cambridge Bay, approximately five students are enrolled in the program each year, and in Kugluktuk there are usually eight to twelve students enrolled at each grade level. Taloyoak also provides some trades programming (Appendix V6-3B).

At the regional level, 43% of Kitikmeot residents aged 25 to 64 held post-secondary credentials in 2016. Of those, the most common educational designations were 'college' (41%), 'apprenticeship/trades' (33%), and 'university certificate, diploma, or degree at the bachelor level or above' (23%). In comparison, 65% of Canadians had post-secondary credentials in 2016 including 44% with a 'university certificate, diploma, or degree at the bachelor level or above', 35% with 'college', 17% with 'apprenticeship/trades credentials' (Statistics Canada 2017d).

Enrolment and Graduation Levels

The following section provides a discussion of regional and community level enrollment and graduation. A more fulsome discussion of each school in the Kitikmeot region, the number of students currently enrolled and expected to graduate, as well as staffing levels and programs offered can be found in Appendices VG-3A and V6-3B.

Public school enrolment increased between 2003 and 2015 in each of the Kitikmeot communities, with the exception of Cambridge Bay where enrolled decreased slightly (NBS 2016e). School attendance rates are low across the territory (i.e., about 70% in 2014), and are reported to have declined to about 58% in the Kitikmeot region (i.e., 2016/2017; (George 2017b). Low elementary school attendance in Gjoa Haven has contributed to this trend, as approximately one in every two school-aged children in Gjoa Haven did not attended in 2016. Attendance has decreased in the region's other four communities as well (George 2017b). About eight in ten students attend in both Kugaaruk and Taloyoak; about seven in ten students attended high school in Kugluktuk (down from eight of ten 2014/15); and fewer than six in ten students attended the high schools in Cambridge Bay (as compared to more than seven in ten in

[6] Aged 25 to 64.

2014/15)[7] and Gjoa Haven (down from seven of ten in 2014/15). Elementary school attendance ranges to 70 to 80% regionally (George 2017b).

There were 34 high school graduates[8] in the Kitikmeot Region in 2014 which was the highest number of graduates since 2008, when 36 students graduated. There were 31 graduates in 2015 including 13 from Kugluktuk, which represents the highest number of graduates on record in a given year for the community. Regional graduation rates have varied over time from lows of 11 students in 2001 and 2004 to a high of 36 in 2008 (NBS 2014d; Letts 2015). For the 2016/17 school year, the number of high school graduates varied by community: four in Taloyoak, seven in Gjoa Haven, eight in both Kugluktuk and Kugaaruk, and eleven in Cambridge Bay (George 2017b). The number of high school graduates also varies with community size (NBS 2014d).

It is of note that those who obtain high school credentials through means other than the traditional high school system are not accounted for in the data described above (NBS 2016f). Community interviews indicate that students who did not complete their high school studies by the age of 18 may later complete high school through the NAC's Pathway to Adult Secondary School (PASS) program (Appendix V6-3B). Of further note is the parallel change to the typical NAC student profile, as students are pursuing education through NAC at younger ages (i.e., 25 or younger; Appendix V6-3B).

In 2012, the most recent data available[9], approximately 58% of Inuit in Canada had not completed high school. On average, most were 17.1 years of age when they last attended high school. While the majority dropped out once, 24% dropped out at least twice; females were more likely than males to have dropped out multiple times (40% for females and 28% for males). Common reasons cited by Inuit men for not completing school are: school problems (22%), lack of interest (15%), and wanted to work (11%). For Inuit women, the main reason for dropping out of school was pregnancy/need to care for children (38%) (Statistics Canada 2012a).

Career Preparation at the High School Level

Kitikmeot high schools make an effort to expose students to various career opportunities, including trades, sciences, culture, and practical skills. Each community high school offers some form of pre-trades program as trades skills are known to be in demand, transferable, and suit many students who are less academically inclined or less suited to office-based or retail work. Pre-trades and other programs also focus on providing a foundation for life skills and work experience. Examples of trades-related classes include carpentry, welding, electrical and traditional tool-making. Typically, the pre-trades programs prepare students to take trades' entrance exams (Appendix V6-3B).

The Kugluktuk high school reported that students have made trips to the Ekati mine (Dominion Diamond Corporation), where they are able to see the mine and workplace firsthand, as well as the living arrangement for workers. The tours also include a discussion of the types of work opportunities available (Appendix V6-3B). Additionally, several former Kugluktuk pre-trades students have graduated and entered the work force including at least five who are currently employed at the Ekati mine (Appendix V6-3B) In Taloyoak, recent graduates have obtained local employment in the community including the weather observation centre and water treatment plant (Appendix V6-3B).

[7] This represents a decrease from an attendance of about nine in ten students in 2001/2002.
[8] It is of note that 'graduates', as defined by the Nunavut Bureau of Statistics, does not include individuals who complete equivalency or upgrading programs.
[9] Aboriginal population profiles to be released by Statistics Canada in 2018.

Educators have stated that it is generally important for students to start a job or training program immediately following high school as the deferral tends to result in a loss of motivation. The GN DFS has partnered with the KIA to sponsor six to eight individuals to attend mining training programs in Yellowknife and Sudbury, Ontario (Appendix V6-3B).

Nunavut Sivuniksavut is a transitional college based in Ottawa that provides Inuit youth with cultural and academic learning experiences to develop the knowledge and skills necessary for further education and employment. High school graduates from each of the Kitikmeot communities have attended Nunavut Sivuniksavut. An association has been drawn between attendance at Nunavut Sivuniksavut and high school graduation in Kugluktuk (Appendix V6-3B).

Post-secondary Education and Other Training

Post-secondary education is offered by the Nunavut Arctic College (NAC), with a central campus is in Cambridge Bay. NAC is responsible for all college programming and provides programs in all Kitikmeot communities through Community Learning Centres (NAC 2008). The NAC campus in Rankin Inlet includes a trades school and a heavy equipment simulator (Appendix V6-3B).

Programs offered through the NAC include trades, certificates and diplomas, career development, academic studies, and continuing education. Enrollment in the NAC Kitikmeot campus has increased from 170 full-time students in 2012 to 208 in 2016. Of the various NAC program offerings, programs for credit have the highest attendance in the territory (54.8% in 2016; (NAC 2016b). The NAC offers a 16-week pre-trades program at the NAC Cambridge Bay campus that assists students with preparation into trades related programs. The pre-trades program provides a foundation in physical science and works with students to improve their communication skills and technical mathematics (NAC 2016a). Additionally, the pre-trades program prepares students for the entrance exam to the Nunavut Trades Training Centre in Rankin Inlet (NAC 2015), which is the centre for trades schooling in Nunavut (Appendix V6-3B).

In addition to Adult Basic Education (ABE) and ABE Essential Skills, the current and most consistently offered programs at NACs Cambridge Bay campus are social work, culinary arts and/or camp cook, environment and technology and early childhood education (ECE; Appendix V6-3B).

Notably, the NAC's 2015/2016 Annual Report states that post-secondary enrolments are primarily influenced by funding and the economy. "*When federal or territorial funding is available, enrollments tend to strengthen. When the economy is strengthened, enrolments tend to weaken as potential students join the workforce*" (NAC 2016b). The report attributes recent increases in enrollment to increased third-party funding, additionally noting the enrolment in ABE has declined over the past ten years due to limited financial sponsorship (NAC 2016b).

The NAC has a strict attendance policy and lack of attendance contributes to attrition. Of those who do attend, approximately 80% graduate. Typical program attrition rates are around 20% to 30% in the Kitikmeot; the average for the Cambridge Bay campus in 2016/17 was 22%. Comparatively, recent community-based research indicates that other post-secondary institutions in Canada have an attrition rate of approximately 17% in the first year of a program. The relatively low attrition rate at the Cambridge Bay campus has been attributed to the small number of students which allows for greater attention and support for each student (Appendix V6-3B).

A recent survey of NAC graduates (2014/15) indicated that less than one year after graduation, 49% of students were employed full-time, 9% part-time, and 1% were self-employed. Of those employed

full-time, 53% were employed by the GN. Of those earning apprenticeship or trades certificates or diplomas in 2016, 79% were male and 24% were female. (NAC 2016b).

In past years, there were typically more female students (65%) than male students in Nunavut (35%; Association of Canadian Community Colleges 2010). However, this trend appears to be dissipating. In 2016, the ratio of males to females with a high school diploma or equivalency certificate was equal (Statistics Canada 2017d). The proportion of males to females earning post-secondary credentials in the Kitikmeot was also similar (males at 53% and women at 47%). At the territorial level, male post-secondary achievement surpasses that of females only slightly (50.5% vs 49.5%; (Statistics Canada 2017d).

The NAC Cambridge Bay campus provides housing for students and their families/partners including two 3-bedroom, eight 2-bedroom, ten 1-bedroom units, plus accommodation for single students in five apartments for 4 students each. Student housing is used by those attending classes (Appendix V6-3B).

The NACs' learning centres in Kugluktuk and other communities operate similarly to the Cambridge Bay campus but are comparatively smaller. The numbers and variety of courses are typically more limited in the learning centres, including ABE and ABE Essential Skills; other programs will be offered if minimum enrolment is met, and if there is a need for the skills in the community. The Kugluktuk campus provides a computer lab that has been recently upgraded and offers ABE programs, tutoring services for upgrading above grade ten, Inuinnaqtun courses, fur production course, and teacher education courses. The Kugluktuk campus has also offered pre-trades training. The college conducts a needs assessment each year to determine the schedule of courses for the upcoming year (Appendix V6-3B).

One known challenge in the Kitikmeot region has been the unavailability of certified tradespeople (journeymen) in the communities, which limits the ability of trades students to apprentice and obtain the experience needed to complete their apprenticeship[10]. Recent research indicates that the LHOs in Taloyoak, Gjoa Haven, and Kugaaruk employ local apprentices including housing maintainers and oil-burner mechanics (Appendix V6-3B). Additionally, the local construction contractors will facilitate apprenticeships if interested and committed candidates are identified. Contractors note that increasing the number skilled tradespeople available locally would reduce the costs of hiring from outside the community and providing housing for southern employees (Appendix V6-3B).

The GN DFS administers apprenticeship programs in Nunavut. Apprentices work with private companies, housing authorities, and hamlets (Appendix V6-3B). Specific apprentices identified during community-based research include:

- two housing maintainer apprentices with the Kugaaruk LHO;
- four apprentices, including two oil-burner mechanics and two housing maintainers at the Taloyoak LHO;
- one mechanic apprentice with the Hamlet of Taloyoak;
- one apprentice (unspecified) with Jago Services in Cambridge Bay; and
- one heavy equipment mechanic apprentice with KitNuna through the Kitikmeot Corp (Appendix V6-3B).

[10] Tradespeople are often working in the community on a project basis but are typically not present long enough to support an apprenticeship (V6-3B).

The opportunity to take and pass the trades entrance exams can be a barrier to prospective apprentices, as pre-trades courses and entrance exams are typically conducted in Rankin Inlet, where Nunavut's only dedicated trades school is located. Within the communities, efforts are sometimes made to provide Taloyoak LHO is working with the NAC and GN DFS to facilitate a pre-trades course and bring an exam invigilator to Taloyoak. However, apprentices must be willing to undertake a three-year apprenticeship including periodic travel to the trades school in Rankin Inlet for course sessions. Recent research indicates that the need to leave the community remains a significant barrier to education for many people (Appendix V6-3B).

TMAC has begun to support training initiatives in the region, including partnerships with Geotech Drilling Services, the KIA, and the GN. Eleven Inuit from the Kitikmeot region recently graduated from a intensive multi-week course held in Cambridge Bay (Kitikmeot Corporation 2017a).

Funding for Education

The Career Development Division of GN Department of Family Services (GN DFS) provides funding for student education. Programs that provide funding for students include: Financial Assistance for Nunavut Students (FANS), Adult Learning and Training Supports (ALTS), and the Special Professional Fund (GN Department of Family Services 2017).

FANS provides partial funding for students attending a designated post-secondary institution and academic program. ALTS covers the cost of training or upgrading that can be completed in under one year and including training that that leads directly to employment or work readiness/upgrade training. The Special Professional Fund is for students accepted into a specialized post-secondary program at a Canadian university (e.g., veterinary medicine or optometry; (GN Department of Family Services 2017).

Federal funding for education in Nunavut includes the Aboriginal Skills and Employment Training Strategy (ASETS) and the Skills and Partnership Fund (SPF). ASETS links training and labour market demands to prepare Aboriginal Canadians for high-demand jobs. Program services include: skills development, training for high-demand jobs, job finding, programs for youth, programs for urban and Aboriginal people with disabilities, and access to childcare. ASETS is coordinated by the KIA in the Kitikmeot Region (Employment and Social Development Canada 2014). The SPF facilitates partnerships between Aboriginal organizations, governments, businesses, and learning institutions to improve skills training and create opportunities for Aboriginal people. A partnership between the KIA and the NWT Mining Training Society was announced in 2012 to support the delivery of mine-related training in the NWT to Kitikmeot residents. Funding to support the training was provided by the KIA and was complimented by cash and in-kind contributions provided by government and industry (KIA 2012).

The January 2017 Labour Market update provided by GN DFS, indicates that 423 students are funded under FANS for 2016/17, 133 Nunavummiut are receiving Adult Learning and Training Supports (ALTS) funding for 2017, 95 students from 14 communities graduated from the Getting Ready for Employment and Training (GREAT) program, and 128 students received the Canada-Nunavut Job Grant (GN DFS 2017c)

The GN Department of Education provides a list of 15 scholarship and awards available to grade 12 students in Nunavut. For example, grade 12 scholarships are provided by the GN, the Qulliq Energy Corporation (QEC) and Canada Post provide scholarships, as well as other Nunavut based scholarships (e.g., Nunavut Sport and Recreation Scholarship; Qikiqtaaluk Corporation Scholarship) as well as many others (e.g., Indspire, Ken Dryden Scholarship, Loran Scholarship, The Yale Young Global Scholars Program). A second list of scholarships and award for Nunavut's students already enrolled in post-secondary education is also provided (GN DOE 2017).

Education Challenges

Challenges to Elementary and High School Education

Challenges to the delivery of education within the Kitikmeot Region are numerous. Schools have difficulties retaining qualified teachers and difficulties finding teachers that are fluent and able to teach in Inuktitut or Inuinnaqtun (Appendices V3-3A andV6-3B).). A program instituted through the NAC resulted in most schools having teachers fluent in the local languages. While there are a number of Inuit teachers in schools, many Kitikmeot teachers have temporarily relocated from the rest of Canada. Non-local teachers may have difficulties working within the local culture.

Interviews with local educators indicates that prior to grade 10, students' academic performance or attendance are not factors in passing to the next grade; rather students are passed so they can remain within their age cohort. However, when students reach grade 10, academic performance is assessed along with attendance (Appendix V6-3B). Educators have indicated that as a result, some students may take grade 10 two or three times, and may become frustrated and leave school. To address this challenge some schools are having early conversations with students about how expectations will be different in the higher grades in order to manage expectations and provide students with a longer-term perspective (Appendix V6-3B).

Recent research indicates that the biggest barrier to educational attainment in high school is low attendance (Appendix V6-3B). Reasons for poor attendance are varied and complex, and include the following:

- Unlike other Canadian jurisdictions there is no legislated or enforceable requirement for children and youth to attend school until a specific age.
- There may be limited encouragement from parents to attend school as some parents have distrust in the school system. Distrust stems from colonialization and residential school experiences.
- Teenage parents are not uncommon and students may leave school to care for children or to provide care for younger siblings in the cases where parents are working and there is limited child care in the community.
- Institutionalized education is not part of the local culture. School content is based on the Alberta curriculum and is not always transferable or relatable in the Inuit or Nunavut context.
- Some students and families deal with poverty and struggle to meet basic needs (e.g. food, housing). For some, education may be a lower priority.
- There are limited employment opportunities in the community, contributing to low motivation for education.
- Frustration can occur in relation to increased expectations for academic performance and attendance requirements beginning grade 10.

Other current challenges to educational attainment include maintaining consistent rules and student behaviour requirements where there is a high rate of teacher turnover, as many teachers stay in the community for one or two years (Appendix V6-3B). Another challenge is the real or perceived lack of connection between education and eventual employment as local employment opportunities are limited (Appendices V6-3A and V6-3B). Other challenges stem from differences between western and Inuit culture as formal schooling is viewed by some as a system imposed from the south, and home issues can also often result in problems in the school (Appendix V6-3A).

Challenges to Post-Secondary Education

Challenges for the delivery of post-secondary education include limited space for course delivery, the age of classroom facilities, and availability of instructors that can deliver courses in modular (i.e., condensed or intensive) format. Modular format teaching requires a short-term but full-time commitment by both students and teachers (Appendix V6-3B).

A lack of life skills and low level of academic readiness are the primary challenges for post-secondary students to be successful in education and employment. Many prospective students have low levels of confidence and skills and can be difficult for the NAC to attract them. For these students, initial enrollment in ABE and other basic programs ensure the development of sufficient skills and also provide strong supports, prior to enrollment in a more advanced or skill-specific program. The ABE Essential Skills and GREAT programs are designed to support and develop these skills. Limited or lack of childcare is another barrier to education for prospective NAC students (Appendix V6-3B).

Outside of the Cambridge Bay NAC campus, there are a limited number of courses available. The need to travel can also be a barrier to education for many students. Recent research indicates that many Kitikmeot residents are unwilling to travel or relocate for employment and education including to Cambridge Bay or Rankin Inlet which houses Nunavut's only dedicated trades school, where most certified trades courses are based (Appendix V6-3B).

3.2.5.4 Labour Force and Employment

Nunavummiut are engaged in both wage-based employment as well as traditional (or subsistence) work. The traditional economy is an important contributor to regional employment and income. Sharing and other Inuit customs continue to inform economic exchange between residents.

Traditional and Regional Economy

Traditional economic activities are recognized to be of great importance in the Kitikmeot communities, particularly among Inuit residents. The traditional (or subsistence) economy includes non-commercial hunting, fishing, trapping, and gathering. It also includes the transformation of harvested products into useful articles such as clothing, tools, or arts and crafts. The Land Use assessment (Volume 6, Chapter 4) provides a further description of the traditional economy.

The Kitikmeot region has a mixed economy, focusing on public sector services, private sector market economies, and traditional activities. Formal economic sectors of particular importance include: government administration, health care and social services, education, retail, construction, transportation, and real estate (Statistics Canada 2017d). The traditional economy is largely focused on subsistence land use, and Inuit in the region often participate in the market economy to supplement their traditional livelihoods. The seasonality of subsistence harvesting and the availability of wage employment influence the timing and consistency of Inuit participation in wage employment and the market economy.

> *From an economic viewpoint, it is often emphasized that traditional hunting and fishing activities, taking place at a distance from modern infrastructure and market opportunities, can represent a barrier for broader participation in the market and thus limit access to what is provided from the market economy: not only wage income, but also access to credit, subsidies and market-related transfer payments" (Poppel 2006).*

The service sector is the base of the Kitikmeot economy, providing employment to around 84% of the employed labour force (Statistics Canada 2013e). Services in the region are related to business,

education, retail trade, health, and social services, among others. In contrast, primary and secondary industries—including resource-based industries and construction—account for 14% of employment (Statistics Canada 2017d). Renewable and non-renewable resource sectors are also important to the regional economy, while tourism is an emerging industry. A recently conducted survey estimates that tourism-related businesses generated more than $40 million in revenue in 2011, representing 3.2% of overall Nunavut GDP that year[11] (GN DED&T 2015). Opportunities to develop mineral-based deposits are expected over the next number of years, leading to continued economic growth in the region and its communities. Nunavummiut are expected to benefit from this growth.

Local employment opportunities are mainly within the public sector (e.g., GN, hamlet, health services, education services, etc.). Available opportunities within the private sector are limited but include retail (e.g., the Northern Store and Co-op), hotel management (e.g., Inns North, other private accommodations), employment with local construction companies (e.g., carpenter, equipment mechanic, excavator operator, and maintenance technician), and more recently mining (e.g., Doris mine began operations in early 2017).

Labour Force and Economy

The potential labour force within the Kitikmeot region, which includes all individuals 15 years of age and older, was approximately 4,325 individuals in 2016. The active labour force (percentage of the potential labour force that is working or seeking work) was approximately 2,855 individuals indicating an average participation rate of 66%. This represents an increase from 61% in 2011 and 63% in 2006. This rate of participation is slightly lower than the territorial average (68%) but is slightly above the national average of 65% (Statistics Canada 2007, 2013b, 2017d).

Participation Rates

At the community level, participation rates are higher than the national average in Cambridge Bay and Kugluktuk (74% and 66%) and are comparatively lower in Gjoa Haven, Taloyoak, and Kugaaruk (64%, 61%, and 60%; Table 3.2-3). Approximately 40% of the working age population in Taloyoak and Kugaaruk reported they are not in the labour force (a decrease from 50% in 2011). The lower rates of participation are reflective of the population engaged in the wage-based economy and may not capture those who are engaged solely in the traditional economy. Some regional residents participate in both the wage-based and traditional economies while others have not transitioned into the wage-economy and continue to solely rely on the traditional economy (Battle 2013). Further research is required to thoroughly understand the drivers leading only some individuals to participate in the wage economy.

Employment and Unemployment Rates

Approximately 72% of the active labour force in the Kitikmeot was employed in 2016, down from 75% in 2011. Employment rates (percentage of the potential labour force that is employed) varied widely across communities from 36% in Taloyoak to 62% in Cambridge Bay. There are fewer government jobs and private sector businesses in the eastern communities. In comparison, of those in the active labour force in the Kivalliq and Baffin regions, 74 and 83% were employed, respectively. The adoption of wage-based employment has differed across the territory as there are fewer Kitikmeot residents (66%) participating in the labour force (i.e., working or seeking employment) in comparison to residents of the Kivalliq (68%) and Qikiqtaaluk (69%) regions. Overall, most of what is consumed in Nunavut is produced outside the territory (Battle 2013). This is one factor that contributes to the limited availability of employment, particularly in the private sector.

[11] The survey indicated that 51% of spending was on airfare.

Cambridge Bay is the regional hub and has a number of private businesses and employment opportunities. Kugluktuk residents have experienced some prosperity through employment with mines in the NWT, and both Kugluktuk and Cambridge Bay have benefitted from the recently opened Doris mine (2017). Given those opportunities, it is not surprising that Cambridge Bay and Kugluktuk have comparatively lower rates of unemployment (17% and 28%). The unemployment rate (percentage of the active labour force that is unemployed) was relatively high in the Kitikmeot communities compared to the national average of 8% and the Nunavut average of 22%. There was a substantial increase to the unemployment rate in Taloyoak (+13%) between 2011 and 2016, a more tempered increase in Kugaaruk (+6%), and slight increases in Cambridge Bay (+3%), Gjoa Haven (+2%). Notably, the unemployment rate in Kugluktuk dropped from 31 to 28% over the same time period (Table 3.2-3).

Table 3.2-3. Labour Force Activity Characteristics in the Kitikmeot Region (2016)

	Cambridge Bay	Kugluktuk	Gjoa Haven	Taloyoak	Kugaaruk	Kitikmeot Region	Kivalliq Region[1]	Qikiqtaaluk Region	Nunavut	Canada
In the labour force	930 (74%)	670 (66%)	530 (64%)	390 (61%)	340 (60%)	2,855 (66%)	4,595 (68%)	8,895 (69%)	16,340 (68%)	18,672,475 (65%)
Not in the labour force	335 (26%)	355 (35%)	300 (36%)	250 (39%)	230 (40%)	1,470 (34%)	2,175 (32%)	3,950 (31%)	7,590 (32%)	9,970,545 (35%)
Participation rate[2]	74%	66%	64%	61%	60%	66%	68%	69%	68%	65%
Employment rate	62%	47%	41%	36%	40%	48%	51%	57%	54%	60%
Unemployment rate[3]	17%	28%	36%	40%	34%	28%	26%	17%	22%	8%

Source: Statistics Canada (Statistics Canada 2017d).
Notes:
[1] Statistics Canada refers to the Kivalliq Region as "Keewatin" and the Qikiqtaaluk region as "Baffin".
[2] Participation rate is defined as the share of the potential labour force (total population 15 years and older) that is active (either employed or unemployed).
[3] Unemployment rate is defined as the share of the active labour force that is unemployed.

Regionally, more than one-quarter of the Kitikmeot active labour force was estimated to be unemployed in 2016, representing the highest regional rate of unemployment (28%), in comparison to the Qikiqtaaluk (17%) and Kivalliq (26%) regions (Statistics Canada 2017d). Unemployment, social assistance, and public housing are interconnected issues that are further discussed in Sections 3.2.5.7 and 3.2.5.8.

Labour Force Characteristics of the Aboriginal Identity Population

Data describing the labour force characteristics of the Canada's Aboriginal population were collected for the 2016 census; however, data was unavailable at the time of writing[12]. The discussion below describes the labour force characteristics of the Kitikmeot communities based on the 2011 NHS.

The majority of the individuals in Kitikmeot communities are Inuit and this segment of the population is experiencing rapid growth, meaning that Inuit comprise the large majority of the labour force. In the Kitikmeot Region, 91% of residents were of Aboriginal origin (90% Inuit) in 2011 (Statistics Canada 2013d). Over time, the proportion of Aboriginal residents in the Kitikmeot Region remained constant at 91%, however in 2016 99% of Aboriginal peoples in the Kitikmeot were Inuit (Statistics Canada 2017d)

[12] Statistics Canada plans to publish this data in early 2018.

The labour force characteristics of the Aboriginal identity population[13] in the Kitikmeot Region vary somewhat from those presented above for the total population. Understanding the employment circumstances of Inuit provides context as to the availability of the resident labour force for future employment.

In all communities, participation in 2011 was slightly lower and unemployment was slightly higher among the Aboriginal identity population. Employment rates varied by community, from lows of approximately 35% in each Gjoa Haven, Taloyoak, and Kugaaruk to a high of 51% in Cambridge Bay. Inuit continue to be engaged in the wage economy to a greater extent than has been realized in the past. Primary reasons for unemployment can include lack of jobs, caring for children and elder relatives, spending time on the land hunting or fishing, illness or disability, and waiting for recall or for another job to begin (Cameron and Gabel 2015b).

Unemployment rates were considerably higher in Gjoa Haven and Kugluktuk in 2011 (36% and 35%, respectively), representing increases from 2006 when the highest unemployment rates in the Kitikmeot were 32% and 31%, in Gjoa Haven and Taloyoak. In comparison, the unemployment rate for the Canadian Aboriginal population in 2011 was 15% (Statistics Canada 2013c). Higher than average unemployment rates reflect the lack of available employment opportunities as well as a mismatch between local skill sets and available employment (Battle 2013).

This focused account of Aboriginal labour force characteristics in 2011 demonstrated a greater balance in participation rates between the Kitikmeot, Kivalliq, and Qikiqtaaluk regions (57%, 59% and 56%, respectively). In terms of unemployment among the Aboriginal identity population, the Kitikmeot Region remained highest of the three regions (30%), while the Kivalliq and Qikiqtaaluk regions more closely reflected the territorial average of 23%. The unemployment-to-job-vacancies ratio was 17.5 in Nunavut in 2014, meaning there were 17.5 unemployed individuals for every job vacancy. In comparison, the ratio for Canada is 6.1, meaning there are about six unemployed individuals for every job vacancy (Statistics Canada 2014b).

Gender Variations in the Labour Force

Participation rates were generally higher for males than females (from 7% higher in Kugaaruk to 1% higher in Cambridge Bay). Regionally, labour force participation was 4% higher for males, while the employment rate was 3% higher for females. While participation rates were higher for males, so were unemployment rates (by 8% regionally). With the exception of Cambridge Bay, approximately one-third to nearly half of all males in the labour force were unemployed (i.e., Taloyoak, 46%; Kugaaruk, 43%; Gjoa Haven, 39%; and Kugluktuk 31%). The unemployment rate for males in Cambridge Bay was low comparatively low at 19%. The unemployment rate for females ranged from 35% in Taloyoak to 14% in Cambridge Bay. In sum, this means that men are more actively involved in the labour force, but that many of these individuals are unemployed and seeking work. Information on labour supply statistics in terms of ages and other demographic categories (other than gender) is not available.

Gender variations in the Kitikmeot labour force may reflect the types of employment available, cultural norms, or other variables. Further research is required to define the drivers of gender variations in labour force participation.

[13] Statistics Canada uses the term Aboriginal identity population to refer to all persons who reported identifying with at least one Aboriginal group, that is North American Indian, Métis, or Inuit, and/or those who reported being a Treaty Indian or a Registered Indian, as defined by the *Indian Act* of Canada.

Work Duration

Regionally, 35% of Kitikmeot residents did not work in 2016. Of those who did work (65%), 38% worked full-time and 62% worked part-time or part year. For Nunavut as a whole, 47% worked full-time and 53% worked part-time or part year. Kitikmeot residents worked slightly fewer weeks per year (34.6) in comparison to the Nunavut average (38.0). Notably, females worked more in terms of average weeks per year both in the Kitikmeot (+0.7) and in Nunavut (+0.8) (Statistics Canada 2017d).

Labour Force Experience

The labour force experience of all individuals aged 15 and over in the Kitikmeot region was concentrated within three sectors in 2016: 'Education, law and social, community and government' (22%), 'sales and services' (20%), and 'trades, transport, equipment operators' (18%) (Table 3.2-4). The GN is a prominent employer in Nunavut communities. Business, finance, and administration occupations, and management occupations also made important contributions to the region's occupational profile, accounting for 11% and 6% of jobs, respectively.

Table 3.2-4. Experienced Labour Force by Occupation, 2016

Occupation	Kugluktuk	Cambridge Bay	Gjoa Haven	Taloyoak	Kugaaruk	Kitikmeot Region	Kivalliq Region	Qikiqtaaluk Region
Total	665	935	525	390	340	2,855	4,595	8,890
Management	25 (4%)	100 (11%)	20 (4%)	15 (4%)	15 (4%)	180 (6%)	330 (7%)	885 (10%)
Business, finance and Administration	65 (10%)	150 (16%)	45 (9%)	35 (9%)	25 (7%)	310 (11%)	530 (12%)	1,355 (15%)
Natural and applied sciences	25 (4%)	30 (3%)	0 (0%)	0 (0%)	10 (3%)	70 (2%)	80 (2%)	305 (3%)
Health	0 (0%)	20 (2%)	25 (5%)	0 (0%)	0 (0%)	60 (2%)	125 (3%)	260 (3%)
Education, law and social, community and government	190 (29%)	195 (21%)	95 (18%)	65 (17%)	80 (24%)	615 (22%)	885 (19%)	1,810 (20%)
Art, culture, recreation, sport	25 (4%)	15 (2%)	15 (3%)	10 (3%)	10 (3%)	70 (2%)	115 (3%)	390 (4%)
Sales and service	125 (19%)	170 (18%)	125 (24%)	90 (23%)	70 (21%)	580 (20%)	1,090 (24%)	1,830 (21%)
Trades, transport, equipment operators	105 (16%)	165 (18%)	95 (18%)	80 (21%)	75 (22%)	520 (18%)	855 (19%)	1,195 (13%)
Natural resources, agriculture, and production	25 (4%)	25 (3%)	10 (2%)	10 (3%)	0 (0%)	65 (2%)	75 (2%)	160 (2%)
Manufacturing and utilities	10 (2%)	20 (2%)	10 (2%)	10 (3%)	10 (3%)	45 (2%)	40 (1%)	120 (1%)

Source: Statistics Canada (Statistics Canada 2017d)
Notes:
[1] Sales and service occupations include all retail, tourism, accommodation, and foods services

Overall, there is greater a diversity of occupational experience in the western Kitikmeot Region than the east. In general, the labour force in Cambridge Bay and Kugluktuk has a greater breadth of occupational experience, whereas in the eastern communities there are some occupations/skillsets that are not present (e.g., natural resources, and manufacturing and natural and applied sciences) (Table 3.2-4). There was a concentration of occupations related to business, finance, and administration in Cambridge Bay (16%). In the eastern Kitikmeot, the labour force was concentrated within fewer occupations. For example, more than a fifth of the population in each Gjoa Haven, Taloyoak, and Kugaaruk were employed in occupations in sales and services (Table 3.2-4). The highest concentration of labour force experience in Gjoa Haven and Taloyoak continued to be in sales and services in 2016 (as compared to 2011). In Kugaaruk, 'education, law and social, community and government' (24%) surpassed both trades and transport (22%) and sales and services (20%) in 2016.

In the western Kitikmeot, the greatest concentration of labour force experience was in 'education, law and social, community and government' (21 and 29% in Cambridge Bay and Kugluktuk). In Cambridge Bay, the second greatest concentration of experience was in 'sales and services' and 'trades and transport', which were equally high at 18%. In Kugluktuk, experience in 'sales and services' (19%) was slightly higher as compared to 'trades and transport' (16%) and about one-tenth of labour force experience was in 'business, finance, and administration'.

Within the eastern Kitikmeot there was no labour force experience in manufacturing or natural and applied sciences in 2011. Labour force experience in manufacturing was present in the eastern communities in 2016, though was relatively low (2 to 3%). Similar increases were not seen for natural and applied sciences, as the eastern communities continue without labour force experience in that area (Table 3.2-4). Also notable, low labour force experience in the health sector reflects a heavy reliance on southern labour. That is, those who are resident in the communities are without health sector employment experience and those who benefit from the experience of working in Nunavut's health sector reside elsewhere in Canada.

Labour force experience in the Kitikmeot is similar to the Kivalliq and the Qikiqtaaluk regions, though there was greater labour force experience in 'business, finance, and administration' comparatively. In 2011, the proportion of the population with experience in trades, transport and equipment operation was highest in the Kitikmeot (22%, as compared to 20 and 17% in the Kivalliq and Qikiqtaaluk Region, respectively), however in 2016, experience was highest in the Kivalliq region (19%), followed closely by the Kitikmeot region (18%), while the Baffin region lagged behind with only 13% (Table 3.2-4).

Regionally, 50 individuals identified their industry to be 'mining, quarrying, and oil and gas extraction' in 2016, a decrease from 90 in 2011. This included 25 people in Cambridge Bay, 20 in Kugluktuk, 10 in each of Gjoa Haven and Kugaaruk, and none in Taloyoak (Statistics Canada 2017d). At the time when the 2016 data was collected (i.e., mid-2016), TMAC's Doris Project was under construction, and the mine was not operational until early 2017. Overall in 2016, TMAC reports that approximately 90 Kitikmeot Inuit worked on the Hope Bay Project, for a total work effort of 6,410 person-days (equal to 37 full-time equivalent jobs). In addition, both the Diavik and Ekati mines in the NWT employ some Kitikmeot Inuit, primarily residents of Kugluktuk. Others are also employed mainly seasonally on advanced exploration projects in the region, such as the Back River Project.

Employment trends by industry varied across the Kitikmeot region. While there were some similarities between communities—for example, the labour force in all of the Kitikmeot communities was concentrated within the 'public administration' sector, representing 21% of workers regionally—few trends applied across the board (Statistics Canada 2013b, 2017d):

- 'Education services' accounted for a range of labour force experience; from a low of 11% in Cambridge Bay to a high of 19% in Kugaaruk.

- 'Public administration' represented about one-quarter of the labour force in Cambridge Bay (26%) and Kugluktuk (25%)

With the exception of Kugluktuk, 'construction' represented about one-fifth of the labour force in the each of the communities (i.e., ranging from 9% in Taloyoak to 13% in Cambridge Bay; Kugluktuk was slightly lower at 6%). While, Kugaaruk had highest proportion of labor force participation in 'education services' (22%), as well as 'retail trade' (14%) and 'construction' (12%).

- The 'retail and trade' sector represented at least one-fifth of labour force experience in each of the Kitikmeot communities with the exception of Cambridge Bay, which was slightly lower at 8%. Notably, retail trade accounted for 15% of labour force experience in Taloyoak.

These labour trends are typical for small, relatively isolated northern communities (Statistics Canada 2017d). Notably, a recent report indicates that accommodation and outfitting businesses employed 1,258 Nunavummiut in 2011 (GN DED&T 2015).

Employment Opportunities

The GN is a prominent employer in the Kitikmeot Region. It dominates the service sector and is a major economic driver. Cambridge Bay is the largest and most diversified economy and is the business and employment hub for the Kitikmeot Region, with an economy that is fairly balanced across the sectors (Appendix V6-3B). Other communities have relatively few private sector businesses and more limited employment opportunities. The employment opportunities that are available are centered on providing essential services required by the community. For example, the LHOs in each community manage and maintain public and staff housing and provide employment within administration, labour, and tradespeople[14]. When skilled tradespeople are not always available locally, they are hired from outside the community, as needed. During the summer months, the LHOs typically increase their workforce in order to undertake maintenance work, painting, and renovations and hire local labourers to do this work (Appendix V6-3B).

To support local housing and infrastructure development and maintenance, construction companies in each community hire locally. Activities may include: housing and building construction, heavy equipment operation and excavation, road construction and maintenance, pad construction, crushing to provide aggregate, and rental of trucks, tools, and equipment (Appendix V6-3A) as well as housing and airport maintenance (Appendix V6-3B). These businesses provide a relatively large number of private sector jobs, particularly during the summer construction season, and for smaller communities they typically provide the greatest number of jobs outside of government.

Recent research indicates that local contractors employ between approximately 10 and 30 people full time, depending on the season and level of activity in the community. Typically, employment levels rise in the summer and some of the contractors indicated peak employment levels of between 60 and 140 people. Most of the employees are local (Appendix V6-3B). In the absence of resident tradespersons, local companies bring in skilled workers including mechanics, electricians and heating specialists. This is particularly the case for government contracts which require certified tradespersons for project development. Local contractors often keep informal rosters of local workers and skills. In Kugluktuk, the hamlet intends to establish a roster of local workers for internal use as well as for employers (Appendix V6-3B).

[14] Including housing maintainers (a designated trade unique to Nunavut), oil-burner mechanics, electricians, and plumbers.

Other businesses that are common to all communities include retail and, to a lesser degree, local hotels. The Co-op and Northern stores employ between 20 and 40 people depending on the size of operation and services. The majority of employees are local residents though a few are from outside the region. The Kugluktuk Co-op has hired students to run the store on the weekends, providing work experience for the students and facilitating time off for other employees. Co-op employee training is mostly provided on site, while the Northern Store offers training manuals and a manager-training program that involves staff being trained in larger stores in other communities (Appendix V6-3B). The Co-op store offers additional types of training including purchasing, which is delivered in Rankin Inlet as well as office admin and mechanic services training programs which are delivered in Winnipeg (Appendix V6-3B).In general, employment opportunities in the Kitikmeot region within the private sector are limited.

Private sector employment opportunities, as indicated by postings online and on local bulletin boards, include general labour and skilled trade jobs. Employment opportunities outside the private sector include public sector positions with the GN. Research continues to indicate a mismatch between the skills of the local labour force and the requirement of locally available employment (Battle 2013).

At the time of writing, employment opportunities posted in Cambridge Bay include Custodian, Wildlife Manager, Facilities Maintenance Technician, Electronics Maintenance Technician, Security Escort, Chef, and Site Supervisor for Raytheon; Security Guard for QC-Scarlet Security Services; Human Resources/Social Responsibility Coordinator for TMAC; Ramp and Cargo Agent and Customer Service Agent for KBX BBE Expediting; Post Office Assistant for Canada Post; Building Official for the GN; and Journeyman Plumber for Jago Services (Indeed 2017b). Current employment opportunities in Kugluktuk include Post Office Assistant for Canada Post, and there were no current employment postings for Gjoa Haven, Taloyoak, or Kugaaruk (Indeed 2017a). Note that the extent to which local businesses in communities use the internet to advertise employment is not known, but expected to be lower than in other jurisdictions. Of note, jobs opportunities are often posted on local bulletin boards in the communities.

The GN DFS has recently produced the "In-Demand Career Options in Nunavut" report to inform Nunavut residents as they plan for their education and eventual careers. The report focuses on the questions of who is hiring, where are the jobs, and who is working? The report provides occupational profiles for numerous in-demand occupations, describes the main duties, required skills and abilities, and details the credentials or experience needed for the position (GN DFS 2017a).

Income

Between 2010 and 2016, the number of employed individuals in Nunavut varied from 14,000 to almost 15,000, steadily increasing over the period with a small dip in 2014 (Table 3.2-5). Average weekly earnings were $1,275 in 2016 ($66,279 in annual income), representing a 21.1% increase over 2010 (Table 3.2-5). However, the median income in the territory was much lower at $29,550 for Nunavut (Table 3.2-6). The median represents the middle income of all residents reporting income, indicating that approximately half of those reporting income had annual income below the minimum wage, full-time equivalent. Further, a median income that is below the average income indicates there are more individuals earning a lower income while a few high income earners inflate the average income.

Nunavut's minimum wage was under review in 2015 to determine how an increase would affect businesses and employees (CBC News North 2016). In 2016, minimum wage in the territory was increased from $11.00 to $13.00 per hour (it was at $10.00 in 2011) (NU LSCO 2017). Those earning the minimum wage and working full-time in 2016 would have had an annual income of approximately

$27,040[15] – this being above the median employment income of $18,440 in the Kitikmeot that year. However, the effects of the increase in minimum wage on employment levels have yet to be observed.

Table 3.2-5. Average Number of Employees and Average Weekly Earnings (Including Overtime), Nunavut, 2010 to 2016

	2010	2011	2012	2013	2014	2015	2016
Average Number of Employees	14,060	14,535	14,579	14,743	14,640	14,785	14,919
Average Weekly Earnings	$1,049	$1,081	$1,125	$1,177	$1,237	$1,256	$1,275
Estimated Annual Income	$54,570	$56,236	$58,519	$61,208	$64,319	$65,301	$66,279

Source: NBS (2017e)
Notes: The estimated annual income is calculated as the average weekly earnings times 52 weeks. It should be noted that the actual annual income may be potentially lower given the fact that not all individuals work full year.

In 2015, there were 3,040 taxfilers with employment income in the Kitikmeot, representing 81% of all taxfilers. By community, Cambridge Bay, Kugaaruk and Taloyoak had the highest proportion of taxfilers with employment income (90%, 80% and 80%, respectively). The regional median employment income was $18,740, being the highest in Cambridge Bay ($30,030) and the lowest in Kugaaruk ($11,170; Table 3.2-6).

Recently released 2016 Census income information indicates that, within the Kitikmeot Region, the median individual income in Cambridge Bay ($31,117) was highest in the region and higher than the territorial average ($23,315). Other Kitikmeot communities reported median individual incomes below the Nunavut average of $29,743 (Table 3.2-6). The lowest individual median income in 2015 was in Kugluktuk ($19,872). Cambridge Bay also reported the highest median household income among the Kitikmeot communities ($96,209), followed by Gjoa Haven with a median household income of $71,509 (Table 3.2-6). Regionally, median household income in the Kitikmeot Region ($77,397) was below that of Kivalliq and Qikiqtaaluk ($93,294 and $104,896, respectively). In comparison, the median household income was $70,336 in Canada (Statistics Canada 2017b).

Earnings also vary by gender. For example, in 2015, the median employment income of females was $15,328 in the Kitikmeot, approximately 25% lower than males ($20,368). This income inequality was most notable in the community of Taloyoak, where males had a median employment income of $15,456 and females that of $7,696, representing a 50.2% difference. In Kugluktuk, the median employment income of males and females were respectively $20,672 and $14,368 in 2015 (representing a 30.5% difference); whereas in Cambridge Bay, the median employment income of males was $34,080 and it was $24,256 for females, representing a 28.8% difference. Gendered differences in median employment income were 25.5% for Kugluktuk and 23.1% for Gjoa Haven. In comparison, in Canada as a whole, the median employment income of males was $39,836 in 2015, and that of females $28,474 (a difference of 28.5%) (Statistics Canada 2017b).

With respect to income sources, employment income[16] represents the largest source of income in all communities. Residents of Cambridge Bay had the highest proportion of income from employment at 87.4%, followed by Kugluktuk at 78.4%; for the remaining communities it was approximately 70% of total income. Government transfer payments are most utilized by residents in Kugaaruk (26.2%), followed by Taloyoak (25.3%) and Gjoa Haven (24.3%). In communities with high employment income, government transfer payments are proportionately lower (Cambridge Bay and Kugluktuk, respectively, 8.8% and 16.9% (Statistics Canada 2017b).

[15] Based on full-time employment, 52 weeks per year.
[16] Statistics Canada defines employment income as one type of market income that is a total of wages and salaries, including any net income from self-employment.

Table 3.2-6. Nunavut Taxfilers with Employment Income by Region and Community, 2006-2015

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Number of Taxfilers with Employment Income:										
Nunavut	14,060	14,200	15,070	15,420	15,940	16,340	16,510	16,460	16,620	17,070
Kitikmeot Region	2,510	2,490	2,730	2,740	2,820	2,890	2,960	2,890	2,910	3,040
Cambridge Bay	800	810	870	890	910	940	950	940	940	1,000
Gjoa Haven	470	460	510	520	550	580	570	580	550	580
Kugaaruk	290	300	330	340	330	360	380	360	370	370
Kugluktuk	630	610	660	640	640	640	680	630	630	650
Taloyoak	330	320	350	360	390	370	390	380	430	430
Proportion of Taxfilers with Employment Income:										
Nunavut	85%	84%	85%	85%	85%	85%	84%	83%	82%	82%
Kitikmeot Region	84%	83%	85%	84%	84%	84%	84%	81%	79%	81%
Cambridge Bay	89%	89%	90%	89%	89%	89%	89%	86%	87%	90%
Gjoa Haven	82%	81%	84%	81%	83%	83%	79%	78%	73%	75%
Kugaaruk	88%	86%	87%	87%	85%	86%	86%	80%	80%	80%
Kugluktuk	83%	81%	83%	82%	81%	80%	83%	78%	74%	76%
Taloyoak	79%	76%	80%	82%	83%	79%	81%	78%	80%	80%
Median Employment Income:										
Nunavut	$23,200	$24,310	$24,750	$25,140	$25,520	$26,500	$27,470	$28,580	$29,550	$29,270
Kitikmeot Region	$17,900	$18,500	$17,280	$17,300	$18,510	$18,900	$17,860	$17,490	$18,440	$18,740
Cambridge Bay	$27,300	$26,950	$28,070	$26,070	$30,620	$32,780	$29,800	$28,800	$28,960	$30,030
Gjoa Haven	$12,000	$14,800	$12,810	$12,690	$14,360	$14,220	$14,700	$14,070	$17,250	$17,910
Kugaaruk	$12,300	$12,190	$10,400	$11,780	$13,990	$12,330	$10,560	$10,250	$11,100	$11,170
Kugluktuk	$20,700	$21,850	$18,900	$18,720	$19,610	$22,520	$19,340	$15,540	$17,420	$19,620
Taloyoak	$12,500	$13,270	$11,970	$13,200	$12,830	$13,280	$10,890	$13,040	$14,580	$11,850

Source: (NBS 2017j)

3.2.5.5 Territorial Economy and Economic Development

Real GDP and Economic Sectors in Nunavut

Nunavut's Gross Domestic Product (GDP) experienced an 18% increase from $1,666 million to $1,966 million between 2010 and 2016 (millions of chained 2007 dollars). Over this period, growth had a strong increase of 17.9% between 2010 and 2013 which was followed by slight declines in 2014 and 2015 (i.e., -1.3% and -1.0%), but growth resumed in 2016 and surpassed the 2013 high (Table 3.2-7). Overall, GDP growth in Canada's three territories was highest in Nunavut over this time period (Statistics Canada 2017g). Table 3.2-7 presents the annual growth in real GDP in Nunavut from 2010 to 2016.

Table 3.2-7. Annual Growth in Real Gross Domestic Product in Nunavut (2010 to 2016)

	2010	2011	2012	2013	2014	2015	2016
Real GDP – All Industries (millions of chained 2007 dollars)	$1,666.5	$1,741.9	$1,785.3	$1,965.6	$1,940.9	$1,929.5	$1,966.1
Annual Growth (%)	Na	4.5%	2.5%	10.0%	-1.3%	-1.0%	1.9%

Source: Statistics Canada (2015b, 2017h)

In Nunavut, a number of factors shape the economy. The public sector is responsible for a notable portion of economic activity, private business is limited, and the retail industry is hindered by a lack of intra-regional transportation networks and cost-effective shipping. Overall, there is a heavy economic reliance on government-funded sectors. I, 2016, the four largest contributors to real GDP[17] in Nunavut were: public administration (22.51%); mining, quarrying, and oil and gas extraction (19.46%); real estate and rental leasing (11.34%); and construction (11.08%; (2017g). Education and health care and social assistance were the fifth and six largest contributors to GDP in 2016 (Statistics Canada 2017g).

The contribution to real GDP from the construction industry increased substantially between 2012 and 2016 (by 82 and 63%, respectively; Table 3.2-8). In 2016, the contribution of the mining, quarrying, and oil and gas extraction industry ($303.3 million) to Nunavut's real GDP was second only to public administration ($408.2 million), a long-standing leading contributor to GDP in the Territory.

Table 3.2-8. Select Industry Contribution to Real GDP in Nunavut (2012 to 2016)

Select Industries Contributing to GDP	Industry Contributions to GDP (millions of chained 2007 dollars)					% Growth 2012 to 2016
	2012	2013	2014	2015	2016	
Mining, quarrying, and oil and gas extraction	$286.7	$319.1	$ 338.2	$317.1	$303.3	6%
Construction	$133.6	$ 252.0	$ 213.7	$195.6	$208.8	56%
Public Administration	$369.3	$ 375.8	$ 384.9	$398.1	$408.2	11%
Real Estate and rental and leasing	$209.2	$212.4	$208.9	$216.3	$220.5	5%

Source: Statistics Canada (Statistics Canada 2017g)

[17] Real GDP is a measure of the value of economic output, or goods and services produced, that is adjusted to account for inflation.

The Centre for the North's Territorial Outlook Report predicted 6.4% GDP growth in Nunavut for 2017 followed by a 0.2% decline in total GDP in 2018. Nunavut's economy has remained strong through the correction in commodity prices. Metal mining is largest contributor to economic growth and all operating mines plan to increase production in 2017, including the Doris mine which opened this year. However, as production at Agnico Eagle's mine is expected to wind down operations as its reserve are drawn down in 2018 (CISION 2017).

The construction sector is also expected to surge in 2017, followed by weaker years as a number of large projects, including the CHARS are completed over the next two years. Service-based industries are expected to benefit from strong population growth (CISION 2017). The construction of CHARS has been an important opportunity for local construction contractors and suppliers in Cambridge Bay (Appendix V6-3B).

Mineral exploration spending in Nunavut has been lower in recent years (2015, 2016, and 2017) in comparison to 2011 when exploration spending peaked at $535.7 million and had more than doubled as compared to the previous year (2010; $256.7 million). Spending remained high at $422.5 million in 2012, but declined by approximately 40% in 2013 to $257.6 million. Spending in 2014 was slightly lower than predicted (actual spending of $144.6 million); economic growth was linked to gold production at the Meadowbank mine, a ramping-up in construction activity at the Mary River iron ore project, and a number of public infrastructure projects (Northern News Services Online 2015). Mineral spending is estimated to reach $163.6 million in 2016, representing a 20% decrease ($41.5 million) $215.1 million in 2015 (The Mining Association of Canada 2016). Over the next four years, a number of projects are expected to become operational including Baffinland's Mary River mine and TMAC's Madrid-Boston mine as well as two new mining sites operated by Agnico Eagle (the Meliadine mine which is slated to be operational in late 2019 and a satellite deposit of the Meadowbank mine; (Frizzell 2017a). Sabina's Back River project has been approved and constructed is expected to begin as early as March 2018 (Frizzell 2017b). An environmental assessment of the Grays Bay port and road commenced in August 2017, a project that would potentially facilitate the eventual development of the Izok Corridor Project (Izok Lake and High Lake deposits), currently controlled by MMG Canada, a subsidiary of China Minmetals which is a huge corporation majority owned by the Peoples' Republic of China (Bell 2017).

There were 124 prospecting permits, 3,335 claims, and 477 leases in good standing in Nunavut in 2016. Exploration and deposit appraisal expenditures in Nunavut were $36.5 million for juniors $85.6 million for seniors for a total of $122.1 million in 2016, representing the lowest level of spending in a decade. Projects on IOL in the Kitikmeot region include: High lake (MMG Ltd.), Hope Bay (TMAC Resources Inc.), Hood River (Inukshuk Exploration, WPC Resources Ltd.), WestKit (NRC Exploration Inc.), and CB57 (Victoria Copper Inc.; (INAC 2016).

Exploration in 2016 included Auryn Resources Inc., which undertook an exploration program for the Committee Bay gold project; Silver Range Resources Inc. is a new entrant to the market with four gold properties near the Grays Bay road; as well as limited activity for Crystal Explorations Muskox diamond project (INAC 2016).

Consumer Price Index

There is no data on Nunavut's Consumer Price Index (CPI). The estimated CPI is based on prices in Iqaluit. According to the Iqaluit index, prices rose by 2.2% between October 2016 and October 2017. In comparison, national change in CPI was 1.4%. Typical changes in the Iqaluit CPI vary from 1.0% to 2.0% per year, with the exception of 2010 when the change in CPI was -0.7% and 2007 when it was 3.2%. There is no evident correlation between changes in the Iqaluit CPI and the national CPI. Overall, prices in the Kitikmeot Region, and in Nunavut and are can be as much as quadruple the Canadian average.

For example, in 2017, the price of tooth paste in the Kitikmeot was triple the cost in Ottawa ($9.00 vs $2.70), whole mile was approximately double ($10.59 vs $6.30), and white flour was about double ($6.66 vs $3.29;(NBS 2017a)(NBS 2015b). Northern communities face inflated food prices as a result of a lack of and expensive transportation options.

Nunavut Imports and Exports and Trade Balance

Nunavut imports two to three times as much as it exports, with virtually all exports and imports beginning or ending in other Canadian provinces. However, exports increased from $167 to $846 million between 2009 and 2013 (an increase of 407%), while during the same period imports increased only (50%), from $1,417 to $2,126 million (NBS 2017f). In 2013, Nunavut continued to import more than twice as much as it exports and this trend remained fairly constant over the next three years. Between 2013 and 2016 exports increased only slightly by 5% and imports decreased by -3%. Exports to other countries remained fairly low between 2009 and 2014 (i.e., ranged from $20 to 33 million annually), however exports to other countries more than doubled in 2015 and doubled again in 2016 (to $85 million in 2015 and $165 million in 2016). Increases in exports to other countries were focused within the export of goods as opposed to services. The export of goods to other provinces rose dramatically between 2009 and 2010 (from $3 to $323 million), mainly associated with the commissioning and first production from the Meadowbank mine in 2010. Exports to other provinces were relatively high between 2012 and 2014, ranging from $818 to 852 million) but declined to $79 million in 2015 and $722 million in 2016 (NBS 2017f).

Imports from other countries decreased between 2009 and 2012 (-3; ranging from $260 to $314 million). In 2013, imports from other countries doubled to $663 million and remained high through to 2016 at $683 million. Imports from other provinces peaked in 2011 at $1,605 million, followed by steady decline to 2015 ($1,366 million), and increased only slightly to $1,382 in 2016 (NBS 2017f).

As evident, Nunavut's trade balance (the difference between the value of exports and the value of imports) was negative as imports were nine times the value of exports in 2009, two times the value of exports in 2013, and remain about double in 2016. In real terms, there were increases in both export and import of 431% and 46% from 2008 to 2013 (NBS 2017f).

Since 2013, Nunavut has continued to import just over twice as much as it exports. Exports were fairly constant between 2014 and 2016 and ranged from $875 to $887 million, while imports varied only slightly, from $2,023 to $2,065 million. The export of goods to other provinces decreased between 2014 and 2016; from an eight year high of $666 million in 2014 to $527 million in 2016. The export of goods to other countries was consistently below $10 million between 2009 and 2014. However there was a substantial increase to $61 million in 2015, and again to $139 million in 2016 (NBS 2017f). This is likely linked to the Mary River mine which first began shipping iron ore in late 2014, with a full open-water season of shipping commencing in 2015 (Baffinland 2014).

Imports from other provinces decreased following a high of $1,605 million in 2011, falling to $1,382 million in 2016. Goods imported from other provinces decreased from $452 million in 2014 to $380 in 2016, while the import of services from other countries increased slightly over this period, from $945 million to $1,002 million. Imports from other countries have remained fairly consistent between 2014 and 2016 ($626, $697, and $683 million) after doubling from $304 million in 2012 to $663 in 2013 (Statistics Canada 2017d).

GDP Expenditure Account and Household Consumption in Nunavut and Canada

In Nunavut, approximately one-third of consumption contributing to GDP is private while two-thirds is public. For Canada as a whole, the reverse is true - approximately two-thirds of total consumption is

private and just over one-third is public. Final consumption expenditure (the total of public and private consumption) increased by approximately 13% between 2008 and 2016 in Nunavut. Government consumption in Nunavut accounted for approximately 65% throughout this time period[18], while household consumption routinely accounted for approximately 33% (Statistics Canada 2017i). In contrast, Canadian household consumption accounted for approximately 72% of total consumption expenditure in 2016 (Statistics Canada 2017c).

Household final consumption expenditure increased by 24% in Nunavut while increasing only 19% nationally over the same period (2008 to 2016). In Nunavut, increases in the consumption of durable goods were highest at 46%, followed by semi-durable goods at 39%, and non-durable goods at 19%. The consumption of services also increased by 23%. In Canada, the household consumption of all goods and services increased by 17% and 21%, respectively (Statistics Canada 2017i).

Personal Savings and Investment Income

The GN collects information on Registered Retirement Savings Plan (RRSP) contributions and investment income. In 2015, there were 2,260 contributors (11.4% of all taxfilers). In total, contributions totaled $17.0 million and the median contribution was $4,000, the lowest median contribution in over a decade (Government of Nunavut 2017b). In comparison, 22.9% of all taxfilers in Canada made contributions and the median contribution was $3,000 (Statistics Canada 2017f). Approximately 81% of those age 15 and over in the Kitikmeot population were taxfilers in 2015 (NBS 2017i).

Incomes from investments were reported by 1,310 Nunavummiut taxfilers (or 6.3% of all taxfilers) in 2015, for a total of $9.3 million. This represents an increase of 0.8% in the number of taxfilers as compared to the previous year (2014) as well as an increase in total investment income of 20.5%. In comparison, the number of taxfilers reporting investment income in Canada decreased by -2.4% between 2014 and 2015, though for those who did invest total investment income went up by 19.5% over the same period (Government of Nunavut 2017a).

While data reporting the number of bank account holders in the territory is unavailable, efforts to establish greater access to services and provide financial management support have been ongoing. Until recently, Cambridge Bay was the only community in the Kitikmeot Region offering banking services. In August 2015, the First Nations Bank of Canada (FNBC) opened a full-service *First Nations Bank of Canada Community Banking Centre* in Kugluktuk providing business and personal banking services including loans, mortgages, investments, transaction accounts, and cash management. Within the previous year, the FNBC opened *Community Banking Centres* in Baker Lake and Pond Inlet. The FNBC, with the support of its largest shareholder, Inuit-owned Atuqtuarvik Corporation, has opened each of the three centres in Nunavut under an arrangement with Arctic Co-operatives Limited (First Nations Bank of Canada 2015).

Business Investment

Across Nunavut, government and private spending on non-residential building construction[19] reached previously unrealized highs in 2013 and 2014, with spending of approximately $95,813 million and $108,587 million, respectively. Prior to 2013/2014 and since then, this type of spending exceeded $50 million only just three times since 1999. Spending on non-residential building construction has

[18] This represents an increase from an average consumption of about 65% annually between 2008 and 2013.

[19] Spending on non-residential building construction includes both government and enterprise spending for industrial, commercial, and institutional buildings. Expenditures on residential construction and engineering work (e.g., bridges, roads, electrical dams, etc.) are not included.

since decreased to $46,636 in 2015 and $25,649 in 2016 (NBS 2017g). Of total spending in 2015 and 2016, governmental non-residential building construction accounted for 25% and 0.1%%, while commercial or private construction accounted for 75% and 94%, respectively. The development of mining facilities including building/facilities construction likely accounts for a large portion of private non-residential construction in 2013/14 (NBS 2014a). Non-residential building construction classified as industrial has accounted for less than 6% annually since 1999 (NBS 2017g).

Specific non-residential construction projects in the Kitikmeot region has recently included the construction of CHARS in Cambridge Bay which was an important opportunity for local construction contractors and suppliers; the expansion of the school and development of a water treatment lagoon in Gjoa Haven; construction of a new hamlet building and the ongoing construction of the new school in Kugaaruk; and the new Taloyoak health clinic that completed construction in 2015 (Appendix V6-3B).

Nunavut Labour Force and Mining Industry

At the time of writing there were three operational mines in Nunavut (Doris, Meadowbank and Mary River). In 2013, mining accounted for 15% or Nunavut's total GDP; to compare, four years earlier mining represented only 0.5% of Nunavut's GDP (MiHR 2014). In 2012, Nunavut produced three types of minerals including gold (accounting for 99% of all production and being the third largest producer in Canada), silver and diamonds (MiHR 2014).

Although Canada's mining labour force is relatively older, compared to other industries, Nunavut's mining labour force has a much higher proportion of workers that are younger. In 2011, an estimated 19% of Nunavut's mining labour force was 15 to 24 years of age and 33% was 25 to 34 years of age, compared to 11% and 26%, respectively, for Canada (MiHR 2014). However, there are gaps in educational attainment in Nunavut's labour force. More than half of the Nunavut's labour force (56%) has no certificate, diploma or degree, while only 11% have a secondary school diploma or equivalent as their highest level of education and 32% has a postsecondary certificate, diploma or degree (including trades, college and university) (Statistics Canada 2017d). Also, those without a certificate, diploma or degree are less likely to participate in the labour force, compared to Canada in general, and those who do participate, are less likely to be employed.

In contrast, those with a university degree are much more likely to participate in the labour force and have high level of employment, as compared to the Canadian labour force (MiHR 2014). Nunavummiut, similar to Canadians in general, have similar participation rates for those with a high school degree or a college degree; however, Nunavummiut tend to have higher rates of unemployment. In comparison to the Canadian average, Nunavummiut with an apprenticeship or a trade certificate have lower participation rates and higher rates of unemployment as compared to Canadians with apprenticeship or a trade certificates (MiHR 2014).

In Nunavut, there is also a high percentage of the workforce who work in the territory but live elsewhere (MiHR 2014). In fact, despite the strong emphasis to first hire from the local labour force, it is estimated that nearly three quarters of Nunavut's workforce is from outside of Nunavut (MiHR 2014). The need to supplement the local workforce comes from the remoteness of mining operations, a small population size, and a lack of infrastructure and housing, as well as education gaps (MiHR 2014).

Over 86% of Nunavut's population is Inuit (Statistics Canada 2017d), and there is strong Inuit participation in the mining industry. Indigenous people are often employed in entry-level and labourer positions and potential barriers to employment include job pre-requisites (i.e., workers' education and skills do not meet entry requirements). Limited employer awareness of how to find and recruit Inuit

workers is a factor (MiHR 2014). With respect to other diversity measures, women represent an estimated 20% of Nunavut's mining labour force, compared to 17% nationwide (MiHR 2014).

MiHR's hiring requirements forecast estimates that, over the next decade (by 2024), Nunavut's mining industry will require 1,120 hires or 112 hires per year on average (under the baseline scenario). Most of this requirement is expected to come from the replacement of existing workers that leave the industry (mainly due to reasons unrelated to retirement; (MiHR 2014). Occupations highest in demand are likely to include trades and production, followed by demand for support workers, supervisors and coordinators, and technical occupations, as well as human resources and financial occupations (MiHR 2014). More specifically, the top five occupations with notable hiring requirement are:

- heavy equipment operators (except crane);
- heavy-duty equipment mechanics;
- truck drivers;
- drillers and blasters; and
- geological and mineral technologists and technicians.

The demand will largely stream from mineral extraction, followed by mineral exploration and mining support services (MiHR 2014). MiHR estimated that in 2013, 2,215 people worked in Nunavut's mining industry; this represented 18% of the total employment in the territory and contributed 18% to GDP (MiHR 2014; MAC 2015). Of the total employment, there were approximately 1,075 workers in the mineral extraction sector and over 1,140 workers in exploration and mining support services (MiHR 2014). Another statistic indicates that, in 2013, 49% of Nunavut's mining workforce were in mining and processing, 32% in exploration and 20% in support services; for Canada these proportions were, respectively, 61%, 22% and 17% (MiHR 2014).

MiHR also prepared an available talent forecast that refers to the new entrants to Nunavut's labour pool. New entrants to the mining industry are mostly individuals who just completed high school or post-secondary school and are planning to join the workforce. New entrants may also include international or interprovincial migrants, or those who are changing occupations or re-entering the workforce (MiHR 2014). The forecast predicts that, over the next ten years (up to 2024), the mining industry in Nunavut will attract a modest 120 new entrants or 12 new entrants per year; this is based on historical rates for the mining industry and its ability to attract workers for specific positions from the broader labour pool (MiHR 2014). Given that the demand for selected occupations is estimated to be six times (790) the number of new entrants, it is expected that there will be a substantial talent gap (MiHR 2014). This talent gap is expected to vary for different occupations. The Mining Association of Canada estimates that the current mining projects in Nunavut that are in various stages of development will create 4,760 operating jobs and spend $11.4 billion in project development costs (MAC 2015). Although this has the potential to create a number of benefits for the territory, it is also expected to worsen the available talent gap for the mining sector.

The territorial market has been affected by the recent economic downturn. The *Labour Market Bulletin* for Northwest Territories, Nunavut and Yukon notes that in 2014, Nunavut lost 3.1% of full-time positions (ESDC 2014). In 2015, there was a loss of jobs in winter months but a gain in jobs in summer months (ESDC 2015).

The *Labour Market Bulletin* for Northwest Territories, Nunavut and Yukon notes that in September 2015 the number of workers employed in Nunavut reached 12,900, this number rose to 13,000 by January 2016, and to 13,600 in July 2017 (ESDC 2015, 2016, 2017b). However, by November 2017 the

number of people employed in Nunavut had decreased to 13,200, as employment gains in the territory's services-producing sector (+9.0%) were offset by losses in the goods-producing sector (-30.0%). Nevertheless, it is noted that the job outlook for Nunavut is still promising as new mining operations and other projects are either in permitting or at the development stage (ESDC 2017a).

The skills gap within the mining industry is a current challenge across northern Canada, where resource development typically occurs. National recommendations point to the dedication of attention and resources for education, employability skills and job-specific skills development (CBoC 2011).

Given that current graduation rates and education levels in Nunavut are below those of the Canadian labour market, it is recognized that labour force capacity can be built through partnership and shared principles such as understanding each other's needs and long-term mutual goals for economic and community development (CBoC 2013). Employability skills, defined as lack of work experience, can be enhanced through mutual consideration of businesses to understand strengths, challenges, experiences, goals, and culture of the communities in which they operate, as well as individuals who must understand the working culture of their employers (CBoC 2013). Job-specific skills can be created by providing training opportunities including post-secondary education, trades training, supervisory and management training (CBoC 2013). The indicated areas are of importance in developing a work-ready talent pool in the North.

Labour Supply by Skill Level

The territorial and regional labour supply, as well as estimates of the size of the partly-utilized and unutilized labour force of the Kitikmeot region is informed by an analysis of the 2016 Census statistics and Beyond 20/20 data provided by Statistics Canada (Appendix V6-3A).

The 2016 Census provides information on the size of the labour force in the Kitikmeot region and in Nunavut, including the distribution of the population aged 15 to 64 (for total population and Aboriginal identity) by highest certificate, diploma or degree. This information is used to estimate the size of the territorial labour force by skill level (Table 3.2-9). It is noted that the labour force is defined for this analysis to include those within the age range 15 to 64, as is common practice. It is acknowledged that this may somewhat overestimate those available for mine employment because some of those in the younger cohort who are pursuing secondary or post-secondary education, and those under 18 who are unable to work at the mine site as specified by legislation.

The educational attainment is described according to the NOC coding system, using the following criteria:

- Skill Level A – occupations usually require university education;
- Skill Level B – occupations usually require college education or apprenticeship training;
- Skill Level C – occupations usually require secondary school and/or occupation-specific training; and
- Skill Level D – on-the-job training is usually provided for occupations (i.e., high school not required).

The total population of the Kitikmeot region in 2016 is estimated at 6,545, of which 4,085 is 15 to 64 years of age (Statistics Canada 2017d)

The Aboriginal identity population in the Kitikmeot region is estimated at 5,960. Of the total population of 6,545, approximately 5,900 (or 90%) are Inuit (Statistics Canada 2017d).

Nunavut's education profile by skill level using the NOC coding system (see Table 3.2-9) is as follows:

- Over half (51%) of the total population in Nunavut, 15 to 64 years of age, does not have a high school diploma or equivalent; this is 61% for the Inuit population in the territory.
- 12% of the total or 2% of the Inuit population in Nunavut has a university degree, and 23% of the total or 21% of the Inuit population has a college education, trade and/or apprenticeship training.

Table 3.2-9. Total Population Age 15 to 64 by Skill Level, Nunavut, 2016

Category	Total Population in Nunavut (2016)		Total Inuit Population in Nunavut (2016)	
	Number	Percentage	Number	Percentage
Total Population Age 15 to 64	**22,895**	**100%**	**19,230**	**100%**
Skill Level A (university education)	2,640	12%	460	2%
Skill Level B (college education or apprenticeship training)	5,185	23%	4,110	21%
Skill Level C (secondary school and/or occupation-specific training)	3,460	15%	2,860	15%
Skill Level D (on-the-job training is usually provided)	11,615	51%	11,800	61%

Source:(Statistics Canada 2016c, 2016a, 2017d)
Note: The following NHS categories were included within each NOC code: Skill Level A – "University certificate or diploma below bachelor level" and "University certificate or degree at or above bachelor level"; Skill Level B – "Apprenticeship or trades certificate or diploma" and "College, CEGEP and non-university certificate or diploma"; Skill Level C – "High school certificate or equivalent"; Skill Level D – "No certificate, diploma or degree".

The education profile of the working age population (age 15 to 64) of the Kitikmeot region, by skill level using the NOC coding system (see Table 3.2-10) is as follows:

- 56% of the total population age 15 to 64 of the Kitikmeot region has no high school diploma or equivalent.
- 8% of the total population has a university degree.
- 24% of total population in the Kitikmeot region has a college education or apprenticeship training and 11% has a secondary school or occupation-specific training.

The Kitikmeot, compared to Nunavut in general, has about the same proportion of those with a college education or apprenticeship training, but lower representation of those with a university degree, secondary school or occupation-specific training (Table 3.2-9 and 3.2-10). These statistics confirm the low levels of educational attainment in Nunavut and the Kitikmeot region, and point to a potential talent gap.

Barriers to taking advantage of resource developments include lack of skilled workers and low rates of post-secondary education and training (Cameron and Gabel 2015b). It has been also reported that students lack the science and math skills required to pass trades entrance exams and that there are few post-secondary options available locally. However, although there is a struggle to gain academic and trades credentials, community members often obtain skills in professions such as mechanics, carpenters, electricians, and other trades as a result of learning from family or other mentors (Cameron and Gabel 2015b).

Table 3.2-10. Total Population Age 15 to 64 by Skill Level, Kitikmeot Region, 2016

Category	Total Population in Kitikmeot Region (2016)		Total Inuit Population in Kitikmeot Region (2016)	
	Number	Percentage	Number	Percentage
Total Population Age 15 to 64	**4,085**	**100%**	**3,675**	**100%**
Skill Level A (university education)	330	8%	85	2%
Skill Level B (college education or apprenticeship training)	1,000	24%	785	21%
Skill Level C (secondary school and/or occupation-specific training)	460	11%	550	15%
Skill Level D (on-the-job training is usually provided)	2,295	56%	2,255	61%

Source: (Statistics Canada 2016c, 2017d)Note: Published statistics on skill level for Inuit in the Kitikmeot region was not available. For the analysis presented here, this was estimated based on the assumption that Inuit population age 15 to 64 in the Kitikmeot region comprises 90% of the total population, and applying the same percentage by skill level for all Nunavut Inuit (Table 3.2-9).
Note: The following NHS categories were included within each NOC code: Skill Level A – "University certificate or diploma below bachelor level" and "University certificate or degree at or above bachelor level"; Skill Level B – "Apprenticeship or trades certificate or diploma" and "College, CEGEP and non-university certificate or diploma"; Skill Level C – "High school certificate or equivalent"; Skill Level D – "No certificate, diploma or degree".

Residents with a higher level of educational attainment tend to have higher rates of participation in the labour force and higher rates of employment (Tables 3.2-9 and 3.2-10). Due to the low skill base of Nunavummiut, residents with a university degree realise a near full rate of employment (94% for the total population and 90% for the Inuit population). Those who do not have a high school diploma or equivalent face higher rates of unemployment and many are not in the labour force.

Based the distribution of the potential labour force by skill level in Tables 3.2-9 (Nunavut) and 3.2-10 (the Kitikmeot), the distribution of those employed, unemployed and not in the labour force by skill level presented for Nunavut in Tables 3.2-11 (total population) and 3.2-10 (Inuit population) is assumed to be similar for the Kitikmeot region (Table 3.2-12). This leads to the estimation of the unutilized labour force by skill level for Nunavut and the Kitikmeot (Table 3.2-13). For comparison, estimates of both those unemployed and those not in the labour force are provided as an indication of the labour force potentially available.

Table 3.2-11. Distribution of Employed, Unemployed and Not in the Labour Force by Skill Level, Nunavut, 2016 – Total Population Age 15 and Over

Category	Employed	Unemployed	Not in the Labour Force
Skill Level A (university education)	94%	2%	4%
Skill Level B (college education or apprenticeship training)	69%	14%	17%
Skill Level C (secondary school and/or occupation-specific training)	63%	14%	23%
Skill Level D (on-the-job training is usually provided)	35%	18%	47%

Source: (Statistics Canada 2017b)

Table 3.2-12. Distribution of Employed, Unemployed and Not in the Labour Force by Skill Level, Kitikmeot Region, 2016 – Inuit Population Age 15 and Over

Category	Employed	Unemployed	Not in the Labour Force
Skill Level A (university education)	90%	2%	8%
Skill Level B (college education or apprenticeship training)	63%	17%	20%
Skill Level C (secondary school and/or occupation-specific training)	59%	16%	25%
Skill Level D (on-the-job training is usually provided)	33%	18%	48%

Source: (Statistics Canada 2017b)

As shown, there is very little unutilized labour (employed and not in the labour force) unemployed in Nunavut or the Kitikmeot at Skill Level A (university education). At Skill Level B (college education or apprenticeship training) there is more unutilized labour, for both Nunavut and the Kitikmeot, than at Skill Level C (secondary school and/or occupation specific training). This is believed to be mainly due to the labour pool at Skill Level B being more than double the size of that at Skill Level C for Nunavut, and nearly three times the size for the Kitikmeot.

Table 3.2-13. Estimation of Unutilized Labour by Skill Level for Nunavut and the Kitikmeot Region, 2016

Category	Total Population		Inuit Population	
	Nunavut	Kitikmeot	Nunavut	Kitikmeot
Unemployed				
Skill Level A (university education)	50	5	10	0
Skill Level B (college education or apprenticeship training)	725	140	700	135
Skill Level C (secondary school and/or occupation-specific training)	485	65	460	90
Skill Level D (on-the-job training is usually provided)	2,090	415	2,125	390
Total	**3,350**	**625**	**3,295**	**615**
Not in the Labour Force				
Skill Level A (university education)	105	15	35	5
Skill Level B (college education or apprenticeship training)	880	170	820	155
Skill Level C (secondary school and/or occupation-specific training)	795	105	715	140
Skill Level D (on-the-job training is usually provided)	5,460	1,080	5,665	1,080
Total	**7,240**	**1,370**	**7,235**	**1,380**

Businesses and Business Opportunities

There is a heavy dependency on the public sector as a result of the harsh climate, geographic remoteness, small population, and underdeveloped infrastructure systems that have led to serious constraints for private sector economic development in the territory. Cambridge Bay is the largest and most diversified economy and is the business hub for the Kitikmeot Region, with an economy that is fairly balanced across the sectors (Appendix V6-3B; Statistics Canada 2013b).

The construction industry is prominent within Nunavut communities and has been supported by opportunities afforded by government spending on housing and infrastructure. There is at least one construction firm in each of the Kitikmeot communities whose services typically include housing and

building construction, heavy equipment operation and excavation, road construction and maintenance, pad construction, and crushing to provide aggregate, as well as the rental of trucks, tools, and equipment (Appendix V6-3A). These privately owned businesses provide a relatively large number of private sector jobs, particularly during the summer construction season (Appendix V6-3B).

Other construction includes public housing units or other types of government-owned buildings (e.g., cultural centre, Elders centre, recreation centre, hamlet government building). The annual construction of public housing, GN staff housing, and other staff housing in the Kitikmeot Region generates work and business for manufacturers from outside the territory and also the privately-owned local construction companies (Appendix V6-3B; (Government of Canada 2012). Though not typical, the construction of private homes and facilities occurs occasionally.

Co-operatives are a popular business model in Nunavut. Each Kitikmeot community has a co-operative (co-op) retail store that sells food, clothing, and a broad range of household items. With the exception of Kugaaruk, communities also have a competing Northern Store. Co-operatives operate the Inns North hotel chain and also hold a number of other contracts for providing services in the community. Recently, the co-op retail store (Arctic Co-operative Limited) has established an agreement with the First Nations Bank of Canada to provide banking services in three Nunavut communities, including Kugluktuk (First Nations Bank of Canada 2015).

Mining service businesses have developed in Cambridge Bay, including medical and safety services, expediting and logistical services, site management, catering, and janitorial services. The mining sector has also influenced economic conditions in Kugluktuk which is near to the Diavik and EKATI operations in the NWT. Kugaaruk has previously been a hub for local exploration companies such as Diamonds North and Indicator Minerals (Appendix V6-3A).

The Canadian High Arctic Research Station (CHARS) was announced by the Government of Canada in 2007 and construction was completed in 2017. CHARS cost $142.2 million to build, $46.2 million to ramp up and will have an annual operating budget of $26.5 million from 2018/19 onward. The development of CHARS also led to a new water treatment system, tank farm, airport expansion, and is expected to promote the case for a new garbage truck, sewage truck, and fire truck. Other spin-off benefits have included more housing construction, new bed & breakfast operations and restaurants, a Northern Store expansion, and more tourists. The facility is expected to be open to the public in early 2018 (George 2017a).

Recent research indicates there will be a renewed effort to develop local projects once CHARS construction and related work is completed. For example, projects under consideration in Cambridge Bay include a new vehicle storage building, a new fire hall or upgrading the existing fire hall, power plant construction, and development of housing (both public and government housings; Appendix V6-3B). Additionally, the Kitikmeot Community Futures Inc. (KCFI) and others have identified new business opportunities to address service requirements of the growing community, such as a laundromat (Appendix V6-3B).

Polar Knowledge Canada, a newly created federal organization will operate the facility with a mandate for advancing Canada's knowledge of the Arctic and strengthening Canadian leadership in polar science and technology (Government of Canada 2015). Once operational, CHARS is expected to have 35 full-time and 50 part-time staff, be a year-round, multi-disciplinary facility located close to the centre of Cambridge Bay (The Municipality of Cambridge Bay 2015).

Directions for Regional Economic Development

Community Economic Development plans provide a vision for economic development and guide local efforts to support economic growth. There are a number of investment support programs offered by the GN to encourage the development of local business. The Nunavut Department of Economic Development and Transportation (NDEDT) provides funding to small business, individuals, organizations, and municipal governments. The four main funding programs include:

- Community Tourism and Cultural Industries Program – strengthens community infrastructure and readiness for tourism, and enhances economic development in sectors such as music, digital media, writing, and performing arts. For example, the arts development program funding (Appendix V6-3B).
- Small Business Support Program – funding for up-and-coming small businesses, community organizations, and individuals to support growth. Funding is provided for small businesses, entrepreneur development and sustainable livelihoods.
- Strategic Investment Program – funding for expansion or start-up costs for businesses that are majority owned by Nunavut residents including financial support for training, marketing, and community development for community governments, not-for-profit corporations, and societies.
- Community Capacity Building Program – operational funding for business development centers and other organizations delivering programs on behalf of the NDEDT. Additional financial support for the employment and training of a Community Economic Development Officer and the preparation of a community economic development plan to increase the capacity of hamlets to promote local economic development.

Funding EDT programs is available to recipients across the Kitikmeot (e.g., individuals, not-for-profit organizations, hamlets, schools; Appendix V6-3B).

Kitikmeot Community Futures Inc. (KCFI) is mandated to support to small and medium-sized enterprises (SMEs) and local non-profits with business services such as small loans, business planning programs, and book keeping services. The KCFI office provides computers for community use and staff to assist individuals submit business registrations, write resumes, and submit online job applications. Support from KCFI has enabled a number of Kitikmeot businesses to become eligible for bank financing. Recently, KCFI supported the development of the Kitikmeot Chamber of Commerce[20], planning to workshop to establish a regional economic strategy (Appendix V6-3B).

Other business development support for Nunavut-based businesses is available from the Nunavut Business Credit Corporation (NBCC) which provides venture debt financing with a focus on SMEs (Nunavut Business Credit Corporation 2015). The Atuqtuarvik Corporation, an Inuit investment company that also offers debt equity financing to viable Inuit businesses (e.g., start-ups, acquisitions, expansions; (Atuqtuarvik Corporation 2015).

The 100% Inuit-owned Kitikmeot Corporation is the economic development arm of the KIA and is tasked with the development of business opportunities and economic development in the Kitikmeot. The Kitikmeot Corporation contributes to employment opportunities by developing profitable businesses, for example in mining and exploration, technology, travel services, property and insurance. Joint

[20] The Kitikmeot Chamber of Commerce will promote the interests of the local business community through advocacy, chamber discount programs, networking events, and education forums.

ventures include, for example, Kitikmeot Camp Solutions, Kitnuna Corporation, Medic North Nunavut, Nunami Stantec, Nunavut Sealink and Supply, PolarNet, and Toromont Arctic Caterpillar (Kitikmeot Corporation 2015a, 2017b).

Overall, there has been a recent increase in local and regional business capacity, particularly in Cambridge Bay, which serves as an indication of new business opportunities arising and an enhanced potential to serve the Madrid-Boston Project in addition to other clients.

Businesses, Economic Development, and Tourism

The Kitikmeot Corporation has established a number of companies.[21] Kitikmeot Cementation and Mine Development is a joint venture with Cementation Canada that supports underground mine development services. Kitikmeot Camp Solutions (previously Kitikmeot Catering) provides catering and janitorial services (Appendix V6-3B). Many of these companies have performed works at the Hope Bay site (either with Newmont, or more recently with TMAC). Nuna Logistics also provides services to the Diavik and Ekati mines, for example road construction/ maintenance services (Appendix V6-3B).

Tourism is increasing across the Kitikmeot, particularly in Cambridge Bay and Kugluktuk. There is interaction with tourists from cruise ships and private vessels that visit the area during the summer months[22]. The biggest constraint to tourism across the region is the cost of transportation (Appendix V6-3B). Opportunities arise when tourists visit the communities for local people to sell Inuit art and cultural products (e.g., boots, vests, other crafts). Tourism is a current focus for the Hamlet of Cambridge Bay including the development of a plan for year-round tourism (Appendix V6-3B).

To support the coordination or cruise ship visits and associated activities, the Hamlet of Cambridge Bay has developed the staff position of "Cruise and Culture Coordinator". This role is responsible for working with the cruise operators to arrange tours and cultural performance[23] for the visitors. There are typically four or five cruise ships that stop in Cambridge Bay each year, plus smaller private vessels. Local artists are also typically notified about cruise ship arrivals, and space is available for artists to showcase their wares. Other tourist attractions in Cambridge Bay include the new heritage park with cultural exhibits, the Kitikmeot visitor Centre, and ATV tours to nearby Mount Pelley (Appendix V6-3B).

Cruise ships also visit Kugluktuk and Gjoa Haven each summer. Five cruise ships and a number of private boats visited Gjoa Haven in 2017. In Gjoa Haven, visitors disembarked to buy arts, crafts, and other provisions such as fuel. Dances and cultural presentations were organized for the cruise ship passengers visiting Gjoa Haven (Appendix V6-3B). One cruise ship disembarked in Taloyoak, unplanned and unannounced, in 2017; the Hamlet of Taloyoak is working to improve communication with cruise operators to ensure there is advance notification and opportunities to prepare community presentations and tours (Appendix V6-3B).

Cruise ships are unable to visit Kugaaruk due to its location within a bay and behind a number of islands. The community similarly struggles with sealift and coast guard access at certain times of year. Finally, access to Kugaaruk is not within the same water channels used to gain access to the other Kitikmeot communities as it is located much more easterly.

[21] A full list of the Kitikmeot Corporation's companies is provided on their website.
[22] Excluding Kugaaruk.
[23] In 2017, visitors were provided guided walking tours (using local guides), cultural performances (e.g., drumming, throat singing, dancing), fashion shows, arctic sports demonstrations, and food catering (e.g., elders made char chowder and bannock; C. Epp, *pers. comm.* Community Research Program 2017).

In Kugluktuk, the Hamlet is also exploring tourism opportunities such as fishing and viewing the northern lights. Other tourist activities near Kugluktuk include canoeing and kayaking on the Coppermine River, although these visitors do not typically stay overnight in the community. Jetboating, ATVing, fishing, and birdwatching tours are offered by the local tourism operator, Koda Tours. In 2017, Koda Tours provided services for about 30 to 40 people including cruise ship passengers and charters (Appendix V6-3B). Other businesses in Kugluktuk include two hotels: the Coppermine Inn and Enokhok B&B. There is also a relatively new local taxi service that is often used for carrying shopping, patients to clinic, and trips to and from the airport (Appendix V6-3B).

Current tourist facilities in Kugluktuk include the local Ulu building which serves as a visitor and heritage centre and features local crafts and carving *(*Appendix V6-3B). The Nattilik Heritage Centre in Gjoa Haven exhibits and sells art and other cultural products[24] showcasing local artists, the community, and Inuit culture. The heritage centre has recently showcased information about the Franklin ships and ongoing archaeological work (Appendix V6-3B).

The opportunities for tourism and other economic development are more limited in the eastern Kitikmeot in comparison to the west. The recent discovery of Sir John Franklin's expedition ships near Gjoa Haven may provide opportunities through Parks Canada for infrastructure development and employment. Local residents of Gjoa Haven have been hired by Parks Canada to guard and support activities near to historic sites (Appendix V6-3B).

In response to Cambridge Bay's strong population growth, CHARS construction, and increased tourist activities, new hotels and restaurants have opened in Cambridge Bay. Many hotels have been fully booked with construction crews or with training course participants, reflecting Cambridge Bay's importance as a regional hub. At present, there is limited land available for development of new hotels and restaurants, which are necessary to support further growth (Appendix V6-3B).

Challenges to Business Growth

Regional challenges to economic development within the Kitikmeot Region relate to the capacity of the labour force, existing transportation and other infrastructure, and access to capital (Appendix V6-3B). Relatively low levels of education and training within the labour force hinder economic development (Appendix V6-3A). There is strong competition for skilled labour (Appendix V6-3A). Additionally, employee retention, absenteeism, and attrition[25] are also issues that present challenges for employers. Despite providing on-the-job training to address low levels of knowledge and skills, employers indicate that even with these efforts there are high rates of employee turnover (Appendix V6-3B).

The cost of air travel is relatively high and schedules can be affected by poor weather (Appendix V6-3A). Transportation can also be a substantial challenge (Appendix V6-3A). Communities rely on one sealift delivery a year[26] (Appendix V6-3B), which can compete with the transportation demands of industry potentially resulting in delivery delays (Appendix V6-3A). Supplies are also shipped by barge (e.g., dry goods, construction materials, and fuel) but this is limited to the summer months. A lack of infrastructure is a continuing hindrance to business growth. This includes both a lack of housing for employees, as well as a lack of building space for the location of businesses (Appendix V6-3A). Access to developed land and facilities is limited. The Northern and Co-op stores in

[24] Wall hangings, carvings and other crafts.
[25] May link to family obligations, unreliable or unavailable childcare, or substance abuse (Community Research Program 2017).
[26] Retailers and companies that provide supplies (e.g., construction companies) indicate that managing freight deliveries is a challenge as there is one sealift delivery per year and products must be ordered well in advance. The only alternative is air shipment which is costly and delivery can be unreliable, particularly in the winter months when the weather is variable and unpredictable (C. Williams, *pers. comm.,* Community Research Program 2017).

several communities identified limited space as a major constraint to business growth. Building and maintenance costs (e.g., power and water) are also limiting factors. Limited internet bandwidth and the associated high cost of bandwidth have also been cited as limitations to economic growth (Appendix V6-3B).

A number of hamlets are interested in establishing an "incubation mall" or building that has a number of office and storefront spaces that can be rented by small businesses. The construction and renovation of government buildings in some communities (e.g., Taloyoak, Gjoa Haven) are providing options for use by small business. The arts and crafts sector has been identified as a priority and requires work space for artists as well as a place to sell products (Appendix V6-3A).

The project-by-project nature of economic development in the region does not support the continued maintenance of larger, more capable, contracting and construction companies. When larger construction contracts are available, including for example the construction of CHARS in Cambridge Bay, new hamlet offices in Cambridge Bay, Kugaaruk, and Taloyoak, and the Taloyoak health centre, the local construction companies often complete only smaller portions of the work. Construction contacts are often structured in such a way that local construction companies are not able to present a successfully bid. Inaccessible contract structures are those that require a high number of skilled employees or large quantity of materials. As a result, much of the work for the construction projects mentioned above was undertaken by larger external contractors (Appendix V6-3B). Notwithstanding, there continues to be an interest in economic development, including the establishment of new businesses or adjustment of existing businesses to meet local demands (Appendix V6-3B).

Other challenges for business growth include access to funding for business start-ups, expansions, and capital purchases. However, there are a number of government services and programs available to provide grants and loans. Nevertheless, local businesses have difficulties raising the personal equity component required for funding (Appendix V6-3B).

Operators of existing businesses or those wishing to establish new businesses in the LSA and the RSA often encounter barriers (Cameron and Gabel 2015b). Some of the challenges to developing a viable local business include high start-up costs, lack of local financing options, lack of financial training including financial management skills, lack of enforcement of local-purchasing regulations, and difficulty in competing with non-local businesses (Cameron and Gabel 2015b). The high cost of living was recently described as a barrier to economic growth, as it limits individuals spending on goods and services (Appendix V6-3B). Development of mining operations is, however, seen as a potential economic benefit to local businesses that supply goods and services to the region, not only through the potential business contracts obtained from the development but also through an increased disposable income of residents that is essential in supporting local businesses (Cameron and Gabel 2015b).

Kitikmeot Qualified Businesses & Registered Inuit Firms

Through the Hope Bay IIBA, TMAC has established a listing of businesses that are pre-qualified for work with the Project to promote and maximizing opportunities generated by the Hope Bay Project (KIA & TMAC 2015). Kitikmeot Qualified Businesses are Inuit owned firms that are located in the Kitikmeot Region and recognized by the KIA as a business capable of doing work for TMAC (Table 3.2-14). All other Inuit Owned Firms or entities not on the Registry are counted separately.

The Kitikmeot Qualified Business Registry includes information on the name of the business, a brief description of the basis for inclusion, a description of the goods and services, relevant experience, bondability and contact information. At the time of this report, there were 37 Kitikmeot Qualified Businesses in the initial Registry, with most located in Cambridge Bay (22), three in Taloyoak, five in

Kugluktuk, and two in Gjoa Haven (Table 3.2-14). The list of businesses on the Registry will evolve and expand over time as additional businesses become qualified under the provisions of the IIBA.

Table 3.2-14. Kitikmeot Qualified Businesses as of November 2017

Business Name	Community	Comment
1984 Nunavut	Vancouver	Support Services to Nunavut Mining exploration sites, offering Medical Staff, Kitchen Staff, Local Hire Training & Programs
5136 Nunavut Ltd.	Cambridge Bay	Support services to Nunavut mining exploration sites, offering medical staff, kitchen staff, local hire training and programs
5296 Nunavut Ltd.	Kugluktuk	Unknown.
Qillaq Innovations (5140 Nunavut Ltd.)	Cambridge Bay	General contracting and retail sales of modular buildings
Angulaalik & Associates - Inuinnaqtun Language Services	Cambridge Bay	Language consulting, teaching, interpreting, and translating
Aqsaqniq Airways Ltd.	Taloyoak	Air charter services
Arktis Piusitippaa Inc.	Gjoa Haven	Unknown.
CAP Enterprises Ltd.	Gjoa Haven	Heavy equipment, construction, goods and services
Geotech Ekutak Ltd.	Cambridge Bay	Drilling - Surface and Subsurface
Ikakvik Kitikmeot Ltd.	Kugluktuk	Bridge design and installation
Inuinnait Services Ltd.	Kugluktuk	Bridge Design and Installation
Jago Services	Cambridge Bay	General Contractor, Electrical Contractor, HVAC Services, and Plumbing and Heating services and supplies.
Kikiak Contracting Ltd.	Kugluktuk	Trade and services
Kitikmeot Air Ltd.	Cambridge Bay	Fixed wing aircraft charter service
Kitnuna BBE Expediting Ltd.	Cambridge Bay	Expediting and logistics
Kitikmeot Blasting Services Ltd.	Cambridge Bay	Provide explosives and explosive related services
Kitikmeot Camp Solutions	Cambridge Bay	Camp Catering, Camp Management, Camp Sales and Retail, Modular Camp Structures, Potable Wastewater Treatment Plant, and Maintenance Services
Kitikmeot Cementation Mining and Development	Cambridge Bay	Underground mine development and training
Kitikmeot Cleaning Services	Cambridge Bay	Janitorial cleaning and retail
Kitnuna Corporation	Cambridge Bay	Trade and services
Kitnuna Corporation	Cambridge Bay	Expediting services
Kitnuna Projects Inc.	Cambridge Bay	General Contracting
Kitikmeot Helicopters Ltd.	Cambridge Bay	Helicopter contracting service
Lyall Construction Ltd.	Taloyoak	Gravel hauling and general contracting
Matrix Kitikmeot Logistics Ltd.	Taloyoak	Aviation Management, Logistics, and Camps.
Medic North Nunavut Ltd.	Cambridge Bay	Emergency medical Services and medical equipment supply
Nuna West Mining Ltd.	Cambridge Bay	Site preparation & infrastructure development, construction management and site earthworks, and infrastructure
Nunami Stantec Ltd.	Cambridge Bay	Environmental Science and Engineering Services
Nunavut Arctic Transportation Company	Cambridge Bay	Marine transportation industry
Nunavut Expediting Services Ltd.	Cambridge Bay	Expediting, camp building, and supply
Nunavut Resources Corporation	Cambridge Bay	Exploration finance, mine-related infrastructure development, regional infrastructure development and financing, investment banking and corporate finance advisory services
Nunavut Sealink and Supply Inc.	Iqaluit	Marine and marine transport services

Business Name	Community	Comment
QDC Logistics Ltd.	Cambridge Bay	Contractor for logistical services, aviation brokering, expediting, remote site management, camp buildings, remote site set up and maintenance
Sanaqatiit Construction	Iqaluit	Design & Build, General Contracting, Roofing, Architectural Metals, and Construction
Summit Air Kitikmeot Ltd.	Kugluktuk	Charter Cargo & Passenger Air Service
Toromont Arctic Ltd.	Iqaluit	Heavy equipment services and parts

Source: (KIA & TMAC 2017)

As outlined in the IIBA, Kitikmeot Qualified Business Contracts represent contracts for goods and services only open to bids from the Kitikmeot Qualified Businesses, whereas Open Contracts are for the provision of goods and services not provided by Kitikmeot Qualified Businesses. TMAC in collaboration with the KIA and other appropriate agencies will work to establish a bid preparation training program for Inuit. Contracts open only to bids from Kitikmeot Qualified Businesses will include the following categories:

- Air regional and site specific services
- Expediting
- Freight shipping
- Infrastructure planning, financing and related advisory – other than engineering, procurement and construction management services
- Catering and housekeeping
- Drilling – surface and subsurface
- Blasting services
- Earthworks and earthworks construction
- Surface mining
- Underground mining
- Environmental services
- Tire services – but not including supply of tires
- Medical and first aid
- Translation and cultural services, and
- Heavy equipment maintenance

With respect to new businesses in the territory, in 2017, there were 64 registered Inuit firms in the business registry maintained by NTI (Table 3.2-15). Eleven Inuit firms were added to the registry between 2015 and 2017. Of these, four were related to mining and mine development related activities. Many businesses in the Kitikmeot Region provide mining services, including four newly registered businesses in the last year. The development of these businesses may have been supported by the Doris North Project (development at the Doris mine preceding TMAC's proposed development at Madrid and Boston sites) or by other mining projects and exploration in the region. A number of businesses provide services not explicitly related to mining but do service the mining industry. Examples include: medical and safety services, expediting and logistical services, site management, catering, and janitorial services. A number of these businesses have benefitted from business opportunities associated with the Project.

Table 3.2-15. Profile of NTI Registered Inuit Firms in the Kitikmeot Region, 2017

Community	Name	Type of Business
Cambridge Bay	Qillaq Innovations [5140 Nunavut Ltd.]	General Contracting and Retail Sales of Modular Buildings
	Angulaalik Inuinnaqtun Language Services	Language consulting, teaching, interpreting and translating
	Aurizon Investments Ltd	Real estate investment, Residential housing complex and hotel
	Arctic Islands Lodge [Ikaluktutiak Co-operative Ltd.]	Store, Inns North Hotel and other hotel
	Kiilliniq Corporation Ltd	Property Management
	Kitikmeot Corporation	Construction, property management, land surveying, real estate
	Kitnuna Projects Inc.	Construction
	Kitikmeot Air Ltd	Fixed wing Aircraft charter service
	Kitikmeot Cleaning Services	Janitorial cleaning & retail
	Kitikmeot Helicopters Ltd	Helicopter contracting service
	Kitnuna Expediting Services Ltd	Expediting services
	Kitikmeot Camp Solutions Limited	Camp Catering, Camp Management and Janitorial Services
	Kitikmeot Cementation Mining and Development Ltd	Underground Mine Development and Training
	Kitikmeot Blasting Services Ltd.	Provide Explosives and explosive related services
	Medic North Nunavut Ltd.	Emergency medical Services, medical equipment supply
	Nuna Logistics Limited	Freight hauling, Open Pit Mining, Crushing, Training Services, Mine Site Services & Construction, Mine Site Infrastructure Rental
	Nunavut Expediting Services Ltd	Expediting, camp building & supply
	Kalvik Enterprises Incorporated	Construction, Renovations, Repairs, Rentals
	Kitnuna Corporation	Trade & Services
	Kitnuna Petroleum Ltd	Trade & Services
	Kitnuna Pharmacy Ltd	Pharmacy Services, Medical Supplies
	Kitikmeot Region Properties Inc.	Real Estate Development
	NATCO [Nunavut Arctic Transportation Company]	Marine Transportation Industry
	Inukshuk Enterprises Ltd	Construction, Cartage, Garage, Property management, Arcade
	Nanook Woodworking Ltd.	Carpentry and Furniture Manufacturing, Renovation
	5093 Nunavut Ltd. [Jago Services Inc]	Plumbing, Heating and Electrical
	Wolf Tracks Taxi/Amagok Tumi Taxi [Otokiak, Amanda]	Taxi Services/Rentals
	Northwest Passage Mechanical [5364 Nunavut Ltd]	Plumbing and Heating
	Kitnuna BBE Expediting Ltd.	Expediting and Logistics
	Nunavut Resources Corporation	Exploration Finance, Mine-related Infrastructure Development, Regional infrastructure Development and Financing, Investment Banking & Corporate Finance Advisory Services
	Nuna West Mining Ltd	Site Preparation & Infrastructure Development, Construction Management & Site Earthworks & Infrastructure
	Geotech Ekutak Ltd.	Drilling and underground Drilling
	Kitikmeot Tire Mine Service Ltd.	Supply Tire and Tire Services and related products/services.
	A&R Cleaning Ltd	Janitorial Services
	Go Cargo Taxi Limited	Taxi & Vehicle Rentals

Community	Name	Type of Business
Gjoa Haven	CAP Enterprises Ltd	Heavy Equipment, Construction Goods and Services for Gjoa Haven
	CAP Enterprises Ltd. [4660 Nunavut Ltd]	Outfitting and Tourism
	Arktis Piusitippaa Incorporated	Engineering, professional consulting services
	Amundsen Hotel [Qikiqtaq Co-operative Ltd]	Store, Inns North Hotel and other hotel, POL, Post Office
	Tamarvik Suites [Porter, Megal and Aglukkaq Sylvia]	Hotel Accommodations
	North Star Taxi [Porter, Stanley]	Taxi
	Mitqut Construction Inc.	Construction
	Pana Construction	General Contractor
	Wallace Services [Porter, Wally]	Renovations, General Construction, Vehicle Rentals, Property Management
Kugaaruk	Inukshuk Inn [Koomiut Co-operative Association]	Store, Inns North Hotel and other hotel
	Guys Arctic Char	Harvest and Sell Arctic Char
Kugluktuk	5296 Nunavut Ltd	General Office Support Services
	Ryfan Kitikmeot Ltd.	Construction and Contracting
	JMS Supplies Ltd	Retail sales of building supplies, residential furniture, recreational vehicles and outdoor equipment
	Aivgak Services Ltd	Convenience Store, Restaurant, Taxi
	Kikiak Contracting Ltd	Trade and Services
	Kugluktuk Co-operative Ltd	Store, Cable TV, POLI
	Summit Air Kitikmeot Ltd.	Air Charter Services including rotary wing and fixed wing for cargo and passenger transportation
	Akhak Mining Services Ltd.	-
	Atco-5296 Buildings and Services Ltd	Camp Projects - Servicers, facilities maintenance and logistic services contractor
Taloyoak	Lyall Construction Ltd	Gravel hauling and general contracting
	Boothia Ventures Ltd	Hotel
	Aqsaqniq Ltd	Hotel and restaurant, cable, general contracting
	Aqsaqniq Airways Ltd	Air Charter Services
	Paleajook Co-operative Ltd	Retail, Inns North Hotel and other hotel, Cable TV, Post Office
	Tuqanie Truck Rental	Truck Rental
	Matrix Kitikmeot Logistics Ltd	Camps, Logistics and Aviation Management
Yellowknife	Arctic Coast Enterprise Ltd	Property Management, Leasing of equipment

Source: (NTI 2017)
Note: Businesses appear same as in the registry.

Kitikmeot Region Business Development & Project Spending

The previous development and operation of the Doris North Project, and other mining activities in the region, have contributed to business development, particularly in Cambridge Bay. Many of the businesses poised to benefit from the development of the Project are likely also those that supported, and benefitted from the development of the Doris North mine. For example:

- In 2013, a total of $8.3 million in contracts went to Inuit-owned and/or Kitikmeot-based businesses.

- In 2014 (January through December), TMAC awarded approximately $14.5 million in contracts to Inuit-owned businesses, plus $3 million to Kitikmeot-based businesses; together, this amounted to approximately 40% of the total contract spending and more than double the amount awarded in 2013.
- For 2015, TMAC contractor spend totaled $24.6 million to Kitikmeot Qualified Businesses, plus $5.2 million to other Inuit-owned businesses. Overall spending on Inuit-owned businesses (including Kitikmeot Qualified Businesses) amounted to $29.7 million, representing 42% of total spending on the Project (excluding processing plant and diesel costs). This represented a 70% increase over the total value of contracts allocated to Inuit and Kitikmeot businesses in 2014.
- For 2016, TMAC's contractor spending totalled $47.7 million to Kitikmeot Qualified Businesses, plus $5.9 million to other Inuit-owned Businesses. This amounted to a total of $53.6 million in contracts awarded to Inuit-owned businesses for the period, representing approximately 34% of total contract spending and an 80% increase over the previous year.

3.2.5.6 Community Infrastructure and Public Services

The following section describes community planning; health and recreation facilities and services; communities, utilities, and waste management, emergency response services, and regional transportation and shipping.

Community Planning

Each Kitikmeot community has a community plan[27] that defines the policies for managing development in a manner that reflects the needs and aspirations of the community. Background reports describing population overviews, housing forecast, and identification of community needs and priorities each contribute to the overall community plan (Appendix V6-3B).

As the regional hub, Cambridge Bay experiences comparatively large capital investments. Between 2012 and 2017, around $480 million in capital investments were made in Cambridge Bay. CHARS has been an important driver of the local economy in Cambridge Bay and resulted in increased construction, the development housing, and new businesses including restaurants and hotels. The community is looking forward to additional trickle-down effects from CHARS and the incoming resident scientists and their families, which are expected to result in additional services such as daycare, restaurants, and personal services. Future planning is focused on the growing tourism industry, and the Hamlet is pursuing opportunities for year-round tourism (Appendix V6-3B).

Recent capital and other investments in Kugluktuk include the development of a six-bay garage and new equipment (trucks and graders), the development of the heritage centre (Ulu building), increased wellness programming, improved water delivery services, and improved road maintenance and equipment. There has also been a recent effort to clean up the community, and develop a separate industrial centre, away from residences. A future focus for the community is the proposed development of a continuing care facility. The Hamlet of Kugluktuk is also exploring the delivery of tourism programs, leveraging the growth of tourism in Yellowknife (Appendix V6-3B).

Improved stability in the delivery of public services in Taloyoak is an important success in the community in recent years. New infrastructure has been developed in the community, including a water plant, hamlet building, health centre and power plant. There is a new airport terminal that is

[27] Based on key informant interviews, the following presents community successes and future plans for each of the Kitikmeot communities, with the exception of Gjoa Haven. Community planning information for Gjoa Haven was not available during the 2017 community research program.

currently under construction. The community hall has undergone renovations. The Taloyoak hamlet is planning to train and certify Class 3 drivers for the water delivery trucks. Taloyoak is now filling a second landfill and the hamlet has considered looking for partnerships with industry to help backhaul supplies out of the community (e.g., old cans, batteries; Appendix V6-3B).

A new hamlet office opened in Kugaaruk in October 2017 and includes a kitchen and community hall for local events. Local residents are interested in expanding existing businesses (e.g., contractors) and developing new businesses, including a taxi service and bakery. Sadly, Kugaaruks' only school was lost to fire in early 2017. Despite the loss, school classes have continued at a variety of locations throughout the community and Kugaaruk has the highest attendance rates in the region. The construction of a new school building is underway (Appendix V6-3B).

Local Accommodation

Each community in Nunavut has at least one hotel that provides accommodation and restaurant/meal service that are often associated with or owned by the local Co-op (Table 3.2-16). Table 3.2-16 provide a listing of the licenced tourist establishments (hotels, lodges, and bed & breakfast businesses) in the Kitikmeot region, the region has a total licenced capacity of 327 guests including 185 in Cambridge Bay.

Table 3.2-16. Tourist Establishments (Hotels) in the Kitikmeot Region (2017)

Name	License Holder	Type of Operation	Outfitter Licence	Nunavut Based	Max Capacity
Admundsen Hotel	Qikiqtaq Co-Operative	Gjoa Haven Hotel	No	Yes	30
Arctic Islands Lodge	Ikaluktutiak Co-Operative	Cambridge Bay Hotel	No	Yes	73
Arctic Vision Bed & Breakfast	Arctic Vision Bed & Breakfast	Kugluktuk Bed & Breakfast	No	Yes	3
Boothia Inn	Aqsaqniq Ltd.	Taloyoak Hotel	No	No	16
Coppermine Inn	Coppermine Inn Ltd.	Kugluktuk Hotel	No	Yes	23
Enokhok Inn and Suites Kugluktuk	Enokhok Developments	Kugluktuk Hotel	No	No	24
Enokhok Inn and Suites	Enokhok Developments	Cambridge Bay Hotel	No	No	21
Gjoa Haven Bed & Breakfast	4660 Nunavut Ltd.	Gjoa Haven Bed & Breakfast	Yes	Yes	34
Green Row Executive Suites	Aurizon Investments Ltd.	Cambridge Bay Hotel	No	Yes	49
Inukshuk Inn	Koomiut Co-Operative	Kugaaruk Hotel	No	Yes	12
Qillaq Lodge	5140 Nunavut Ltd. – Qillaq Innovations	Cambridge Bay Lodge	No	Yes	30
Umingmaktok Lodge B&B	Jago Services Ltd.	Cambridge Bay Hotel	No	Yes	12

Source: (GN DED&T 2017)
Notes: Other licenced Tourist Establishments in the Kitikmeot Region (e.g., outpost camps and lodges) are discussed in the Land Use Effects Assessment (Volume 6, Chapter 4).

Local Retail and Food Services

The Co-op stores sell groceries, clothing, a range of household goods and offer TV and cable services. The Co-op also maintains the service contract[28] for delivery of petroleum, oil, and lubricant for the

[28] This is a 10-year contract that has been recently renewed.

communities. The Co-op is a member-owned institution, and members receive annual dividends. In Cambridge Bay, Gjoa Haven and Kugaaruk, the Inns North hotels and associated restaurant are managed through the Co-op. In Gjoa Haven, there is a coffee shop that also serves hot food in the Co-op. In Kugluktuk, a new restaurant providing coffee and lunch opened inside the Co-op store in October 2017; this new service resulted in new employment including service delivery and management roles (Appendix V6-3B).

The main competition for the Co-op is the Northern Store, which has a presence in each community, with the exception of Kugaaruk. The Northern Store in Cambridge Bay offers Pizza Hut and KFC food services. The Northern Stores sell food and household products and also offer some financial services (e.g., cheque cashing, cash transfers, automated teller machines [ATMs], in-house tax assessment). The Northern Store also provides basic support to service snowmobiles and ATVs. Future plans for the Northern Store vary across the region. In Kugluktuk, the store intends to expand and include Tim Horton's and Taloyoak is scheduled for renovations in 2019 and plans to develop a separate convenience store that will serve hot food (e.g., pizza or Tim Hortons). The two stores remain fairly price competitive[29] while offering slightly different products. Both the Co-op and Northern Stores bring in seasonal products (e.g., for holidays, for fishing/camping season), and there is fairly stable demand and provision of product (Appendix V6-3B).

Preliminary estimates for the total sales of the food services and drinking places industry in Nunavut indicate a decrease of -9.8% between September 2016 and September 2017. Comparatively, there was an increase of 5.2% for Canada as a whole over this time period. Similarly, sales of alcoholic beverages in Nunavut totaled $5,568,000, which represented a decrease of -29% between 2014/2015 and 2015/16 (NBS 2017a).

There are a variety of food services in the Kitikmeot communities. In Cambridge Bay, there are two grocery stores (the Northern Store and the Ikaluktutiak Co-op), two convenience stores (Kalgen's Dis & Dat Convenience Store and Olapkivik Game Hall), a meat packer (Kitikmeot Foods Ltd), and several restaurants and coffee shops (Arctic Islands Lodge, Qillaq Lodge, Quick Stop, Saxifrage Resto-Café and the Kuugaq Cafe). The Northern Store offers both fresh and frozen foods, and other household items. A feature of the Northern Store, the Quick Stop restaurant/snack bar, offers KFC and Pizza Hut options among other choices. The Ikaluktutiak Store is a department store that includes a grocery section, as well as household items and hardware. The convenience stores offer a limited selection of groceries and snacks. The Kitikmeot Foods packages and sells locally harvested speciality meat and fish products including Arctic char and Nunavut muskox. Dinning is available at the Arctic Islands Lodge that is open for breakfast, lunch and dinner, as well as coffee during hotel hours; the lodge also provides catering services. The Qillaq Lodge offers take out and catering services. The Saxifrage Resto-Café serves breakfast, lunch, and supper; takeaway and catering are also offered. Finally, the Kuugaq Café offers menu items, takeout and catering services (Cambridge Bay 2017).

The Northern Store has also locations in other Kitikmeot communities including Gjoa Haven, Kugluktuk (including the Quick Stop snack bar), and Taloyoak (NorthMart 2017). A co-op store is in Kugaaruk (Koomiut Co-operative), Kugluktuk (Kugluktuk Co-operative, that also includes a coffee shop), Taloyoak (Paleajook Eskimo Co-operative), and Gjoa Haven (Qikiqtaq Co-operative) (Arctic Co-op 2017). The Amundsen Hotel in Gjoa Haven offers dinning and catering (Gjoa Haven 2017). Gjoa Haven also has two convenience stores, the Gjoa's Smoke Shop and Gjoa's Arcade (Explore Nunavut 2017a).The Inukshuk Inn in Kuggaruk offers dinning services (Kugaaruk 2017). In Kugluktuk, two hotels, the Coppermine Inn and the Enokhok Inn, offer restaurant services for guests only; Coronation Restaurant & Catering Ltd

[29] Most items for retail sale are sourced from Winnipeg, Edmonton or Yellowknife.

offers camp catering services, take out and bake goods (Explore Nunavut 2017b). Another hotel in Taloyoak, the Boothia Inn, also offers restaurant and catering services (Explore Nunavut 2017c).

Childcare

There were nine licenced childcare facilities in the Kitikmeot region in 2017/18 including:

- two facilities in Cambridge Bay providing spaces for ten infants and 46 preschoolers, in total (Cambridge Bay Childcare Centre and Omingmak Preschool);
- three in Kugluktuk providing spaces for 13 infants and 53 preschoolers, in total (Kakayak Daycare, Kugluktuk Aboriginal Head Start, and Ilaliuvik Daycare);
- one in Gjoa Haven providing spaces for 22 preschoolers (Gjoa Haven Aboriginal Head Start);
- two in Taloyoak providing spaces for seven infants and 37 preschoolers, in total (Innitait Daycare and Taloyoak Aboriginal Head Start); and
- one in Kugaaruk providing 24 spaces for preschoolers (Taloyoak Aboriginal Head Start (GN 2017).

The Cambridge Bay Childcare Society is a 46-space daycare centre providing full-time, part-time, and after school care for children ages six month to six years. There are ten spaces for children ages six months to 18 months, and 36 spaces for children ages 18 months to six years (Municipality of Cambridge Bay n.d.). The school in Kugaaruk provides pre-school for children that are four years of age (Appendix V6-3B). Kitikmeot daycare facilities have had challenges maintaining services due to difficulties with financial administration, board management, vandalism, and staff training, among others.

Health Facilities and Services

Each community in the Kitikmeot region has a health centre that serves as the focal point for the delivery of health care and social services. Community health centres provide access to a wide range of services to meet the health service needs of the residents, which include assessment, treatment, and prevention. Health centres are operated and staffed by the GN. Essential services are generally provided on a full-time basis while other services are provided at intervals by rotating health professionals through Stanton Hospital in Yellowknife. The Kitikmeot regional headquarters for the Nunavut Department of Health is in Cambridge Bay, with two additional offices in Kugluktuk (Appendix V6-3B).

Health care services can be broadly classified as consisting of (1) the treatment of illness or injury and (2) public health, services and programs. Health care is delivered by different community health care and social service providers that include the following:

- Community Health nurses – provide assessment and primary, direct care to patients (e.g., injury or illness).
- Community Health Representatives (CHRs) – deliver public health programs that include Well Woman, Well Child, Well Man, and Prenatal programs. Information topics include disease prevention, healthy eating, and drug and alcohol awareness, among others (Appendix V6-3A).
- Home and Community Care workers – these workers serve clients who require extra care due to illness, poor health, or disability.
- Mental Health workers – provide assessment, counselling, treatment, and referrals to clients with mental health issues.

- Community Social Service workers – support the delivery of government services related to child protection, adoption, guardianship, adult support, residential care, and family violence services.
- Doctors (general physicians) work at the clinics regularly, on a rotation of around one week per month. There is a full-time doctor at the health centre in Cambridge Bay (Appendix V6-3B).
- Health centres may also be staffed with a psychiatric nurse and/or a dental therapist.

Filling vacant positions in many areas of health care has been a continuing struggle for the GN (GN Department of Health and Social Services 2010). Specialists visit community health centres on a rotational basis to provide services (e.g., audiology, vision, obstetrics, gynaecology, paediatrics, psychiatry, dentistry, and orthodontics; Appendix V6-3B). Nursing staff may contact on-call physicians outside of the region by phone to seek advice on the treatment of a case (Appendix V6-3A). Communities are also connected to a video teleconferencing system ('tele-health'), which connects patients to physicians and specialized health professionals located in larger centres.

The Kitikmeot Health Centre in Cambridge Bay is the largest in the region and provides additional services not offered in other communities. This includes diagnostic services (i.e., medical laboratory, x-ray services, and endoscopy) and midwife services. In-patient care is also provided for both adults and children. The Kitikmeot Health Centre also serves as the training centre to provide orientation and mentorship to newly recruited community health professionals (Nunavut Department of Health and Social Services 2008). Additional health supplies for the region are kept in warehouse at the health centre in Cambridge Bay. There is a pharmaceutical technician in Cambridge Bay (Appendix V6-3B).

Further detailed discussion of the local health centres in the Kitikmeot, including a full listing of staff for each of the Kitikmeot communities, is provided in the Madrid-Boston Community Research Report (Appendix V6-3B).

Mental Health Facility

A mental health facility has been established in Cambridge Bay in lieu of the previously proposed residential addictions treatment center. The facility has the capacity to house 12 clients. The change in focus is linked to the Nunavut Suicide Prevention Strategy which outlines the need to improve infrastructure to provide better mental health services (Nunatsiaq News 2014b).

The Cambridge Bay mental health facility is open to patients from throughout the region but typically used by local residents. The facility is staffed by psychiatric nurses and provides counselling and life skills support. The facility is generally used as an 'in-between' service for people coming from addictions treatment programs outside the community and often provides shelter to people with nowhere else to go; the mental health centre is usually at capacity and the only other mental health facility in Nunavut is in Iqaluit (Appendix V6-3B).

Community Wellness Centres and Services

Each hamlet in the Kitikmeot Region operates a wellness centre/department and administers programs aimed at promoting healthy living habits and the development of community. These programs also work closely with health care, social services, and the RCMP. Wellness programs aim to take a holistic approach to improving the health and well-being of community members (DHSS 2006). Community wellness centres have coordinated the implementation of a number of programs, including:

- Pre-natal care – instruction in nutrition, cooking, sewing, and the use of country foods.

- Aboriginal Head Start – the pre-school program developed by the Government of Canada (Public Health Agency of Canada 2011) that focuses on early intervention for education, health, culture and language, nutrition, social support, and includes parental involvement.
- Children – food and education services as well as arts and crafts, story time, and moms and tots drop-in sessions.
- Youth – structured activities, such as sports, games, and movie nights at the youth centre.
- Elders – this program typically involves group activities at an Elders' Palace (a centre for Elders) and the operation of Health Foods North (food delivery to the home).
- Family violence – this initiative includes emergency shelter services for women and children and the delivery of support programs.
- Alcohol, gambling, and drug additions – programs consist of counselling services and public education and awareness campaign, which may include Alcoholics Anonymous and Alateen (i.e., a weekly discussion group for teens with abuse in the family due to alcohol abuse).

Nunavut has a territorial wellness coordinator that oversees wellness programming and community coordinators (or regional wellness program coordinators). As of 2011, two of the five Kitikmeot communities (Kugluktuk and Kugaaruk) had developed Community Wellness Plans as part of a pilot project funded by Health Canada (NTI 2011). The key health and wellness challenges facing the communities are substance abuse, addiction, and mental health[30]. These challenges have been consistent over the last few years or have increased due to inter-generational exacerbation (Appendix V6-3B).

The hamlet of Cambridge Bay has operated a Wellness Centre for over 25 years and provides numerous programs and services that fill the gap in locally available social services. The Wellness Centre's mandate is to assist people in becoming independent, healthy, and safe (The Municipality of Cambridge Bay 2015). Recently, the need to establishing wellness programming specifically for men has been identified as requiring additional sources (Appendix V6-3B).

Elder Care Services

There are two continuing care facilities in the Kitikmeot, a nine-bed facility in Gjoa Haven and the newly opened (February 2017) eight-bed facility in Cambridge Bay[31]. Both are operated by the GN Department of Health and are at capacity with waitlists. Other community-level Elder care is provided by home care workers though care if often provided by family members (Appendix V6-3A). Some Elder care services are available through the individual hamlet wellness programs. The Kugluktuk hamlet has proposed to develop a long-term care facility (Appendix V6-3B).

Additional description of Elder care and the continuing care facilities and services is provided in the Madrid-Boston Community Research Report (Appendix V6-3B).

Emergency Shelters

The GN DFS is responsible to provide and operate emergency shelters in the Kitikmeot region. Currently emergency housing is available in Cambridge Bay, Kugaaruk, and Kugluktuk (Nunatsiaq News 2014a)(Appendix V6-3B). The Crisis Shelter in Cambridge Bay which operates in partnership with the

[30] Mental health issues may be related to addiction but are also often related to the legacy impacts of colonization and the residential school system (K. Foote, *pers. comm.*).

[31] These facilities are two of the three continuing care facilities in Nunavut. The third is located in Igloolik (Community Research Program 2017).

Community Wellness Center provides shelter to women and children (Cambridge Bay Community Wellness Center n.d.). Different forms of emergency housing have existed in the other Kitikmeot communities over time. The Wellness Centre in Cambridge Bay recently opened a men's shelter as well (December 2016; Appendix V6-3B.),

Recreation Programs and Facilities

Recreation in the communities is funded by hamlets and overseen by coordinators responsible for the delivery of programs and management of facilities (i.e., ice arena, community hall). Program availability varies by community and is based on local demand, infrastructure, and funding. Recreation programs focus on youth (Appendix V6-3A) and include regular events such as boys' and girls' basketball, ping pong, music club, fitness program, ice hockey, curling, bingo, and weekend dances. Special events may include hockey tournaments, Christmas games, Arctic games, volleyball, cribbage tournaments, community feasts, and fishing derbies, as well as Canada Day and Nunavut Day celebrations (Appendix V6-3A). The state of recreation facilities may pose a challenge to the provision of programming; for example, the hockey arena in Cambridge Bay was recently closed as a result of health concerns (Appendix V6-3B). Further details describing the recreation programs and facilities in each Kitikmeot community, including a listing of recreational facilities and programs, are provided in Appendix V6-3B.

There is a newly established heritage park with cultural exhibits in Cambridge Bay behind the hamlet building. This area is for public use and may include space for artists and others to display and sell arts and cultural products in the future (Appendix V6-3B).

Communications, Utilities, and Waste Management

Water and sewer services are provided by the hamlet and include water delivery and sewage pump-out by truck. In addition, Cambridge Bay has piped water supply to a number of buildings (Municipality of Cambridge Bay 2015). The GN owned Qulliq Energy Corporation (QEC) provides electricity to all communities in Nunavut. QEC generates and distributes power to all 25 Nunavut communities through the operation of 25 standalone diesel plants. Within the Kitikmeot, electrical and line maintenance is provided from Cambridge Bay (QEC 2014).

Communication services in the Kitikmeot Region include internet and phone services. Both are provided via satellite. High-speed internet services are available through Qiniq, Netkaster, and NorthwesTel. Qiniq is an Inuit-owned service provider offering wireless broadband internet via satellite in 25 Nunavut communities. In July 2015, the federal government announced that $35 million will be made available for Qiniq to double internet download speeds and make upgrades to the satellite-based internet service in Nunavut (CBC News North 2015b). In 2017, $50 million in federal funds was announced for Nunavut as part of the Connect to Innovate program which invests in new broadband infrastructure project that connect public institutions like schools and hospitals as well as for backbone upgrades and last-mile projects for households and businesses lacking service speed of 5 Mbps (Nunavik Communications 2017).

Emergency Response

Each community health centre provides medical emergency response. Emergency transportation is provided by the RCMP or personal vehicles with the exception of Cambridge Bay which has a hamlet-operated ambulance service. There is an RCMP detachment and a volunteer fire department in each community.

Medical Evacuation

Patients with emergencies that cannot be addressed by the level of treatment available at community health centres are medically evacuated, typically to Stanton Territorial Hospital in Yellowknife, NWT. Non-emergency cases requiring a full-service hospital or medical specialists are also transported out of the community to Stanton Territorial Hospital; medical travel to Edmonton and other centres also occurs on an as needed basis (Appendix V6-3B). Transported cases include those needing access to specialized medical expertise for neurology, dermatology, rheumatology, oncology, orthopaedics, and urology, among others. Medical evacuation response times can fluctuate (Appendix V6-3A; Appendix V6-3B).

Search and Rescue

Search and Rescue services in the Kitikmeot region vary based on a number of factors including the time of year, whether the search is land or water based, the danger severity, availability of resources, and level of local organization. In the case of a person or group overdue in non-life threatening conditions, a private search by friends and family is a usual first response. In the case that the danger to missing or overdue persons is high or a private search is unsuccessful, a community based search is initiated. This type of search is initiated by the Nunavut Emergency Measures Office (EMO) under the Nunavut Emergency Measures Act. The Nunavut EMO may task the use of available resources such as the local RCMP, Canadian Rangers Patrol, local Search and Rescue Organization (SARO), and suitable private and military aircraft as required to assist in the search. Regional helicopter companies support search and rescue activities, including Kitikmeot Helicopters (based in Cambridge Bay), Great Slave Helicopters (Kitikmeot/Gleat Slave Helicopters 2015), and the Canadian Helicopters Company (Kitikmeot Corporation 2015b). Search and rescue activities may be coordinated by the RCMP and Canadian Rangers (CBC News North 2015a), and may involve the Canadian Coast Guard for marine operations.

All Kitikmeot Hamlets except Kugluktuk maintain a local search and rescue committee that is recognised by the Nunavut EMO as a local SARO for search and rescue purposes. In Kugluktuk, a separate society has been formed to perform SARO duties. In the case of marine based search and rescue, the Canadian Coast Guard is the lead responsible agency. Additional information about the search and rescue services in the Kitikmeot region is provided in the Madrid-Boston Community Research Report (Appendix V6-3B).

Fire Protection

A volunteer fire department provides fire protection services in each community. Each hamlet has basic fire-fighting equipment.

Law Enforcement and Crime Prevention

RCMP in each community provides policing services including: law enforcement, criminal investigation, crime prevention, the swearing of legal documents, driver licencing, and community justice. The RCMP also assist Social Services and Mental Health Services, and provide first response and patient transport to the health centre, as required (Appendix V6-3A; Appendix V6-3B).

RCMP staffing varies by the size of the community and the local service demand (Appendix V6-3B). At a minimum, RCMP policy requires stationing at least two officers in each community, though it is not uncommon to have as many as five full-time officers in the larger communities. Emergencies that require specialized policing services or additional officers typically utilize RCMP staff stationed in Iqaluit or Yellowknife (Appendix V6-3A; Appendix V6-3B). RCMP officers also participate in a number of

community-based programs[32] including the Junior Rangers Program and assist municipal Bylaw Enforcement Officers (Appendix V6-3A; Appendix V6-3B). Basic equipment available to RCMP includes trucks, ATVs, and snowmobiles, and some detachments have a boat (Appendix V6-3A; Appendix V6-3B).

The most common circumstance requiring police response in the Kitikmeot region involves adults and domestic violence or disturbance, many of which are fuel by alcohol and to a lesser extent, drugs (Appendix V6-3B).

Paramedic

Professional ambulance or paramedic services are not available in most of the Kitikmeot communities. Cambridge Bay, however, has an ambulance service that is staffed by volunteers. Ground transportation for trauma patients and emergencies may be undertaken by patients, assisted by the nursing staff, the RCMP or others (Appendix V6-3A; Appendix V6-3B).

Regional Transportation and Shipping

Sealift barges deliver annual provisions to communities during the ice-free period. The sealift includes food, household items, construction supplies, heavy equipment, and fuel, among other supplies that are needed throughout the year. The shipping ports that service the region include Hay River and Inuvik, NWT, and Ste-Catherine, Quebec. In past years, shipping ports have also included Becancour and Valleyfield, Quebec. Most communities in Nunavut obtain sealift re-supply services directly from private carriers, except for the station at Eureka on Ellesmere Island and Kugaaruk, whose sealift resupply is first delivered to Nanisivik by Nunavut Sealift and Supply Inc. (NSSI)[33] or Nunavut Eastern Arctic Shipping (NEAS) and then delivered to their final destination by the Canadian Coast Guard (Gregoire 2014). With the exception of Kugaaruk, the Kitikmeot communities receive barge service from the Northern Transportation Company Ltd. (NTCL) or NSSI annually (NSSI 2015; NTCL 2015a).

The 2014 sealift delivery by the Canadian Coast Guard from Nanisivik to Kugaaruk was disrupted by heavy ice between the usual anchorage location and the beach which did not allow cargo to be lightered by barge. Some cargo was transferred by the onboard helicopter, but three-quarters of the total cargo to supply Kugaaruk for the year could not be landed and was returned south to Churchill to be remarshalled in 2015. This was the first time since 1994, when the Canadian Coast Guide began providing service to Kugaaruk, that the delivery was not possible (Department of Community and Government Services 2015). In 2015, NSSI delivered directly to Kugaaruk for the first time (A. Buchanon, *pers. comm.*).

The 2015 delivery schedules for NSSI, NTCL, and NEAS do not include a schedule service to Bathurst Inlet and Omingmaktok , although NTCL has retained a pricing schedule for both (NEAS 2015; NSSI 2015; NTCL 2015b). In 2017, NSSI made three stops in Cambridge Bay and one stop in each of the other Kitikmeot communities (NSSI 2017). NEAS made one stop in each of the Kitikmeot communities with the exception of Kugaaruk (NEAS 2017).

Recently, the NIRB approved the construction of an $85 million dep sea port project in Iqaluit that was provide each of Nunavut's 25 communities with access to 24-hour sealift carriers, facilities the delivery of dry cargo and fuel. Construction of the new port is slated to begin in summer 2018 and is expected to be operational by 2021 (ESDC 2017a).

[32] Further description of the community-based programs the RCMP participate in is provided in Appendix V6-3B.
[33] NSSI is a company under the Kitikmeot Corporation.

All Kitikmeot communities with the exception of Bathurst Inlet and Omingmaktok are accessible by scheduled air travel provided by First Air and Canadian North. Air travel is used for cargo deliveries as well as passenger travel. All communities are also serviced by chartered air travel by a number of companies based in Yellowknife and Edmonton. Other types of traffic include marine vessel and ATV in the summer months and snowmobile during winter months. Cruise ships also operate in the area especially through the renowned Northwest Passage (Arctic Co-op 2017; Cambridge Bay 2017; Explore Nunavut 2017a, 2017b, 2017c; Gjoa Haven 2017; Kugaaruk 2017; NorthMart 2017)

3.2.5.7 Housing

The challenging housing circumstances in Nunavut today stem from the settlement of Inuit by the federal government in the 1950s and 60s. At the time, the government made promises to provide free or low rent housing to entice Inuit to settle in permanent communities. The policy of the federal government was to settle Inuit into communities and to provide a family allowance (welfare/social assistance) to those who agreed to participate in western education (i.e., residential schools, at the time). The first homes provided by government demonstrated a lack of understanding of the north and of Inuit culture: the homes provided were poorly constructed[34], the materials used were not appropriate for the northern climate, and not enough homes were provided. A senate committee recently acknowledged that "*Despite these conditions…many Inuit were forced to remain in the settlements.*" (Dyck & Patterson 2017).

Types of Housing

Today, housing circumstances and costs in Nunavut differ from those that typify most of Canada. The most common type of housing tenure in Nunavut is public, government-subsidized housing (approximately 57%; (NHC 2017; Statistics Canada 2017d). Private housing accounted for less than a quarter of units in the Kitikmeot Region in 2011 (Statistics Canada 2012c) and less than a fifth in 2016 (Statistics Canada 2017d). Private home ownership is challenging to develop and expensive to maintain and as such, private home ownership is generally not recommended to anyone who earns under $120,000 annually (Appendix V6-3B*)*. There is a fledgling private housing market in Cambridge Bay; however, this is unique among the Kitikmeot communities (Appendix V6-3B).

A third type of housing tenure in Nunavut is subsidized staff housing, commonly provided for GN employees, including teachers, nurses, government workers and others who relocate from southern Canada and elsewhere. Staff housing and private market rental units form less substantial proportions of available housing in the communities. The NHC maintained 1,511 staff housing units in 2016 (NHC 2017). A majority of staff housing in NHC's portfolio is leave to the GN (NHC 2017).

A form of private housing in Nunavut includes private housing owned by businesses for short-term use as rental accommodation for employees. For example, some local construction contractors have acquired private housing units to accommodate workers (including skilled tradespersons) from outside the community, as hotel accommodations are often limited. Some of these businesses have expanded to also provide privately owned housing for rent by their employees, or as part of an employment contract. For example:

- Jago Services in Cambridge Bay owns six housing units which are commonly used to accommodate tradespeople brought into the community for short-term work. At times, the units are leased to other businesses in the community (Appendix V6-3B);

[34] These first homes have been described as "basically a square box with no utilities and wooden walls with hardly any insulation" (Dyck & Patterson 2016).

- Lyall Construction in Taloyoak installed trailers with space to accommodate up to 23 people and currently house the construction crew that is building the new airport terminal (Appendix V6-3B); and
- CAP Enterprises in Gjoa Haven has a number of short-term rental properties which are used by work crews (Appendix V6-3B).

Finally, as discussed earlier in the chapter, the NAC Cambridge Bay Campus provides housing for students who are enrolled in post-secondary education. The NAC Cambridge Bay campus provides two 3-bedroom, eight 2-bedroom, ten 1-bedroom units, plus accommodation for single students in five apartments for four students each (Appendix V6-3B).

The Cost of Providing Public Housing

The Nunavut Housing Corporation (NHC) is mandated to create, coordinate, and administer housing programs and provide fair access to a range of affordable housing options for families in Nunavut (NHC 2014c). The NHC administers public and GN staff housing units through local housing organizations (LHOs) that are located in each community in Nunavut. The annual budget of the LHOs in the Kitikmeot was approximately $7 million for 2015 (Table 3.2-17).

Table 3.2-17. Kitikmeot District LHO Operating Budgets (2015 to 2016)

Community	Operating Budget
Cambridge Bay	$1,407,852
Kugluktuk	$1,735,881
Gjoa Haven	$1,423,712
Taloyoak	$1,395,215
Kugaaruk	$1,092,664
Kitikmeot Total	$7,055,324

Source: Conroy (2015)

The NHC's total revenues are mainly comprised of transfers from the GN and CMHC (93%). GN contributions increased by 21% over four years and accounted for 83% of NHC's revenues in 2016/17 (NHC 2017). The 2016 federal budget included $76.7 million over two years through CMHC's Investment in Affordable Housing (IAH) initiative, which supports social housing in northern Canada (Dyck & Patterson 2017).

New public housing construction in the Kitikmeot communities will help address the housing need (Appendix V6-3B). Construction costs are high in Nunavut, about three times the cost of southern construction. The average cost of new public housing in Nunavut is $400,000 to $550,000 (NHC 2016). However, available funding for public housing falls short of the demand and, based on the current trends, construction continues to fall further behind the increasing need of a growing population. Public housing stock and need levels in each community are discussed in more detail later in this section.

In addition to funding for new housing, the NHC administered the cost of 5,153 public housing units in Nunavut in 2014/15. The cost of the operation and maintenance of one public housing unit is $24,800 annually, the majority of which can be attributed to utilities (Table 3.2-18). The cost of maintaining Nunavut's 5,153 public housing units was $127,794,400 in 2014/15 (NHC 2016). The number of public housing units increased to 5,431 in March 2017, increasing NHC's annual operation and maintenance costs to $143,921,500 (Table 3.2-18; (NHC 2017). Nunavut's housing spend is about twice as much as

NWT, four times as much as YK, and 13 times greater than the provinces (NHC 2016). The NHC has stated that the operation and maintenance costs of public housing are so high that the NHC were successful in addressing the housing deficit by adding 3,000 units by 2037, its operating budget would have to double (Dyck & Patterson 2017).

Table 3.2-18. Annual Operation and Maintenance Costs for Public Housing in Nunavut

	2014/2015		2016/17	
	Average Cost Per Unit	**Totals (5,153 units)**	**Average Cost Per Unit**	**Totals (5,431 units)**
Water and Sewage	$7,400	$38,123,200	$8,600	$46,706,600
Power	$5,100	$26,280,300	$4,900	$26,611,900
Fuel	$3,700	$19,280,300	$3,500	$19,008,500
Garbage	$700	$3,607,100	$700	$3,801,700
Taxes	$400	$2,061,200	$500	$2,715,500
LHO Administration	$2,300	$11,851,900	$2,400	$13,034,400
LHO Maintenance	$5,200	$26,795,600	$5,900	$32,042,900
Total	$24,800	$127,794,400	$26,500	$143,921,500

Source: (NHC 2016)

Cost Recovery and Paying Rent

The NHC identifies cost recovery as one of the underlying challenges associated with providing public housing in Nunavut. Rental revenues for the public housing units provided are limited due to the lack of economic activities for residents. Approximately 75% of Nunavut's public housing clients earn less than $22,800 annually. Public housing rent in Nunavut is geared to income and as a result the vast majority of tenants pay the minimum rent of only $60 per month or $720 annually (NHC 2016). That is, the rent collected on the majority of public housing units covers less than 3% of the operation and maintained of the unit.

Notwithstanding, the NHC collected $1.6 million more in rent for 2016/2017, over 2015/16 for a total collection of $15.2 million. "The increase in social housing rent was due to the combined impact of an increase in housing stock and the improved process for collecting tenants' income information through the Canada Revenue Agency (CRA)". While the NHC provides programs to facilitate residents in becoming home owners, "a significant number of … mortgages are impaired and have been written down" (NHC 2017).

The NHC implemented changes to the Public Housing Rent Scale (PHRS) in 2013/14 to support individuals in retaining employment and gradually reducing their reliance on public housing. In the past, individuals receiving income support and the public housing subsidy, whose employment status changed from unemployed to employed, experienced an extreme rent increase. The increase was so substantial that it acted as a disincentive to employment and led people to quit their jobs in favour of income support and the public housing subsidy, in order to remain in their homes (NHC 2014b).

The new system aimed to enable tenants to accumulate wealth, while gradually increasing the rent[35] (or decreasing the public housing subsidy) in a manageable manner that supports individuals in retaining and advancing their employment (NHC 2014b). Additionally, the income of full-time students

[35] Rent includes water, sewer services, and fuel/electricity which are costly in Nunavut and will never exceed 30% of a leaseholder's income.

and individuals attending pre-trades and trade course, and other academic upgrading, will continue to be exempt from rental assessments. These changes to the PHRS were anticipated to increase the proportion of public housing tenants paying $60 per month to 76% and to create a revenue loss of $2.4 million in rental assessments in the first year. However, it was estimated that should 500 people (2.5% of public housing tenants) no longer require income support following the first year of the new program, the losses would be recovered (NHC 2014b).

In 2016/17, between 82% (in Cambridge Bay) and 95% (Taloyoak) of public housing rental clients paid rent. Interestingly, the portion of public housing tenants paying their rent was generally lower in the western communities (82 and 84%), which are considered to have greater economic opportunities. The number of months of outstanding rent varied across the region, from a low of 19 months in Kugaaruk to a high of 33 months owing in Cambridge Bay. Collection rates may be somewhat skewed as LHOs may have collected more than was assessed during the year by collecting previous arears. In recent years, the number of months outstanding has decreased due to improved collections, the write-off of deceased tenant balances, and the removal of statute barred accounts[36]. Additionally, LHOs began the direct receipt of income assistance rent cheques from the department of Family Services during 2016/17 (as opposed to receipt by the tenant (NHC 2017).

The NHC Annual Report 2016/17 reported that of 20,674 public housing tenants in the territory, 42% (8,574 tenants) are under 18 years of age and 6% (1,159 tenants) are over 60 years of age. Currently, 12% of tenants are between the ages of 45 and 60, meaning that over the next 15 years the number of Elders living in public housing will more than double. There is a need for additional supportive housing for Elders. Further, of the 11,893 public housing tenants who are above the age of 18, 78% (9,326) have an annual income below $22,880. Another 6% earn between $22,881 and $40,000 dollars. Only 2% earn $80,000 and over. Rent is assessed based on the combined income of the two primary tenants in each unit. The public housing rent scale is based on the following income brackets:

- below $22,881 - $60 per month (78% of tenants)
- $22,881 to $40,000 - 20% of annual income (6% of tenants)
- $40,001 to $80,000 - 25% of annual income (5% of tenants)
- $80,001 and above – 30% of annual income (2% of tenants)

Therefore, 78% of tenants pay $60 per month (income less than $22,881), 6% of tenants pay between $4,576 to $8,000 annually or about $381 to $667 per month (income of $22,881 to $40,000), 5% pay $10,000 to $20,000 annually or about $883 to $1,667 per month (income of $40,001 to $80,000), and 2% pay at least $28,000 annually or at least $2,333 per month (income of $80,001 and above). The ability to generate revenues from rent is severely limited. In 2016/17, LHOs assessed $15.2 million in public housing rent (what was owed for the year) which equaled 8% of the cost of providing public housing (NHC 2017).

Public Housing Development Constraints

Public housing development is constrained by limited funding, the transportation of supplies (annual sealift), and a short construction season. The number of units developed each year, in each community, is determined by NHC based on the annual needs assessments. Construction is typically planned around the annual sealift and it is usually possibly to construct of housing units within a year.

[36] NHC is able to write off debt that is at least 6 years old but is less than $20,000 if no payment has been issued within the past 6 years.

There is a shortage of undeveloped lots in some of the Kitikmeot communities which creates challenges to housing provision in the communities. There are many costs associated with zoning housing lots (e.g., surveying and registering land, roads, power, and drainage development). Within the Kitikmeot hamlets, there is limited funding and capacity to undertake the activities required to develop new lands for housing. As such, the Planning and Lands Division of the GN Department of Community and Government Services works with the hamlets to undertake community plans and zoning, land surveys, land administration, community mapping and property assessment for taxation purposes. More significantly, GN Department of Community and Government Services has encouraged municipalities to enter into one time, up-front equity leases in order to recoup land development expenditures made under municipal Land Development Reserve Funds, allowing for reinvestment into new lot development. In Cambridge Bay, the construction of CHARS motivated the development of new subdivisions and zoning of new land (Appendix V6-3B).

The lack of available certified tradespeople in the Kitikmeot region has further resulted in differing abilities to maintain housing units. Across Nunavut, the LHOs rely heavily on 'housing maintainers', a generalist trade unique to the territory (Appendix V6-3B) that is supported by NAC programming including the 'Pre-Apprenticeship Housing Maintainer program as well as a specialty of Housing Maintainer within the general Apprenticeship program (NAC 2017).

Housing Stock

Tenant housing includes public housing, government staff housing (GN and Government of Canada), non-government employer-provided staff housing, and private market rental units. Public housing units are subsidized rented dwellings managed by the NHC and are available to Nunavummiut who meet eligibility requirements. Private market rental units are owned by private individuals, corporations, or other organizations and are made available on the rental market (NBS 2011).

As of the 2016 census, there were 430 occupied dwellings in Kugluktuk, 540 in Cambridge Bay, 285 in Gjoa Haven, 230 in Taloyoak, and 175 in Kugaaruk; the majority of dwellings are public housing stock (Statistics Canada 2017d). This represents an increase in overall housing stock of 2 to 13% over 2011. Despite this increase, recent census data and community-based research highlights overcrowded conditions throughout the Kitikmeot region (Appendix V6-3B) (Statistics Canada 2017d). Overcrowding is due to a high natural population growth rate, limited available housing stock, and a backlog of new home development. The LHOs track overcrowding through a public housing registry and can triangulate this information using utility records (i.e., water, fuel delivery, and septic service; Appendix V6-3B).

In the eastern Kitikmeot communities of Gjoa Haven, Taloyoak, and Kugaaruk, 49 to 61% of homes housed five or more persons in 2016 and an additional 11 to 20% have four persons per household. The vast majority of these are occupied by residents with only 2 to 16% either occupied by temporary residents or unoccupied. The most common types of dwellings are single detached houses (50%) and row houses with three or more units (36%[37]). The 2016 census indicates that about one-quarter to 60% of the housing stock in the Kitikmeot is not suitable. Housing suitability refers to whether a private household has enough bedrooms for the size and composition of the household (Statistics Canada 2017d).

In total, 65% to 72% of homes in the eastern communities have four or more persons per household. Approximately 45% of households in Kugluktuk and 38% of households in Cambridge Bay have four or more persons per household. Despite the high number of people per household, the majority of homes in the Kitikmeot communities have only two bedrooms (from 36% in Cambridge Bay to 52% in Gjoa

[37] Up from 28% in 2011.

Haven). Fewer homes have four or more bedrooms, including about one-fifth in Kugaaruk and Taloyoak and just over one-tenth in Gjoa Haven, Cambridge Bay, and Kugluktuk.

The percentage of multi-family homes is also quite high in the eastern communities at 35% in Kugaaruk, 22% in Taloyoak, and 24% in Gjoa Haven. Overall, the proportion of households in the Kitikmeot Region with four or more persons (47%) is similar as compared to the territorial average (47%), and there is also a higher percentage of two-or-more family households (17%) as compared to the territorial average (12%) (Statistics Canada 2017d).

The majority of dwellings are rented (including public housing)—about 75% in Cambridge Bay, 80% in Kugluktuk and Kugaaruk, 88% in Gjoa Haven, and 91% in Taloyoak. Of those who rent, between 87% and 95% reside in subsidized housing. Notably, the percentage of renters in subsidized housing is lowest in the western communities (87-89%) and highest in the eastern communities (90-95%). The median monthly shelter cost for rented dwellings ranges from a low $127 in Kugluktuk to a high of $196 in Cambridge Bay. The average rental costs are higher, particularly in the western communities (Statistics Canada 2017d).

Public Housing Need

Housing shortages, lengthy public housing waitlists, and overcrowding are not new issues in the territory. In 2004, the NHC indicated that 3,000 new social housing units were needed (NHC 2004). Despite over $500 million invested, over a decade later the situation has not changed (NHC 2016).

Census data suggest that overcrowding is more prevalent in the eastern Kitikmeot region. NHC employs a needs-based allocation[38] methodology for public housing that targets the construction of the maximum number of housing units, rather than the construction of some housing in every community. The previous allocation system created inefficiencies, as some of the highest costs of construction are those associated with the mobilization of labour and supplies. By reducing the number of construction sites, the number of units built is increased, and overall cost-per-unit is decreased (NHC 2014a).

The new approach[39] is supported by a needs-based allocation methodology that accounts for community population and the capacity of community infrastructure and systems (e.g., land, power, water, sewage) to absorb the increased pressure from new units. The density and size of a unit (e.g., number of bedrooms) as well as the number of individuals on the housing waitlist are also considered. Though 2011 census data indicated that the proportion of housing need was greatest in the eastern Kitikmeot, in 2013 the NHC determined that absolute housing needs were greatest in Cambridge Bay, Gjoa Haven and Kugluktuk, each of which ranked as having some of the highest housing need in the territory at the time (fourth, eighth, and tenth, respectively; NHC 2014a).

To determine housing need in 2016/17, the NHC ranks the public housing need of each Nunavut community as a percentage of its existing stock[40]. Despite the addition of 8 public housing units in 2013 and 55 in 2015 (Conroy 2015), in 2016/17, the NHC assessed Kugaaruk, Gjoa Haven, and Cambridge Bay as having the second, third, and fourth highest housing need in the territory (57%, 55%, and 51%,

[38] Recent community research indicates that public housing units are allocated according to a needs-based assessment which considers overcrowding levels, the condition of units, mental well-being, and family size/number of dependents (R. Boisvert, *pers. comm.*). Personal income and employment status are not a factor for an applicant's position on the housing waitlist or for housing allocation. Residents will not be evicted from public housing as a result of income or employment. Income is a factor in determining the rent, once a unit has been allocated (Community Based Research Program 2017)..

[39] The new methodology was first used to rank each community and allocate a 2013/2014 federal housing investment of $100 million.

[40] For example, if a community with a public housing waiting list of 1,000 units currently has stock of 2,500 unit, its housing need as a percentage of stock is 40% (1,000/2,500; NHC 2017).

respectively. Each is considered to have 'critical' need for public housing. Public housing need was considered 'high' in Taloyoak (40%) and 'serious' in Kugluktuk (31%)[41] (NHC 2017). Construction during 2016/17 marked the end of a 293-unit public housing construction program that began in 2013 and was funded by CMHC under the Economic Action Plan and IAH initiative. In the Kitikmeot this included construction that is now completed: three new 5-plexes in Kugaaruk designated as public housing units[42], and construction that is in progress: five public housing units in each Gjoa Haven and Kugaaruk and five staff housing units in each Gjoa Haven, Kugaaruk, and Kugluktuk (NHC 2017).

In 2017, public housing waitlists[43] in the Kitikmeot included 87 Kugaaruk families, representing approximately 450 people; 75 approved applicants in Taloyoak, representing approximately 200 people, and 115 applicants in Gjoa Haven as well as about 100 others Gjoa Haven residents that are eligible but have not applied (Appendix V6-3B*)*. The typical wait-time for public housing in the Kitikmeot communities was reported to be around seven to eight years (Appendix V6-3B). Many people are not on the waitlist despite eligibility, which has been attributed to frustration with the waitlist system, low expectations around the public housing allocation system, lack of awareness about the application process, or not looking ahead to future needs (Appendix V6-3B).

As context, Table 3.2-19 provides an overview of public housing in the Kitikmeot Region in 2015. Additional units were added in 2016 and 2017 however an updated public housing waitlist is not readily available.

Table 3.2-19. Public Housing in the Kitikmeot Region (2015)[1]

	Public Housing				Wait List for Public Housing (August 2015)
	Public Housing Units	Public GN Staff Housing (Owned)	Public GN Staff Housing (Leased)	Total NHC Housing Units	
Cambridge Bay	266	40	47	353	90
Kugluktuk	291	24	15	330	83
Gjoa Haven	212	15	15	242	49
Taloyoak	189	10	3	202	89
Kugaaruk	126	6	4	136	73
Total	1,084	95	84	1,263	384

Source: Conroy (2015)
Notes:
[1] Community research conducted in 2017 indicate that LHOs currently oversee 200 housing units (163 public units and 37 staff units) in Kugaaruk and 220 housing units (200 public housing units and 20 staff units) in Taloyoak.

Housing as a Determinant of Health

"Housing is a key determinant of health and … while it may not be the only issue, all issues relate to housing" (Dyck & Patterson 2017).

"Housing is an important determinant of health, community well-being, and economic development, directly affecting educational outcomes, increasing the risk of communicable disease, and adding to social challenges" (Dyck & Patterson 2017).

[41] Housing need as a percentage of stock is characterized as 'less severe' (29% or less); 'serious' (30 to 35%), 'high' (36 to 40%); and 'critical' (41% and higher).
[42] Rent for the new 5-plex's in Kugaaruk is capped at $1,668 for 2017 (R. Sutton, *pers. comm.)*.
[43] Data was not collected for Cambridge or Kugluktuk during the 2017 Community Research Program due to the availability of participants.

The availability of suitable and affordable housing is an important issue for all Kitikmeot communities. The shortage and overcrowding of housing in Nunavut and throughout the Kitikmeot Region has broad implications for health and well-being and has been linked to family violence, depression, stress, and a higher incidence of infectious diseases (Inuit Tapiriit Kanatami 2007; NTI 2008; Inuit Tapiriit Kanatami 2014). Overcrowded conditions can lead to greater conflict and family violence, more substance abuse, a greater incidence of disease (e.g., respiratory illnesses), and mental health issues (Appendix V6-3A). Winter further exacerbates these issues when individuals are confined indoors.

Overcrowding and housing shortages are prevalent across Inuit Nunangat and while these trends are not new, research providing evidence of the negative results of housing shortage and overcrowded conditions are becoming more widely available. For example, ITK has stated that the reported rate tuberculosis among Inuit (2011) was approximately 254 times high than the rate for Canadian-born non-Indigenous peoples (Dyck & Patterson 2017). Other reports suggest that tuberculosis rates for Inuit are approximately 50 times higher as compared to the overall Canadian population (Public Health Agency of Canada 2016). Other studies link overcrowding to high rates of depression and stress; others yet to low educational achievement. There is also a risk of increased domestic and sexual violence as those affected do not have anywhere to go (e.g., somewhere else to live or emergency housing or shelter; (Dyck & Patterson 2017).

In 2016, the Standing Senate Committee on Aboriginal Peoples undertook a study of northern housing. The Committee held fifteen meetings in Ottawa where it heard from over 50 witnesses including Inuit governments and community members, northern housing authorities, Indigenous organizations working in the North, academics, architects, and youth representatives. In April 2016, the committee travelled to communities in Nunavik and Nunavut to see first-hand the challenges and best-practices related to housing in the North (Dyck & Patterson 2017).

The Committee's study focused on all areas of Inuit Nunangat and included specific remarks about conditions in Nunavut. During the meetings, a witness from Nunavut stated the following:

> *The reality is that our children are not adequately housed. Our children sleep in shifts in some households and have no place to do their homework. It's typical to see mattress lining the floors of many of our homes (Dyck & Patterson 2017).*

During one of the community visits, the Committee saw small three-bedroom units that were home to 15 people, including young children. Most spaces in the homes were converted into sleeping areas and mattresses lined the floors. Committee members visited homes and found mould; due to the overcrowding, ventilation systems were overworked, leading to excess moisture in the homes and the development of mould (Dyck & Patterson 2017). Recent community research indicates that there are issues with mould in housing in the Kitikmeot region due to the lack of mechanical ventilation systems, leaky water tanks, problematic heating appliances, and roofing issues (Appendix V6-3B). Mould adversely impacts health and results in higher rates of respiratory tract infections (see Section 3.2.3.9).

> *"The housing crisis directly contributes to the grim education statistics… children and youth easily fall behind in their studies due to lack of sleep and inability to do homework. It's not surprising that our children suffer from astronomical dropout rates: 74% of Inuit children leave school before graduating" Jeannie Arreak-Kullualik, Director, Social Cultural Development Department, NTI, as quoted in (Dyck & Patterson 2017).*

Further discussions during the committee meetings focused on physical and sexual violence, which link to overcrowding, communicable disease rates, hidden homeless and the consequences for youth. The Committee made a number of recommendations to the CMHC that focused on:

- a long-term funding strategy for northern housing;
- direct funding for Inuit housing organizations, where appropriate;
- sufficient funding to construct additional transitional housing options based on community need;
- support for homeownership, including the exploration of alternative models of home ownership (e.g., cooperative and co-housing, home buy back and grant programs);
- funding for Habitat for Humanity's Indigenous Housing Program;
- allocation of a portion of the Affordable Rental Housing Innovation Fund for alternative housing options; and
- a coordinated strategy for government research and development into northern housing.

Additional recommendations were made to the Treasury Board of Canada Secretariat to review and expand the Isolated posts and Government Housing Directive's eligibility criteria to include local Inuit employees, where appropriate. Recommendations were also made to the National Research Council to develop model building codes tailored to the conditions and limitations of the North (Dyck & Patterson 2017).

3.2.5.8 Community Health

Health Status

Disease, Life Expectancy, & Perceptions of Health

A number of indicators contribute to a holistic understanding of community health and well-being. For residents of Nunavut, this information is available at the territorial level. In 2013, Nunavummiut were less likely to perceive their overall health condition as very good or excellent as compared to Canadians at 43% and 60%, respectively. The proportion of Nunavummiut who perceive their overall health as very good or excellent is also decreasing (e.g., from 46% in 2010), while the comparable statistic for Canadians remains unchanged (Statistics Canada 2013e).

Nunavummiut experience lower rates of arthritis, diabetes, asthma, and high blood pressure compared to the average Canadian; however, more Nunavummiut are overweight and obese, and have a higher incidence of cancer in comparison to national averages. The incidence of lung cancer (206.8 per 100,000) is particularly high at approximately four times the national average (56.9 per 100,000). Correspondingly, the rate of death due to respiratory disease in Nunavut is more than four times the national average.

Life expectancy is also much shorter for Nunavummiut in comparison to other Canadians (Statistics Canada 2013e). On average, Nunavummiut have a life expectancy of 71.6 years at birth and 15.2 years at age 65 (2007/2009 average). These values are strikingly lower than the Canadian average life expectancies for the same period (i.e., approximately 81.1 years at birth and 20.2 years at age 65). The lifespan for Nunavut males is almost 10 years shorter than the lifespan for the average Canadian male at birth and almost five years shorter at age 65. It has been estimated that Inuit have the lowest life expectancy among all of Canada's Aboriginal groups; in fact, Inuit currently have a life expectancy of an average Canadian in the 1940s (Spicer 2008). Comparisons of the two-year averages indicate that,

for Nunavummiut, life expectancy at birth is not only lower than that of other Canadians, but life expectancy at birth is decreasing over time. In contrast, Canadian residents continue to experience small gains in life expectancy at birth. Lastly, although Nunavut residents have experienced greater gains in life expectancy at age 65 over time, Canadians continue to live longer (Statistics Canada 2013f).

Life expectancy among Nunavummiut has continued to decrease over time from 71.1 years, at birth (2007/2009 average) to 70.7 years, at birth (2012/2014 average). The life expectancy of those who are 15 years of age has also decreased from 58.1 years (2007/2009 average) to 57.7 years (2012/2014 average) (Statistics Canada n.d.). Other data suggests that the life expectancy of Inuit in Canada is lower yet, with a life expectancy of 68.5 years at birth (in 2017; life expectancy at birth of 64 years for males and 73 years for females (Public Health Agency of Canada 2016).

The health status of all Inuit in Inuit Nunangat (which includes Nunavik in northern Quebec, Nunatsiavut in Northern Labrador, Nunavut, and the Inuvialuit Region of the Northwest Territories) is poorer in comparison to national averages. For example, research indicates there are:

- higher rates of chronic illness and infectious disease among Inuit infants and children;
- higher tuberculosis rates (262/100,000, compared to 0.7/100,00 for the non-Aboriginal population); and
- the highest rates of smoking in Canada (54% of adults are daily smokers) including 56% of Inuit women who are pregnant (Inuit Tapiriit Kanatami 2014).

High-risk behaviours such as alcohol abuse and smoking are known coping mechanisms connected to underlying socio-economic inequalities and issues associated with the legacy of colonialism. While there are direct health consequences associated with these behaviours (e.g., cancers), there are also indirect consequences (e.g., domestic violence) that fundamentally affect individual and community well-being. As a result, the social inequities that underpin these behaviours are key factors determining Inuit health and well-being (Inuit Tapiriit Kanatami 2014).

Infant Mortality & Birth Weight

Within Canada, adverse early child health outcomes (e.g., infant mortality, congenital anomalies, prematurity, and low birth weight) are highest in Nunavut (Collins 2012). In 2007, Nunavut's infant mortality rate was nearly three times that of Canada. In 2013, Nunavut's infant mortality rate remained more than double the national average (12% in comparison to 5%). In 2014, Nunavut's infant mortality rate was 16.8/1,000 live births, a decrease from 18.2/1,000 in 2013; 21.4/1,000 in 2012, and 28.7/1,000 in 2011. The comparable rate for Canada as a whole was 4.7/1,000 in 2014, and has slightly but steadily decreased over time (Statistics Canada 2014a). A study conducted in 2012[44] concluded that the leading causes of infant death in Nunavut included sudden infant death syndrome (SIDS[45]; 21%), sudden unexpected death in infancy (SUDI[46]; 27%), and infections (21%). Combined, SIDS and SUDI comprised the majority of infant mortality cases (48%). Of the SIDS/SUDI cases, sleep position and bed-sharing were major contributing factors (Collins 2012). While there have been specific years (1996 and

[44] Conducted by the University of British Columbia, University of Victoria, the GN Department of Justice, GN Department of Health and Social Services, University of Manitoba, and NTI.
[45] SIDS is a diagnosis of exclusion where the cause of death remains unexplained after investigation including autopsy, examination of death scene, and review of clinical history.
[46] SUDI is a broader category that includes unexpected infants deaths with other risk factors present, such as an illness or risk factors for asphyxia.

2007) during which Nunavut and Canada's infant mortality rates were comparable, the rate for Nunavut was approximately three times the Canadian average between 2006 and 2009.

In the case of infection as a cause of infant death, approximately two-thirds of deaths were caused by respiratory infections while the remaining third were related to influenza. Cause-specific mortality rates[47] and respiratory infections were higher in the Kitikmeot Region compared to the Kivalliq and Qikiqtaaluk regions. Infants in Nunavut also had the highest reported rate of hospitalization for lower respiratory tract infections worldwide (Collins 2012). Some risk factors for respiratory infections and hospital admissions in Nunavut include prematurity, tobacco smoke exposure (prenatal and postnatal), overcrowding, and poor ventilation. Education strategies to promote safe sleeping practices and further understanding of infant mortality are underway (Collins 2012).

The proportion of infants with low birth weight is also typically higher in Nunavut compared to Canada (Statistics Canada 2013e) and is a contributing factor in SIDS/SUDI cases (Collins 2012). Of all the births in Canada during the years 2000 through 2013, Nunavut had the highest proportion of low birth weight births (7.8%), higher than the Canadian average of 6.0% during the period (Statistics Canada 2016d) Birth weight is another indication of the general health and well-being status of the population. The proportion of babies born in Nunavut with low birth weight has effectively remained unchanged between 2006 and 2010. Although the percentage of low birth weight babies born in Nunavut and in Canada has both increased and decreased over time, the percentage of low birth weight babies in Nunavut (7.6%) was higher than the Canadian average (6.20%) in 2013 (Statistics Canada 2013a).

Sexually Transmitted Infections (STIs)

Sexual health is an important part of health and well-being. STIs are a health concern of focus in Nunavut and represent most of the reported communicable diseases. The three most common STIs are chlamydia, gonorrhea, and syphilis. Chlamydia was the most commonly reporting STI in 2015 with 1,376 new reported cases; almost one-third (30%) of cases were in the 15-19 age group. Rates of chlamydia were dramatically higher in Nunavut in comparison to the Canadian average (i.e., in 2015, about 32/1,000 in Nunavut and about 2/1,000 in Canada). Gonorrhea rates decreased in 2015 and there were 302 new reported infections, though more were reported in younger women. Previously, syphilis was rare in Nunavut, however following an outbreak in 2012 there have been a number of new cases each year since, including 69 in 2015 (GN n.d.).

Community Health Challenges

Recent community research indicates that perspectives of health and social determinants in the Kitikmeot region are directly tied to physical and mental health outcomes. Overcrowded housing has been linked to respiratory illness, domestic violence, and mental health issues; poverty and low income affect food insecurity and nutrition; and low levels of education and poor health literacy contribute to health issues in the communities (Appendix V6-3A; Appendix V6-3B).

Recurring health challenges identified in the Kitikmeot communities include (Appendix V6-3A; Appendix V6-3B):

- **Nutrition**: Low-income households must choose between costly healthy food and expenditures such as alcohol. Sugar addiction has been identified as a challenge in several communities and contributes to dental issues, obesity, and diabetes.

[47] Cause specific mortality rates are defined by the World Health Organization (WHO) as "the mortality rate due to a specific disease or phenomena".

- **Alcohol and drugs**: Substance abuse and addiction is prevalent in the Kitikmeot communities regardless of whether alcohol is permitted or restricted. Drug use is primarily related to marijuana[48]. Household spending on alcohol decreases the amount of money available for food.
- **Smoking**: Smoking cigarettes is common including among young children and is a known health risk. Recently, smoking inside homes has decreased.
- **Cancer**: Anecdotally, there is more cancer than in the past in both the older and younger populations.
- **Sexual activity and pregnancy**: Youth are sexually active at a young age (often pre-teen) and young parents are not uncommon. Access to various means birth control are available, however families are not always supportive of contraceptive measures. As noted in Section 3.2.5.2 (Family Structure and Traditional Gender Roles), traditional Inuit society involved marriage at a young age, and sexual activity amongst youth is often not disapproved.
- **Infants and children care**: Poor nutrition results in a number of health issues for infants. This has been attributed to limited awareness and understanding of infant dietary requirements and breastfeeding. Additionally, low incomes reduce access to baby formula. Malnutrition at a young age can lead poor health in later years. Health issues for younger children include oral (dental) health.
- **Mental health**: Mental health issues are associated with alcohol and drug (cannabis) use, domestic violence, overcrowding, limited life/coping skills, and low sense of self-worth. Suicide has been an ongoing issue in the Kitikmeot region, though suicide rates in Kugluktuk and Kugaaruk are reported to have decreased. For teens and young adults mental health issues are related to low self-esteem, limited coping skills, drinking, and domestic violence.

Health Centers, Services, and Capacity

The most commonly accessed health care programs and services are pre-natal, sexual health, communicable disease, immunizations, and the Well Man and Well Woman programs (Appendix V6-3B).

Kitikmeot health centers provide a wide range of services. Programs offered through the centres include the pre-natal, chronic disease clinic, well women clinic, well man clinic, and well child clinic. Generally, all programs are well attended with the exception of the well man clinics. There is one health center in each Kitikmeot community. Further discussion of the local health centres in each Kitikmeot community is provided in the Madrid-Boston Community Research Report (Appendix V6-3B).

Over the past few years, the demand for health services in the Kitikmeot region has grown. This has been attributed, in part, to an increased awareness of the types of services available in Nunavut and in other parts of Canada (Appendix V6-3B).

NBS data describes the number of health center visits by community. Data is available from 2003 to 2015. Regionally, there were 39,049 visits to the health centres in the Kitikmeot Region, a decrease from 43,722 visits in 2014, which was the highest number of health centre visits over the past decade at 6.6 visits per capita (regionally). Visits per capita were 5.7 in 2015. Within the communities, Kugaaruk had the highest number of health centre visits in 2015 at 7.2 visits per capita, followed by Taloyoak with 6.9 visits per capita. Cambridge Bay and Gjoa Haven closely resembled the regional average at 5.8 and 5.5 visits per capita, respectively. Kugluktuk, which is typically closer to regional

[48] Although use of methamphetamines has been reported in Cambridge Bay (Anonymous 9, *pers. comm.,* Community Research Program 2017).

average had a low of 4.3 visits per capita in 2015. The main or typical reasons for visits to the health centres include: for sick clinic, prenatal care, well clinic, and/or chronic diseases (NBS 2016b). A large portion of health centre visits (25-28%) are attributed to a diagnostic group named 'All other diagnoses and factors influencing health status and contract with health services' for which the most common visitation categories include laboratory exams, counselling, newborn assessments, STI screenings, and wound care/aftercare (NBS 2017b).

Woman's Health and Pregnancy

The discussion of well-being as it relates to women's health is informed by a description of health services capacity (an overview of facilities and services is provided in Section 3.2.4.7). While there are a number of woman's health issues in the region, the challenges associated with giving birth are well documented. Typically in Nunavut and in many other northern jurisdictions in Canada, pregnant women must travel to a full-service medical facility in the south approximately four weeks prior to giving birth. The new Birthing Program at the Kitikmeot Health Centre in Cambridge Bay allows women with low-risk pregnancies to give birth with the assistance of a midwife (Appendix V6-3B). Obstetrical cases continue to be directed to either Stanton Territorial Hospital in Yellowknife or the University of Alberta Hospital in Edmonton (CIHI 2013).

Limited housing options hinder the ability of the Kitikmeot Health Centre to provide midwifery services to residents of other communities. Some expectant mothers may be reluctant to leave the community and prefer to remain near their families; as a result, many births still occur at health centres. However if expectant mothers must travel at all, they elect to continue their travel on to Yellowknife where they're able to access a greater variety of less expensive baby-related items (Appendix V6-3A.).

All high-risk pregnancies are typically flown out of the community at 36 weeks (Appendix V6-3A). Conditions that result in the classification of a pregnancy as high-risk vary and include: age (under 17 or over 35), alcohol and/or drug use, smoking, diabetes, asthma, and cancer, as well as others. Statistics Canada reports that the proportion of Nunavut mothers giving birth outside the territory increased between 2007 and 2011 (i.e., from 40 to 47%; Statistics Canada 2013a). In 2014, 898 Nunavummiut gave birth, 481 occurred within Nunavut (54%), as well as 128 in the NWT (14%). The 14% that gave birth in NWT were likely Kitikmeot residents (Canada N.d.).

3.2.5.9 Community Well-being

Well-being is a broad concept that approximates the overall wellness or quality of life in communities based on the complex interactions between existing social, economic, and cultural conditions. Research and reporting on the social determinants of Inuit health was conducted by Inuit Tapiriit Kanatami (ITK) in 2007 based on consultation that occurred between 2003 and 2004 and health statistics available at that time. Further research conducted to update these results in 2013 indicates that factors contributing to Inuit health and well-being include: the quality of early childhood development, culture and language, livelihoods, income distribution, housing, personal safety and security, education, food security, availability of health services, mental wellness, and the environment (Inuit Tapiriit Kanatami 2014).

Community Well-being Index

Though dated, the following discussion presents the most recent data available for the Community well-being index. This is followed by a more recent discussion of research results describing CWB as it pertains to Baker Lake, post-mining.

Community well-being (CWB) is a broad concept that approximates the overall wellness or quality of life based on the complex interactions between existing social, economic, and cultural conditions. Indigenous and Northern Affairs Canada (INAC) calculates an index of community well-being based on four components: education, labour force, income, and housing. While additional components contribute to overall well-being, these four components provide a reasonable estimate of well-being given what is known about the existing conditions and current data gaps. The community well-being scores can be used to compare well-being, at least as measured by the index, across Aboriginal and other Canadian communities and over time (INAC 2010).

INAC has measured and calculated community well-being scores for Inuit, First Nations, and non-Aboriginal communities, over a 30 year period (including 1981, 1991, 1996, 2001, 2006, and 2011). While the CWB scores for Nunavut's communities have steadily increased over the past 30 years, the gap between Aboriginal and non-Aboriginal communities remains largely unchanged.

For 2011, the most recent data available, Nunavut had an overall community well-being index score of 61, the lowest of all the Canadian provinces and territories, and a decrease from 65.1 in 2006. Communities in the Kitikmeot Region also ranked low on the community well-being index. In 2006, Taloyoak, Kugaaruk, and Gjoa Haven scored very low (53, 55, and 56, respectively). Kugluktuk scored near the average for Nunavut as a whole, while Cambridge Bay fared somewhat better at 73, although still below the scores of other Canadian provinces and territories.

With the exception of Taloyoak, the CWB scores dropped in each of the Kitikmeot communities between 2006 and 2011 (i.e., by one point in each Cambridge Bay and Gjoa Haven, two points in Kugluktuk, and four points in Kugaaruk). Taloyoak is the exception as the only community in the Kitikmeot Region with an increased CWB score (53 in 2006 to 54 in 2011). Despite the overall decreases, the 2011 CWB scores in Cambridge Bay and Kugluktuk (73 and 65, respectively) exceeded the territorial average of 61. CWB scores in Gjoa Haven, Taloyoak, and Kugaaruk remained lower than the territorial average, at 55, 54, and 51, respectively.

A review of trends in the well-being of Inuit in Canada concluded that, on average, Inuit community well-being scores were 15 points lower than non-Aboriginal communities in 2006. In 2011, Inuit community well-being scores were 16 points lower. In 2006, there were 34 Inuit communities among the "bottom 500" Canadian communities, and no Inuit communities ranked among the "top 500" Canadian communities. Of the four components analyzed, the largest gap between Inuit and non-Aboriginal communities was in housing. Over the past 30 years, the gap between the CWB scores for Inuit and non-Aboriginal communities narrowed for both the income and education components; however, labour force activity scores varied and remained only slightly higher (four points) in 2011 than in 1981 (Statistics Canada 2015a; AANDC n.d.). This infers that while Inuit income levels and educational attainment now more closely resemble that of the non-Aboriginal population, similar gains have not been seen for the Inuit labour force (that is, the labour force circumstances of Inuit in 2011 have not substantially improved since 1981).

Inuit Community Well-being: Baker Lake Experience

Recently, research focused on the experience Baker Lake, mining, and outcomes for well-being. Baker Lake is a community in Nunavut's Kivalliq region near to the operational Meadowbank mine. CWB is described by local residents as inclusive of relationships with the land, family, and community and as dependant on experiences that shape cultural identity and living the values for a good life. Survival and sustenance as well as emotional, spiritual, and social well-being are attributed to the land; while working together, sharing resources, social supports, and togetherness, as well as respect, open communication, coping skills and family as the central site for shared experience. Learning the values

to live well are attributed to family and community. Historic and existing conditions that detract from CWB are noted and discussed including, colonialism, changes to family structure, general gap in cultural knowledge and institutionalized learned, intergenerational language barriers, and others (Maksimowski 2014). Each of these detractors is relevant, to some extent, within the Kitikmeot region as well.

Maksimowski (2014) reports the following themes associated with aspects of Inuit well-being at Baker Lake that are influenced by mining:

- Availability of time, access to caribou and opportunities for cultural knowledge transfer, identity, and well-being;
- Caribou availability (linked to perceptions about caribou quality and having to travel further to access caribou) for social values and harvesting;
- Spiritual relationships to the land and impacts from industrial development;
- Uncertainties regarding contamination of the land for well-being: lack of perceived control over and experience with industrial development;
- The land, Inuit control, and mine consultation processes: Incorporating Inuit knowledge and experiences; and
- The land, self-determination and mining processes: implications for cultural continuity, identity, and well-being.

Changes linked to mining:

- Income and spending, "This source of employment has enabled community members to cope with the high costs of living in Nunavut today". Related concerns include spending on alcohol, drugs, and gambling, for some.
- Growing sense of individualism and materialism due to new income inequalities that may be replacing Inuit values and the influence of Elders.
- Mining and technology may lead to less 'togetherness'.
- Mine employees are too tired to participate in cultural activities and trips on the land and also to volunteer.
- Mining and family and spousal relationships: concern that families could become more distant. However despite this concern, study participants indicated family was of central importance. Spousal relationships were reportedly affected by rumors and negativity. The effect varies greatly by family and is dependent on the capacity to cope with the continued changes to Inuit ways living.
- The two-week on/off rotation schedule was challenging for families that require childcare, as the day care did not have enough capacity to meet the needs of community members working at the mine. Single mothers were not able to access employment without adequate childcare.
- Frustration that the community is not benefitting as much as it should from the development of mining demonstrated the perceptions of lack of control over industrial development.

Community Suggested Solutions to Improve Well-being and Benefit from Mining

- Additional community programs, services, and infrastructure: as such childcare, additional staff to provide community services, physical space for programs and socializing (e.g., cafes and coffee shops), housing, and alcohol education.
- Bridging the 'old ways' and the 'news way' to retain a connection to the past and adapt traditional Inuit values to life in communities and industrialization.
- Better communication and awareness about issues that are facing the community.
- Communication and trust within the family protect against negative outcomes related to rumors and gossip.
- Strengthen relationship with Inuit heritage, particularly for youth because cultural activities improve self-esteem and identity in youth. To do this, youth spending time with Elders and on the land is key.
- Education and training as tools for adaptation and self-determination.
- Balancing 'old ways' with 'new way's'.

It is of note that many of the links between mining and CWB are determined by an individual's ability to make choices and be accountable. Participants reported positive change as a result of employment on self-esteem and pride. Other remarks focused on the perceived lack of control of mining development, mine closure, and other related decisions and communication of those decisions[49]. In the past, silence and personal resolve were the coping mechanisms Inuit relied on to deal with hardship and life changes. Participants suggested that the today the community needs to come together to deal with the community issues that are linked to mining, as a collective. Finally, as social relationships form a distinctive part of well-being and mining employment and rotational shift work affect social relationships, there is an impact of mining on well-being. The ability of Inuit to cope with these changes varies and is dependent upon an the ability to adapt, practice moderation, and sustain cultural continuity, and on individual and community self-determination (Maksimowski 2014).

History of Acculturation

Prior to the 1950s, most Inuit lived on the land in extended family groups following the migration of wildlife across the Arctic. During this time men and women had very specific roles as hunters and care-givers that were tied to the land and linked to a way of life based on survival in harsh climatic conditions. During the 1950s, the Canadian government actively encouraged Inuit to settle in permanent communities and provided low-cost housing, medical facilities, and other modern services. The transition from subsistence to modern ways of living have radically disrupted Inuit social and environmental relationships and is recognized as contributing to social marginalization, stress, and a higher incidence of suicide (Inuit Tapiriit Kanatami 2014). For example, traditional gender roles were informed by the activities required to meet daily needs for food and shelter. Once those needs were met through a different means, gender roles shifted.

The roles of elders in Inuit communities are reported to have changed with the introduction of schools, peer groups, and southern media. Traditionally, within a family group an elder would provide direction as to how to deal with specific challenges, and elders were held as the ultimate authority. The introduction of numerous other 'authorities' has been linked to alcohol and drug use by teenagers (and others) who are, in many ways, torn between two worlds (Inuit Tapiriit Kanatami 2014).

[49] Pertaining to the mine, local government (hamlet), and territorial government (allocation of royalties).

While traditional land use activities persist, the transition from a traditional subsistence-based economy to a mixed traditional/wage economy has resulted in both beneficial and adverse outcomes. Residential schools created disconnect between traditional familial, communal, and socio-cultural relationships and disrupted the inter-generational exchange of knowledge, cultural values, parenting skills, and language which form the basis of Inuit identity. The legacy of residential school system is often cited as the source of 'community trauma' that continues to affect Inuit health and mental well-being today (Inuit Tapiriit Kanatami 2014).

Finally, acculturation, rapid cultural change, and the residential schools legacy have produced a number of serious and obvious stressors in everyday life. These stressors are harmful whether experienced personally or through indirect exposure (e.g., as a witness to the behaviour) and are linked to higher incidence of suicide. Stressors include: exposure to or experience of physical abuse, sexual abuse, or substance abuse, suicide of a friend(s) or family member(s), a sense of alienation, hopelessness, and mental health issues such as depression. These factors can create overwhelming stress and undermine the ability of an individual to cope with stress (Henderson 2003).

The Importance of Country Foods

Country foods are an important foundation within Inuit culture that link and perpetuate traditional harvesting activities, social and familial relationships, as well as sharing and informal networks. The 2006 Aboriginal Peoples Survey (Statistics Canada 2008) included a review of country foods and harvesting within Inuit Nunaat, or the "Inuit homeland" which includes the Inuit of Nunatsiavut, Nunavik, Nunavut, and Inuvialuit. For the majority of Nunavut residents (66%), at least half of the meat and fish they consume is obtained through traditional harvesting methods. An additional 38% report that more than half of the meat and fish consumed is obtain through harvesting activities (as compared to the amount that is purchased in stores).

In 2006, over two-thirds of Nunavummiut harvested country foods in the previous year. A higher portion of males participated in harvesting (74%) than females (59%). The portion of the population harvesting country food was slightly lower for those aged 15 to 24, but remained relatively stable for both males and females. The 2006 Aboriginal Peoples Survey also reported that approximately 57% of Nunavut children ages 6 to 14 ate wild meat, caribou, walrus, and/or muktuk three or more days per week (Inuit Qaujisarvingat Knowedge Centre n.d.).

Although food subsidy programs such as Nutrition North and Food Mail aim to provide an affordable healthy diet for Inuit, the composition of this diet is quite different from the foods Inuit have traditionally consumed. Fruit and vegetables thought to be an essential part of healthy diet are not naturally available in Nunavut and must be flown into the community at costs that are often not affordable to the majority of consumers. The length of time to transport fresh food to the north usually results in short shelf lives and less appealing produce than is available from in the south (National Aboriginal Health Organization 2004). The appropriateness of a traditional diet is characterized by the following:

> *When one eats meat, it warms your body very quickly. But when one eats fruit or other imported food, it doesn't help you keep very warm. With imported food… you're warm just a short period of time. But [our] meat is different; it keeps you warm. It doesn't matter if it's raw meat or frozen meat… it has the same effect* (Freeman et al. 1998).

A recent report by ITK (2014) clearly outlines the connection between traditional harvesting and Inuit health; there is no question that participation in harvesting activities is social determinant of health for Inuit people. ITK states that participation in traditional harvesting has a positive impact on Inuit health outcomes due to the:

- consumption of healthy traditional foods (e.g., seal, caribou, and fish);
- associated economic benefit (i.e., the monetary value of country food, that is, country food is like a supplement to income as the family requires less store bought food and household security is enhanced); and
- socio-cultural aspects of well-being in that harvesting activities reinforce connection with the land, culture, identify, and self-reliance.

ITK also notes that post-harvesting activities are equally important for strengthening communal and familial bonds through the preparation and sharing of country food (ITK 2014).

Food Insecurity

There has been a recent focus on the issue of food security in Nunavut (Statistics Canada 2010; De Schutter 2012; Northern Public Affairs 2012). In the recent roundtable discussion "Issues and Ideas for Change," Kitikmeot residents described hunger, poverty, food security, nutrition, and access to country foods as key issues (Nunavut Roundtable for Poverty Reduction 2011). The issue of food insecurity has continued to escalate in recent years. The level of food insecurity in Nunavut is the highest in Canada at 46.8% for households, as indicated by the Canadian Community Health Survey (Tarasuk 2016). While household food insecurity affects an average of 1 in 6 Canadian children, 60% of children in Nunavut live in food insecure homes. Importantly, the proportion of Nunavut residents who experience severe food insecurity is almost 20%, in comparison to the rest of Canada where severe food insecurity ranges from 1.75% to 4.3%. Social assistance recipients are particularly vulnerable to food insecurity across Canada; 83.3% of Nunavummiut who receive social assistance are food insecure. Households with children are also particularly vulnerable to food security (Tarasuk 2016).

The Canadian Community Health Survey has measured food insecurity in Nunavut for over a decade. Table 3.2-20 indicates the consistently high and growing rate of food insecurity in Nunavut. In comparison, Saskatchewan had the lowest rate of food insecurity in Canada[50] at 10.6% and the second highest rates of food insecurity in Canada were found in the Northwest Territories (24.1%) and Nova Scotia (15.4%). The disparity between food insecurity in Nunavut and in the rest of Canada is significant and is increasing.

Table 3.2-20. Household Food Insecurity – Nunavut, 2005-2014

	2005	2007	2008	2009	2010	2011	2012	2013	2014
Nunavut	38.0%	35.4%	34.6%	31.0%	31.0%	36.4%	45.2%	45.0%	46.8%

Source: (Tarasuk 2016).

Previously, the International Polar Year Inuit Child Health Survey[51] (Egeland 2010) concluded that food insecurity is a problem in Nunavut homes. The survey indicated that 35.1% of homes were severely food insecure (defined as disrupted eating patterns and reduced food intake among adults and/or children), and another 35.1% of homes were moderately food insecure. Homes with children were more likely to be food insecure than homes without children. Specifically, the survey indicated that 38.4% of homes with children were severely food insecure and another 33.0% were moderately food insecure (Egeland 2010). This suggests that over two-thirds of Nunavummiut homes with children struggle with food security.

[50] BC, MB, NFL&L, and YK did not participate in the survey in 2014.
[51] Conducted by the Qanuippitali Steering Committee and McGill University. Participants were from Nunavut's 25 communities.

Food Prices and Subsidies

In the Kitikmeot region, food is subsidized as part of the Nutrition North Program and is typically flown in from Yellowknife, or arrives on the annual sealift. The Northern Food Basket (now called the Revised Northern Food Basket [RNFB]) Program began in 2005 with the purpose of monitoring the cost of healthy eating in isolated northern communities. Each month registered northern retailers provide retail prices for the food in the RNFB and INAC then calculates the cost of the RNFB using 'average community food prices'[52]. This information is used to make decision about subsidy rates. Data is collected at different times of year to capture any seasonal variation in the cost of food. . The program measures the cost of a nutritious diet for a family of four for one week using 67 standard food items. The food items selected for inclusion in the RNFB are based on food consumption surveys of Inuit and First Nations conducted by INAC and other researchers. Recent data is provided (2011 to 2015) for each of the Kitikmeot communities eligible for the Nutrition North Canada program[53] (Nutrition North Canada 2016).

Overall, prices varied but remained high in the Kitikmeot region between 2011 and 2015. In 2011, the cost of food in the Kitikmeot region ranged from $450.41 in Cambridge Bay to $503.53 in Kugluktuk. In 2015, there was a slight improvement in the cost of the food as the cost of the food ranged from $436.86 in Cambridge Bay to $488.18 in Taloyoak. The cost difference between southern centres and the Kitikmeot communities is substantial. While the RNFB has not continued to provide comparable data for relevant southern locations including Yellowknife and Edmonton, the cost of food in southern communities averaged $220 per week, for a family of four in 2017 (Alini 2017).

For Kitikmeot families (of four people) calculating a monthly food budget, this equates to cost of $1747.44 in Cambridge Bay, $1934.72 in Gjoa Haven, $1777.44 in Kugluktuk, and $1952.72 in Taloyoak. In contrast, a monthly food budget in southern Canada is, on average, approximately $880. The cost of food in the Kitikmeot region is about double that of southern Canada (Nutrition North Canada 2016; Alini 2017). With an average annual income of $42,213 in the Kitikmeot region (Section 3.2.3.4), and an average food cost of approximately $22,236.96, annually, food insecurity is inevitable.

Local Intervention

Local attempts to address food insecurity often involve intervention by schools and wellness centres. For example, the high school in Kugluktuk achieves the delivery of 80 pounds of fresh food for the school each week through a partnership with Dominion Diamonds, wherein Dominion Diamonds provides transport for the produce using crew flights (Appendix V6-3B). A number of the Kitikmeot school provide breakfast and lunch programs for students and some that include parents or other family members (e.g., the literacy lunch in Gjoa Haven, country food lunch in Kugaaruk; Appendix V6-3B).

Food Security Plans and Programs

The Nunavut Food Security Coalition was established in 2009 and in 2014 and released a Nunavut Food Security and Action Plan 2014-2016 (N. GN, & Nunavut Roundtable for Poverty Reduction, 2014). The report includes a call for action and a number of related strategies to reduce food insecurity in the territory. Each strategy was developed to include a mission, rationale, and objectives to reduce food insecurity. The strategies and missions are:

- Country food: We will promote country food as a foundational food of Nunavummiut.

[52] Average community food prices are the average cost of different brands or the cost of a food item at different retail locations.
[53] All Kitikmeot communities are eligible with the exception of Kugaaruk. One of the requirements for eligibility is year around surface access (road, rail, or marine), which Kugaaruk does not have.

- Store-bought food: We will support a food supply chain that promotes the availability and affordability of store-bought food that maximize nutritional and economic value for Nunavummiut.
- Local food production: We will explore and promote the potential for local food production in Nunavut.
- Life skills: We will support efforts to increase the ability of Nunavummiut to improve their own food security by gaining and utilizing life skills, including language, literacy, and numeracy.
- Programs and community initiative: We will support community efforts that improve access to food for those who are most vulnerable to hunger.
- Policy and legislation: We will advocate for a strong social safety net that promotes food security through relevant policy and legislative measures.

The strategies, missions, and objectives were further explored to establish actions items and outcomes. The Coalition provides updates as to the progress made in achieving these goals in their annual reports. The most recent annual report (N. GN, Nunavut Roundtable for Poverty Reduction, & NFSC, 2016) reviews the projects underway and progress for each strategy.

Actions to promote country foods included the commercialization of country food project that investigated options to buy and sell country food and the country food guidelines project that established guidelines for acquiring, storing, preparing, and serving country foods in Nunavut facilities. Other projects focused on store-bought foods including the core recipe project that provides information about how select nutritious food items and prepare store-bought food. As well, the Nunavut Food Price Survey commenced to inform a review of the food allowance provided by the Social Assistance program and capture differences in the cost of living (N. GN, Nunavut Roundtable for Poverty Reduction, & NFSC, 2016).

To address concerns about and barriers to serving country foods in institutional settings (e.g., hospitals, daycares, group homes, GN buildings, hamlet offices, work camps) the Coalition developed the Country Food Guidelines that provide instruction on acquiring, storing, preparing, and serving country food. Country food plays an important role in the diets of Nunavummiut and the Government of Nunavut encourages facilities and programs to serve country food (GN DFS 2017b).

A report "The Nutrition North Canada Program" provides 15 recommendations to improve the program from a Nunavummiut perspective. To promote local food production, the Arviat Greenhouse project involved establishing a research greenhouse to improve local soil quality and enhance community greenhouse viability, including identifying local food crops that are suitable for harvesting (N. GN, Nunavut Roundtable for Poverty Reduction, & NFSC, 2016).

Additionally, there have been increases in funding for programs and community initiatives and changes to policy and legislation. For example, Baker Lake conducted a community-led food assessment to improve access to healthy, culturally appropriate food and financial support for community-based food security events such as feasts and cooking classes. Changes to policy and legislation include the new *Donation of Food Act* (March 2013) which encourages food donations to the most vulnerable while protecting those who make donation as well as food security research involvement including the issuance of 10 research licences by the NRI in 2014 for the investigation of food security in the territory (N. GN, Nunavut Roundtable for Poverty Reduction, & NFSC, 2016).

Recently, the Nunavut Poverty Progress Profile (2016) indicated that, despite efforts to address food insecurity in the territory, almost 70% of Inuit households in Nunavut are food insecure.

> *"Not only is this [rate of food insecurity in Nunavut] eight times higher than the national average, but it is also among the highest documented food insecurity rates for an Indigenous population in a developed country." (Canada Without Poverty 2016).*

Food security is just one aspect of the larger issue of poverty within Nunavut, and should be understood in relation to other challenges such as housing, health, and unemployment. Recent research that uses the Human Development Index to measure life expectancy, education, and income ranks Nunavut significantly lower in comparison to Canada as a whole (i.e., Nunavut ranks 46th, while Canada ranks 9th, of 188 national states) (Canada Without Poverty 2016). The need for housing, food security and mental health services remains high. Forthcoming Plans for homeless and mental health, as well as the review of Nunavut's Social Assistance and long-term care programs are underway and are expected to contribute to poverty reduction and future successes in Nunavut (Canada Without Poverty 2016).

Career and Life Skills Support

GN Career Development Officers (CDOs) are available in Cambridge Bay and Kugluktuk. The KIA also retains a CDO in Gjoa Haven. CDOs provide group employment workshops focused on enhancing the skills of job seekers. One component of the group employment workshop focuses on personal finances and budgeting. Other topics include life skills, job search skills, interview skills and childcare options (GN Family Services 2015; Nunavut Community Information Database 2015).

High schools in the region offer GN-developed program called Knowledge and Employability. This curriculum is designed to establish and strengthen learning and life skills for students, including workplace readiness skills such as budgeting, money management, and resume writing (Appendix V6-3B).

The NAC's Cambridge Bay campus has previously offered a management studies program that included accounting and other business skills (Appendix V6-3B).

Social Assistance

The NBS indicates that social assistance or income support is a program of last resort for Nunavummiut who, because of an inability to obtain employment, loss of the principle family provider, illness, disability, age, or any other cause cannot provide for themselves and their dependents. The GN provides social assistance in the form of monthly payments to help meet a minimum standard of living (NBS 2014e).

More than half of the population of the Kitikmeot Region received social assistance in 2013 (52.7%; the most recent year for which data is available), representing a regional increase of 9.4% over the previous year. Increases in the number of social assistance recipients (between 2012 and 2013) ranged from 4.0% in Kugaaruk to 9.2% in Gjoa Haven, with the exception of Cambridge Bay which saw an increase of 23.6% (or about 100 residents). At the community level, social assistance recipients comprise about 68% of the population in each Gjoa Haven and Taloyoak, 62% in Kugaaruk, 49% in Kugluktuk, and 32% in Cambridge Bay (NBS 2014e).

Though more current statistics describing social assistance provision in the Kitikmeot region are unavailable, recent community-based research indicates the number of income assistance recipients has decreased across the Kitikmeot in recent years. In part, this has been attributed to a new electronic case management system that tracks recipients and makes income assistance recipients more accountable (Appendix V6-3B).

Mental Health and Suicide

Suicide is a multifaceted issue in Nunavut with high rates attributed to recent and rapidly occurring social change. ITK reports that "suicide is a demonstrative sign of socio-economic distress and a strong manifestation of social exclusion" (Inuit Tapiriit Kanatami 2014). High suicide rates have led to a general sense of discontinuity and a loss of self-reliance among Nunavummiut. The GN has identified the following factors contributing to risk of suicide:

- personal characteristics of depression, deficits in problem-solving skills, and substance abuse;
- situational factors of living in a troubled family, physical or sexual abuse, loss of a parent or caregiver, and exposure to suicidal acts of family or friends;
- social network, including loss of relationships, isolation, and inter-personal problems; and
- socio-cultural factors of poverty, social disorganization, and loss of tradition.

Factors reducing suicide risk include having a stable home life, being educated, being employed, and receiving mental health care as required (GN et al. 2010).

The number of deaths by suicide and the degree of suicide-related trauma are higher in Nunavut than in other Canadian jurisdictions. Suicide-related deaths are highest among young Inuit males (GN et al. 2010). Suicide in Nunavut peaked in 2013, with 45 deaths, decreased to 27 in 2014 (Contenta 2015), and then increased again to 32 deaths in both 2015 and 2016[54]. Of these, all were between the ages of 15 and 49 and 75% were male. Nunavut police state that officers responded to 112 incidents in 2016 that were classified as attempted suicides, which is double in comparison to the previous year (Ducharme 2017).

In the Kitikmeot region, the number of annual deaths by suicide has ranged from a high of eight in 2006 to a low of one in 2002[55]. In 2016, there were six deaths by suicide, a decrease from seven deaths in both 2015 and 2013, but high in comparison to the three deaths in 2009, 2010, 2012, and 2014. In 2016, rate of suicide in the Kitikmeot region was 87/100,000 (NBS 2017h).

Suicides in Nunavut (per 100,000) remained more than three times the Canadian average, and seven times higher than the province with the least suicides (i.e., Ontario) between 2009 and 2011 (Conference Board of Canada 2015). The proportion of Nunavummiut reporting very good or excellent mental health was the lowest in Canada at 57% (Statistics Canada 2013f), much lower than the Canadian average of 72% (Conference Board of Canada 2015). Suicide rates in Nunavut have been alarmingly high for an extended period of time: from 119.7/100,000 for 1999-2003 rates decreased slightly to 109.6/100,000 for 2004-2008 and then increased to 116.7/100,000 for 2009-2013. In comparison, the suicide rate in Canada has fluctuated from 11.9, to 10.8, and 11.3/100,000 over the same time period (ITK 2016).

In response to the need to more effectively address suicide in Nunavut communities, the GN, NTI, the Embrace Life Council, and the RCMP worked together to develop the Nunavut Suicide Prevention Strategy (2010) and Implementation Plan (2011). The Plan included specific actions as well as a timeline for implementation (Government of Nunavut 2010). A review and evaluation of implemented activities was undertaken (Embrace Life Council 2014).

[54] There are two additional deaths in 2016 that have not yet been ruled as suicides as they are still under investigation.
[55] Data is available from 1999 to 2016.

As follow-up to the Nunavut Suicide Prevention Action Plan (2011), a literature review characterized the risk factors and protective mechanisms associated with suicide. In brief, the report concluded:

- Child sexual abuse is a demonstrated risk factor for suicidal behaviour;
- There is little evidence to demonstrate that specific documentation of child sexual abuse practices are related to healing outcomes;
- Children whose parents have experienced trauma are at a higher risk for suicidality;
- There is little evidence to demonstrate peer counselling is effective at reducing risk behaviour or promoting healthy behaviour; and
- Cannabis use is linked to suicidal ideation, suicide attempts, and completed suicides (Snelling 2013).

Primary research was also conducted in relation to each of the identified themes and reinforced these conclusions. In the latter half of 2015, an inquest into Nunavut's high rate of suicide was held (Skura 2015).

In response to continuing elevated rates of suicide in Inuit Nunangat[56], a new National Inuit Suicide Prevention Strategy was released in 2016 by ITK (ITK 2016). The Strategy present an evidence-based approach to suicide prevention that is based on a shared understanding of the context and underlying risk factors for suicide among Inuit. The Strategy has specific objectives and actions to prevent suicide among Inuit within six priority areas:

- Creating social equity;
- Creating cultural continuity;
- Nurturing healthy Inuit children from birth;
- Ensuring access to a continuum of mental wellness services for Inuit;
- Healing unsolved trauma and grief; and
- Mobilizing Inuit knowledge for resilience and suicide prevention.

The Strategy highlights housing and shelter as an example of means through which suicide risk can be reduced and outlines how the strategy can help. "People who were abused as children may be at greater risk for suicide" as compared to those who were not. "In Nunavut… Inuit who died by suicide were found to be significantly more likely to have experienced physical or sexual abuse as children". In addition to risk factors for suicide, there are protective factors, or those elements of life that make people less likely to commit suicide (Table 3.2-21). Growing up in a safe household is a protective factor against suicide. Currently, "many families who are experiencing abuse where they live have nowhere safe to go because they lack access to shelters and housing". Given this, the Strategy is intended for use in securing resources related to protective factors. For example, the provision of housing and shelter can help to ensure the safety of children and families. That is, the Strategy aims to assist policy makers in making decisions and allocating resources to reduce suicide through indirect means, for example, to housing. "Even though protective factors do not completely eliminate suicide risk, they can instill resilience and the capacity to cope with and even grow from adversity" (ITK 2016).

[56] 25 times the rate of suicide for Canada as a whole.

Table 3.2-21. Suicide Risk and Protective Factors for Inuit Canada

Risk Factors	Protective Factors
Historical Trauma: impacts of colonialism, residential school, relations, dog slaughter	Cultural continuity: strongly grounded in Inuit language, culture, and history
Community Distress: Social inequities including crowded housing, food insecurity, lack of access to services	Social equity: adequate economic, educational, health and other resources that support and foster reliance
Wounded Family: Intergenerational trauma, family violence, family history of suicide	Family Strength: Safe, supportive, and nurturing homes
Traumatic Stress and Early Adversity: Experiencing acute or toxic stress in the womb, witnessing for experiencing physical or sexual abuse	Healthy Development: Providing children with safe environments that nurture social and emotional development
Mental distress: depression, substance misuse, mental health disorder, self-harm	Mental Wellness: Access to Inuit-specific mental health services and supports
Acute stress or loss: recent loss, intoxication, access to means, hopelessness, isolation	Coping with acute stress: Ability to regulate and cope with distress, access to social supports, and resources

Source: (ITK 2016)

Specific social and economic inequities affecting Inuit include overcrowding, educational attainment, food insecurity, unemployment and low income, access to health care, and lower than average life expectancy (ITK 2016). A number of more detailed objectives and ITK actions have been developed as part of the Strategy. The full report is available online[57].

Recent primary research indicates that a Crisis Response team has been established in the Kitikmeot that focuses on suicide prevention and mental health. Crises may include suicide, alcohol-related incidents, fires, and other issues. The response is coordinated at the territorial level, and the team travels to wherever there is a need (Appendix V6-3B).

Crime

From 2001 to 2016 across the Kitikmeot Region, crime rates increased. Notable is the regional decline in violent crime between 2009 and 2015 (-28%), following a steady increase from 2001 to 2009. In 2016, violent crime increased slightly by 9%. Rates of violent crime were highest in Kugluktuk and Taloyoak in 2016. Non-violent crime was highest in Cambridge, with twice almost twice as many violations in comparison to Taloyoak and Kugluktuk (the second and third highest rates, respectively). In 2016, the regional rate of non-violent crime was at the highest point since 2009. Comparatively, the rate per 100,000 of non-violent crime was highest in the Baffin Region, followed by the Kitikmeot, and the Kivalliq region was lowest (NBS 2017d).

For other violations (i.e., mischief, bail violations, disturbing the peace, arson, and offensive weapons) Cambridge Bay and Taloyoak were highest in 2016; previously Taloyoak was often third highest in terms of other violation, however there was a large increase between 2015 and 2016. For federal statute violations including drug-related offenses, Cambridge Bay and Kugluktuk have the highest crime rates from 2001 to 2016, though Taloyoak was similar to Kugluktuk in terms of federal statutes violations in 2016. In particular, Kugluktuk had relatively high rates of other violations[58] from 2003 through 2006 and

[57] https://www.itk.ca/wp-content/uploads/2016/07/ITK-National-Inuit-Suicide-Prevention-Strategy-2016.pdf.

[58] Other violations include criminal code offences that are not classified as violent or property crime incidents (excluding traffic). Examples include mischief, bail violations, disturbing the peace, arson, prostitution, and offensive weapons. Prior to 2009, other violations included sexual offences against children, forcible confinement or kidnapping, extortion, uttering threats, threatening or harassing phone calls.

in 2013 has surpassed rates of other violations and federal statute violations in Cambridge Bay. In other communities, trends in crime rates are less evident showing substantial fluctuations over time. Kugaaruk has consistently had the lowest rates for all crimes over time (NBS 2017c). Community-based research also highlights the low levels of crime in Kugaaruk and indicates that Kugaaruk had the third-lowest crime rate in Nunavut (Appendix V6-3B). However, local RCMP reported a slight increase in crime in 2017. This has been attributed to an increase in alcohol consumption as a result of increased employment and income with the construction of the new school and hamlet building (Appendix V6-3B).

Mischief and disturbing the peace were the most common types of crime in 2016: In Cambridge Bay, Kugluktuk, and Taloyoak these accounted for over 70% of crime in Cambridge Bay, 60% in Taloyoak, and about 53% in Kugluktuk. In Gjoa Haven and Kugaaruk, mischief and assault were most common, accounting for about 55% of all crime in each community. Assault was also notably high in Taloyoak and Kugluktuk at about 20 and 15%, respectively. Disturbing the peace was high in Gjoa Haven at 15% (NBS 2017c).

Criminal violations attributed to the 'administration of justice' include breach of probation, failure to appear in court, escaping from public custody, or being a prisoner unlawfully at large are also very common in the Kitikmeot communities. These accounted for between four and nine percent of criminal violations in 2016 (NBS 2014b).

Breaking and entering accounting for approximately four to six percent of all criminal violations in 2016, which includes notable decreases in Kugaaruk and Gjoa Haven since 2015 (NBS 2014b). Threats and harassment accounted for 5% of all criminal violations in the each of the Kitikmeot communities with the exception of Cambridge Bay which was slightly lower, representing an increase for some communities and a decrease for others (NBS 2014b).

Three-hundred and twenty adults were charged in the Kitikmeot region in 2015, 151 of whom were charged for assault. The number of adults charged in the region has decreased each year since 2012. Additionally, 37 Kitikmeot youth (aged 12 to 17) were charged in 2015; assault was also the most common charge amount youth (i.e., 9 of 37). The number of youth charged has decreased dramatically since 2009 (i.e., 171 youth were charged in 2009; (NBS 2016a).

The number of calls for service is also an important indicator of demand on policing services in each community, as a call for service may not necessarily result in a police-reported incidence of crime. For each community in the Kitikmeot Region, the number of calls for service has increased between 2010 and 2012, most notably in Kugaaruk where the number of calls for police services has increased by approximately 186% over the two years. The police presence in Nunavut included 131 officers in 2016 and 2015 (Statistics Canada 2017e).

Community Justice

Community justice is also an important feature of the social landscape in Nunavut. It is based on the practice of restorative justice, meaning the development of a healing relationship with the community, reintegration and mediation. The responsibilities of the Community Justice Division, Nunavut Department of Justice, include: diversions[59], crime prevention, family mediation, victim services, and

[59] Diversions are programs in the criminal justice system that allow the RCMP to refer an offender to a Community Justice Committee that works with the offender, the family, and victim to 'make things right'. In the Kitikmeot, community justice often includes a method of family group conferencing (Department of Justice, 2015).

administration of the *Family Abuse Intervention Act (2006)* (Community Justice Division 2011). IQ serves as the guiding principle of community justice, including:

- inuuqatigiitsiarniq (respecting others, relationships, and caring for people);
- tunnganarniq (fostering good spirit by being open, welcoming, and inclusive);
- pijitsirniq (serving and providing for families and communities); and
- qanuqtuurniq (being innovative and resourceful).

Within each community, there is a Community Justice Committee and, except where there are position vacancies, a Community Justice Outreach Worker. Committees are made up of a diversity of people from the community, including elders. For diversion clients, the Community Justice Committee meets to assess cases and to prescribe the necessary restorative measures. The mandate of the Community Justice Committee also includes crime prevention, community awareness, and advocacy (Community Justice Division 2011). The Committees provide a community-based approach to assist individuals who are the victims of crime and work with those who have caused harm by committing an offence (Appendix V6-3B).

The Ilavut Healing Centre in Kugluktuk opened in 2005 and provides a culturally based approach to healing low risk offenders. The centre's aim is to reconnect inmates with Inuit traditions and societal values. The minimum-security centre has the capacity to hold 15 inmates and stresses healing and community integration much like a halfway house. In 2013-2014, the average occupancy was eight inmates (Auditor General of Canada 2015).

There are five correctional outpost camps in Nunavut with two to four beds each that provide criminal offenders with the opportunity to connect with Inuit heritage and culture by learning land skills, usually from an elder. All five renewed three year contracts in 2013 (Rohner 2014). The correctional outpost camps are run as small private businesses by a family living on the land that is willing to invite offenders into their homes.

> *"They'll build a qamutiq and during the qamutiq building they'll talk about family issues, about how they came to be where they are, how the Inuit population came to be where they are. It's traditional counselling and learning on the land" (Rohner 2014).*

Other aspects of the Community Justice program include public-private partnerships. For example, in Gjoa Haven, the Kikitak Housing Association works with the Community Justice Program to employ people who have community service obligations. Individuals who have vandalized houses or buildings are hired to work on repairs and maintenance. People with a history of criminal activity are diverted through the Community Justice Program, offered employment opportunities, and provided an opportunity to gain a sense of pride and ownership in the community.

3.2.5.10 Community Readiness Initiatives

The Canadian Northern Economic Development Agency (CanNor) is currently funding community-based research aimed to enhance the ability of northerners to benefit from resource and other development. Funds are focused to enable communities to take a more active role in managing and benefiting from the impacts of resource development. Research to establish joint implementation plans that advance community readiness activities ahead of resource development projects, combine co-operative governance and the gathering of community-based evidence.

As part of regional community readiness, the KIA signed an MOU with the CanNor with respect to cooperation for the coordination and management of major projects in the Kitikmeot Region in November 2012. The MOU is a mutual understanding of cooperation and confirms the parties mutual interest in supporting responsible resource and regional infrastructure development, working collaboratively to facilitate the effective and transparent environmental assessment/impact review and regulatory permitting of projects, and optimizing opportunities to advance economic development for Kitikmeot Inuit, as related to major projects (CanNor & KIA 2012).

At the time of writing, community readiness initiatives had been undertaken in Kugluktuk and Cambridge Bay, as described below.

Kugluktuk Community Readiness Initiative

The first Community Readiness Initiative (CRI) project in the Kitikmeot was based in Kugluktuk and began in 2014. Envisioned as a community-driven initiative, work commenced with a feast, community-wide survey, focus groups, and requests for community members to identify changes they would like to see in their community. The CRI process has recently begun in Cambridge Bay.

The Kugluktuk Community Readiness Plan and recommendations were finalized in November 2015. The work was based on an assessment of the socio-economic community needs prior to mine development. The CRI team sought to document how Kugluktuk residents thought resource development in the Kitikmeot region may impact their community and to assist with planning for the potential benefits and impacts (Cameron and Gabel 2015a). The final CRI recommendations focused on issues and challenges for which there is potential for community-level action to address to improve well-being.

The Kugluktuk CRI resulted in four recommendations (Cameron and Gabel 2015a; Conference Board of Canada 2016):

- First, address the mental health challenges faced by individuals and families: strengthen the professional mental health services available and strengthen the range of community-based activities that can support individual, family, and community wellness.
- Second, invest in the well-being of children: there is recognition that children that have a good start in life are those who mature into happy and successful adults.
- Third, focus on employability in general and developing a critical mass of well-educated people: in mining as well as all other sectors (as opposed to a focus on developing skills specific to the mining sector).
- Forth, ensure access to and well-being of the land and wildlife: the land is not only a source of county food but is central to mental health and wellness, culture and language, the development of skills and judgement, and the building and maintenance of relationships.

Mental health was a top priority for Kugluktukmiut in preparation for major resource development and was the highlighted as the primary recommendation of the CRI. Actions to contribute to improved mental wellness included obtaining funding for several new mental health workers as well as support for the development of community-based, culturally-relevant health and wellness programs.

Other priority recommendations included support for a process to provide criminal record suppression to those who are eligible. The CRI report indicates that having a criminal record is linked to poverty, poor infrastructure, and housing conditions and is also a deterrent to participation in training and seeking employment. At present, obtaining criminal record suppression is incredibly challenging due to the cost of and inadequate access to legal services. The KIA has a program in place to assist

beneficiaries in pursuing criminal record suppression; however, there is only one lawyer available for the region and many people are not aware of the program. Efforts to build awareness around this issue may be hugely beneficial for those who are eligible for criminal record suppression and otherwise qualified for employment.

The final CRI priority recommendation is to provide workshops to increase financial literacy and money management skills. A strong majority of Kugluktukmiut (84%) who contributed to the CRI process felt they would benefit from learning more about how to manage money.

Cambridge Bay Community Readiness Initiative

The Cambridge Bay CRI resulted in three reports; the first providing a socio-economic baseline of the community, the second describing the wants, needs, and perceptions of the community, and the third outlining a plan for action (Conference Board of Canada 2016). The residents shared their perspectives, identified needs and wants, and developed a plan of action. Perspectives, needs, and wants fell into the following areas: Community well-being, municipal services, economic activities, traditional activities and culture, health and well-being, housing, major projects, education and training, youth, and Elders. The Plan of Actions included setting goals related to each of the identified area. Recent community-based research indicates that some of the needs and wants identified in the reports have already been accomplished. For example, the men's shelter in Cambridge Bay and the Cambridge Bay Chamber of Commerce. The Plan for Action report highlighted perspectives about mining and provided a series of goals in relation to mining, including:

- A greater understanding of mining organizations (and the opportunities available to residents);
- A greater understanding of mining related organizations;
- Budgeting support for employees;
- Information on advancement opportunities; and
- Promoting Employment Assistance Programs.

Other suggestions for mining organizations included promoting Community Advisory Groups (CAGs) more widely as a useful tool for resident. For example, by making radio announcements, in community newsletters, and by putting posters up in the community; continuing to provide Project updates; continue to work on partnerships with training organizations to inform youth about mining work. The report also indicates some residents are apprehensive about the opportunities associated with mining due to previous experience with mine closures (Conference Board of Canada 2016).

3.2.6 Summary

Governance in the Kitikmeot communities is provided by hamlets which are typically responsible for public works, water and sewer, waste management, fire protection, wellness, recreation, and economic development. Hamlet governments also lead community planning with the assistance of the GN.

There has been immense population growth in the Kitikmeot communities over the past 30 years. The transition to community life and the wage economy has, in many ways, altered the structure of Inuit society and daily life. The Kitikmeot Region has a median age of 24.6 years, which is slightly lower than Nunavut's median age of 25.1 years and much younger than the Canadian median age of 41.2 years (Statistics Canada 2017d). A high proportion of the population in the Kitikmeot communities is Aboriginal, primarily Inuit. In 2016, approximately 84% of Cambridge Bay residents self-identified as Aboriginal. This proportion was higher in all the other Kitikmeot communities, with 91% or more identifying as Aboriginal. The Kitikmeot communities tend to have a slightly higher proportion of males

as compared to females. Within the Kitikmeot communities, there is a notable difference in family structure as compared to the general Canadian population. This difference is seen in the lower proportion of married couples in the Kitikmeot Region (27.3%) as compared to Canada (65.8%). In 2016, the majority of residents in each of the Kitikmeot communities reported English as their mother tongue.

Formal education levels are low in the Kitikmeot communities when compared to Canadian averages. The proportion of the population with formal education is slightly higher in Cambridge Bay but is still well below the Canadian average. However, increases in educational attainment in the Kitikmeot region were evident in 2016. Given the fairly recent introduction of western-style education (within the last 50 years), the evolving transition to the wage economy, and current economic conditions within communities, lower than average high school completion rates are expected. Current economic conditions have led to a disconnect between education and employment, leaving some residents to prefer an early transition to wage-labour, where possible, or other pursuits such as family. Over time, the number of high school graduates has varied but generally increased and is expected to continue in this direction.

The Kitikmeot communities have high rates of unemployment among men and women. In 2016, the potential labour force in the region was approximately 4,325 people with an active labour force of 2,855 people, indicating a 66%% participation rate, which is lower than the Nunavut average of 68% (Statistics Canada 2012d, 2017d). In Kitikmeot communities, unemployment rates are also higher than the Nunavut average of 22% as well as the national average of 8%. The exception is Cambridge Bay with an unemployment rate of 17%. Over one-quarter of the Kitikmeot region labour force were estimated to be unemployed in 2016 resulting in the highest unemployment rate within the territory (28%). In comparison, the Qikiqtaaluk (17%) and Kivalliq (26%) regions more closely reflect the territorial rate (22%; (Statistics Canada 2017d).

Overall, the Kitikmeot economy is characterized as mixed and is focused across three major sectors – public, private, and traditional. The public sector dominates and acts as a major economic driver for local communities. Cambridge Bay has a more diversified economy than the other communities, and is increasingly expanding into the private sector. Recently, the introduction of CHARS and related economic activity has supported this trend. Regional economic development is constrained by a lack of skilled labour, lack of infrastructure, and difficulties with transportation and distance from outside markets.

In Cambridge Bay, individual and household income are typically higher and employment-based (derived in greater proportions from employment) as compared to the other Kitikmeot communities. The proportion of income from government transfers in other Kitikmeot communities is typically higher than the Nunavut average. On the whole, the Kitikmeot Region has the lowest earnings compared with the other regions in Nunavut (Statistics Canada 2017b).

As evidenced by typical health indicators, such as infant mortality and life expectancy, the health status of Kitikmeot residents requires further improvement to be on par with that of the general Canadian population. Despite the relatively small populations, there are a wide range of health services and programs available in Kitikmeot communities. Although Cambridge Bay is the only community that provides full-time physician services, visiting doctors see patients in the other communities on a rotational basis. With respect to community health within Kitikmeot communities, relatively high suicide rates are a concern. This has been attributed to recent rapid social change, resulting in a loss of self-reliance and a sense of discontinuity (GN et al. 2010).

Community well-being was recently studied in relation to mining in Baker Lake, Nunavut. While Baker Lake is not in the Kitikmeot region – Inuit have a shared history and values that are the foundation of Inuit community well-being. It is thought that these sentiments might equally apply to the Kitikmeot Inuit:

> *Community well-being is inclusive of relationships with the land, family, and community and is dependent on experiences that shape cultural identity and living the values for a good life. Survival and sustenance as well as emotional, spiritual, and social well-being are attributed to the land; while working together, sharing resources, social supports, and togetherness, as well as respect, open communication, coping skills and family as the central site for shared experience. Learning the values to live well is the domain of family and community (Maksimowski 2014).*

Historic and existing conditions that detract from CWB are noted and discussed including, colonialism, changes to family structure, general gap in cultural knowledge and institutionalized learned, intergenerational language barriers, and others (Maksimowski 2014). Each of these detractors is thought to be equally relevant within the Kitikmeot region.

Public housing is the most common type of tenure, and dependence on the public sector for housing is likely to continue given severe economic, climatic, and geographic constraints on private sector involvement.

Housing availability and food insecurity have become pressing issues across Nunavut. Construction during 2016/17 marked the end of a territory-wide 293-unit public housing construction program that began in 2013 and was funded by CMHC under the Economic Action Plan and IAH initiative. Related construction in the Kitikmeot included three new 5-plex's in Kugaaruk designated as public housing units[60], five public housing units in each Gjoa Haven and Kugaaruk, and five staff housing units in each Gjoa Haven, Kugaaruk, and Kugluktuk (NHC 2017). Despite these additions in 2016/17[61], the NHC assessed Kugaaruk, Gjoa Haven, and Cambridge Bay as having the second, third, and fourth highest housing need in the territory. Each is considered to have 'critical' need for public housing (NHC 2017).

The 2016 census indicates that about one-quarter to 60% of the housing stock in the Kitikmeot is not suitable. Housing suitability refers to whether a private household has enough bedrooms for the size and composition of the household (Statistics Canada 2017d). In the eastern Kitikmeot communities 49 to 61% of homes housed five or more persons in 2016. Despite the high number of people per household, the majority of homes in the Kitikmeot communities have only two bedrooms (from 36% in Cambridge Bay to 52% in Gjoa Haven). Fewer homes have four or more bedrooms including about one-fifth in Kugaaruk and Taloyoak and just over one-tenth in Gjoa Haven, Cambridge Bay, and Kugluktuk. The percentage of multi-family homes is also quite high in the eastern communities at 35% in Kugaaruk, 22% in Taloyoak, and 24% in Gjoa Haven. In comparison the territorial average of two-or-more family households was 12% (Statistics Canada 2017d).

For many Kitikmeot families[62] the monthly cost of food is unaffordable (i.e., $1747.44 in Cambridge Bay, $1934.72 in Gjoa Haven, $1777.44 in Kugluktuk, and $1952.72 in Taloyoak). In contrast, a monthly food budget in southern Canada is approximately $880 on average. The cost of food in the Kitikmeot region is about double that of southern Canada (Nutrition North Canada 2016; Alini 2017). With an

[60] Rent for the new 5-plex's in Kugaaruk is capped at $1,668 for 2017 (R. Sutton, *pers. comm.)*.
[61] Some of the construction described has not yet been completed.
[62] Cost estimates are based on a family of four people (two adults and two children).

average annual income of $42,213 in the Kitikmeot region (Section 3.2.3.4), and an average food cost of approximately $22,236.96 annually, food insecurity is inevitable (Section 3.2.5.8).

Crime and housing conditions contribute to lower community health and well-being. There were slight increases in both violent and non-violent crime at the regional level in 2016. Kugaaruk typically has low crime rates in relation to other Kitikmeot communities (Section 3.2.5.8).Nunavut's GDP experienced an overall increase of approximately 18% between 2010 and 2015. A strong increase of 10% between 2012 and 2013 was followed by slight decreases in both 2014 and 2015. There was an increase of 1.9% in 2016 as GDP surpassed the high reached in 2013. Overall, GDP growth in Canada's three territories was highest in Nunavut over this time period (Statistics Canada 2017d).

Nunavut imports almost three times as much as it exports, with virtually all exports and imports coming from or ending in other Canadian provinces. Overall, between 2013 and 2016, exports increased only slightly and imports decreased by -3% (NBS 2017f).

In Nunavut, the final consumption expenditure, or the total of public and private consumption, increased by approximately 13% between 2008 and 2016. This routinely included approximately 65% government consumption and 33% household consumption (NBS 2017f). Cambridge Bay has a more diversified economy than the other communities, and continues to expand into the private sector. The traditional subsistence economy is important to livelihoods in the Kitikmeot region and is based on Inuit culture. Harvesting activities underpin the social fabric of communities and perpetuate traditional forms of social relationships and networks among Inuit.

With respect to health within Kitikmeot communities, persistent high suicide rates have been a major concern in the region, and also throughout Nunavut. Recent rapid social change resulting in a loss of self-reliance and a sense of discontinuity are important factors in triggering suicides (Government of Nunavut 2010). Maintaining cultural knowledge, education, language, activities, and values are of high importance in Kitikmeot communities. There are two main Inuit languages within the region – Inuinnaqtun and Inuktitut. Although English is most often spoken at home, traditional languages are still spoken in some households most commonly in Gjoa Haven, Taloyoak, and Kugaaruk. Elders' camps and other education activities are organized for youth, allowing them to learn about Inuit cultural and traditional practices through direct involvement.

Communities in the Kitikmeot are preparing for mining and other future developments anticipated to support local economies and provide much-needed employment, as is evidenced by recent increases in education attainment. The measures taken to prepare for development may vary by community but are likely to focus on education and training and establishing means through which projects proponents can enhance the ability of local communities to benefit from mining development within the region.

3.3 VALUED COMPONENTS

3.3.1 Potential Valued Components and Scoping

Valued Socio-economic Components (VSECs) are those components of the human environment considered to be of scientific, ecological, economic, social, cultural, or heritage importance (Volume 2, Chapter 4). The selection and scoping of VSECs considers socio-economic conditions and trends that may interact with the proposed Project, variability in socio-economic conditions over time, and data availability as well as the ability to measure socio-economic conditions that may interact with the Project and are important to the communities potentially impacted by the Project.

3.3.1.1 The Scoping Process and Identification of VSECs

The scoping of VSECs follows the process outlined in the Assessment Methodology (Volume 2, Chapter 4). VSECs considered for inclusion in the socio-economic effects assessment relate to the local economy, businesses, and employment; education; infrastructure and services; demographics; and health and wellbeing (NIRB 2012b).

The EIS guidelines (NIRB 2012b) propose a number of VSECs to be considered for inclusion in the socio-economic effects assessment:

- Economic development opportunities;
- Contracting and business opportunities;
- Employment;
- Education and training;
- Population demographics;
- Health and well-being;
  - Individual and community wellness;
  - Family and community cohesion; and
  - Crime;
- Community infrastructure and public service, including housing; and
- Health and safety including worker and public safety.

The identified VSECs represent an appropriate starting point to guide the identification and scoping of VSECs (NIRB 2012b). The selection of VSECs began with those proposed in the EIS guidelines and was further informed through consultation with communities, regulatory agencies, available TK, professional expertise, the CRI reports, and the NIRB's final scoping report (Appendix B of the EIS Guidelines). For an interaction to occur there must be spatial and temporal overlap between a VSEC and Project component and/or activities. The determination of VSECs and potential effects for inclusion in this effects assessment considered and was informed by:

- Community-level research conducted for the Project including interviews with local service providers;
- The Cambridge Bay and Kugluktuk Community Readiness Initiative Reports (Cameron and Gabel 2015a; Conference Board of Canada 2016).
- Review of recently completed Nunavut EAs (e.g., Back River, Meliadine);
- The Hope Bay Project Inuit Impact and Benefit Agreement (IIBA; (KIA and TMAC 2015);
- Consultation and engagement with local and regional Inuit groups (for example, the KIA);
- The Environmental Impact Statement (EIS) guidelines and appendices (NIRB 2012b); and
- The public, during public consultation and open house meetings held in the Kitikmeot communities in May, 2016 (see Volume 2, Chapter 3, Public Consultation).

Other key data sources that have provided context to inform the selection of VSECs and effects to be assessed include the Hope Bay Baseline Report (Rescan 2012), the Draft Nunavut Land Use Plan (NPC 2014), the NIRB reference and guidance documents (NIRB 2013b, 2013c, 2013d), the KIA TK Report

(Banci & Spicker 2016), and the 2017 community research report (Appendix V6-3B). Topics discussed during community meetings, focus groups, interviews, and other meetings with the KIA and relevant government bodies were integrated within specific VSECs for further examination in the assessment process.

The content and results of other EIS chapters were reviewed to inform the selection of VSECs and effects including Public Consultation and Government Engagement (Volume 2, Chapter 3), Human Health Risk Assessment (Volume 6, Chapter 5), and the Land Use Effects Assessment (Volume 6, Chapter 4). Specific chapters and sections of these volumes are referenced, where appropriate.

The selection of VSECs was also informed by community research, specifically interviews with hamlet officials, business owners, and numerous health, education, housing, and social service providers in the Kitikmeot, who highlighted the importance of community wellness and the need for employment (Appendices V6-3A and V6-3B).

3.3.1.2 NIRB Scoping Sessions

Scoping sessions hosted by NIRB (2012c) with key stakeholders and local community members (i.e., the public) focused on identifying the components that are important to local residents, as related to the Project. Comments made during these sessions were compiled and analysed as part of VSEC scoping. Notably, many remarks related to the human environment linked to the socio-economics centered on the desire for employment tempered with the need to minimize adverse effects to the environment and community wellness.

Comments indicated a desire for: employment at the mine, job shadowing, ongoing training in local communities, financial planning guidance for youth, and benefits to the eastern Kitikmeot communities. Barriers to mine employment (e.g., criminal record checks) was raised as a concern.. An increased presence of drugs and alcohol in the communities (brought in by company contractors) was also raised as a concern. Other comments described a concern regarding Nunavut's capacity to provide enough people to staff the high number of currently proposed projects and whether it was possible to sequence Projects over time (NIRB 2012c).

3.3.1.3 TMAC Consultation and Engagement Informing VSEC Selection

Community meetings for the Hope Bay Project were conducted in each of the five Kitikmeot communities between May 2nd and 6th, 2016. The meetings are a central component of engagement with the public and an opportunity to share information and seek public feedback. Overall, the community meetings were well attended, attracting a total of 144 attendees. Public feedback (questions, comments, and concerns) about the proposed Project was obtained through open dialogue during Project presentations and review of Project materials (e.g., information brochure, storyboards, and maps), and through comments provided in feedback forms. One common topic of discussion in each of the five community meetings was employment. Questions, comments, and concerns related to employment included:

- The number of hires and types of jobs available;
- The process of applying for a job;
- Points of hire/pick-up locations and flight routing;
- Support for apprenticeship programs;
- Difficulties with relying on KIA Community Liaison Officers in the communities for hiring;
- The duration of employment;

- The level of Inuit and Nunavut employment;
- The number of hires from the community;
- Benefits to smaller communities;
- Positions for women (e.g., as bear monitors);
- Work hours and schedule;
- Advertisement of job openings and hiring process;
- Engagement of high school students and training for graduates;
- Hiring of Kitikmeot Inuit versus Inuit from elsewhere; and
- The location of training.

Other socio-economic topics of discussion during the 2016 community meetings included business opportunities, and the process for Inuit businesses to get contract work with TMAC.

3.3.2 Valued Components Included in the Assessment

VSECs have been selected to represent the interests of Kitikmeot residents in relation to the Project. Regional interests were identified in public and community meetings held in the Kitikmeot communities. The scoping analysis identified the following VSECs for inclusion in the assessment:

1. Economic development;
2. Business opportunities;
3. Employment;
4. Education and training;
5. Migration, Housing, and Infrastructure and Services; and
6. Community Health and Well-being.

The VSECs selected to guide the assessment of the potential effects of the Project on socio-economics are those:

- that have potential to interact with the activities and components of the Project;
- identified as important by local communities, Inuit organizations, governments, regulators, and other stakeholders during consultation and engagement; and
- informed by IQ (Volume 2, Chapter 2) and professional judgement.

Table 3.3-1 summarizes the VSECs included in the socio-economic assessment and indicates whether each proposed by the EIS guidelines (NIRB 2012b) have either been included as indicated, included as part of another VSEC, or otherwise addressed elsewhere in the EIS.

The VSEC **Economic Development** was selected to guide the discussion of the Project's anticipated beneficial effects on regional, territorial, and national economic production (Gross Domestic Product, or GDP) and revenues (taxes, royalties and other fees paid to governments and Inuit organizations). The discussion considers the anticipated direct, indirect, and induced effects of the Project on the regional economy, including, for example, the potential demand created by local Project employees with increased incomes and the induced effects of the Project on local demand for goods and services.

Table 3.3-1. VSECs Included in the Socio-economic Assessment

VSECs proposed in the EIS Guidelines	Included/ Excluded	Rational	Final VSEC
Economic development and opportunities	Included	Project-related procurement of local, regional, and territorial goods and services; indirect and induced Project employment	Economic Development
Contracting and business opportunities	Included	Project-related procurement of local goods and services; indirect Project employment	Business Opportunities
Employment	Included	Direct, indirect and induced Project employment	Employment
Education and training	Included	Provision of Project employment expected to enhance local education profile and training available, and place demand on local training institutions	Education and Training
Population demographics	Excluded	Consideration is given to the potential for in-migration as a result of indirect and induced employment as part of the VSEC Migration, Housing, and Infrastructure and Services	Migration, Housing, and Infrastructure and Services
Health and wellbeing: Individual and community wellness	Included	Project employment, specifically increased income	Community Health and well-being
Health and wellbeing: Family and community cohesion	Included	Project employment, specifically changes to family routines due to the fly-in/fly-out operation of the Project	Community Health and well-being
Health and wellbeing: Crime levels	Included	Project contracting and employment, specifically an increased income disparity	Community Health and well-being
Community infrastructure and public service, including housing	Excluded	Potential Project interactions with community infrastructure and public services included housing are assessed in relation to the VSEC Migration, Housing, and Infrastructure and Services which is included in the assessment to address local concerns related to migration, lack of services capacity, and overcrowding of housing	Migration, Housing, and Infrastructure and Services
Health and safety including worker and public safety	Excluded	Human health and safety as potentially impacted by environmental risks is assessed as part of the Human Health Risk Assessment (Volume 6, Chapter 5). Public safety within the Kitikmeot communities is discussed as part of effects to Community Health and Well-being including crime levels. Management of worker health and safety on site is discussed in the Hope Bay Health and Safety Management Plan (Volume 8, Annex V8-4).	Community Health and well-being

The VSEC **Business Opportunities** was selected to guide the discussion of the Project's anticipated effects on existing Inuit and northern businesses and viability of new or additional business ventures in the region and territory. The discussion considers Project contract and sub-contract opportunities and focuses on the procurement of goods and services from local suppliers. Predictions are provided to characterize the contributing effect of increased income within the Kitikmeot on the demand for goods and services potentially enhancing local demand and creating new business opportunities.

The VSEC **Employment** was selected to guide the discussion of the Project's anticipated effects on the regional labour force as a result of the provision of direct, indirect, and induced employment. The

discussion considers regional employment estimates, the potential for the Project to compete with local employers for workers, and how the Project might alter the capacity of the labour force.

The VSEC **Education and Training** was selected to guide the discussion of the Project's anticipated effects on education and training opportunities available, local demand for education and training, and youth outlooks on education and the future. The discussion considers the locally expressed desire for employment, regional education profile, employment requirements of the Project, and contributions to the Kitikmeot Employment and Training Fund. Also considered is the potential for the Project to influence youth perceptions of the connection between education, employment and future opportunities.

The VSEC **Migration, Housing, and Infrastructure and Services** was selected to represent local concern for the potential for population influx to affect housing demand and create pressure on locally provided services, including health care and education. The Project is not accessible from Kitikmeot communities by public road or commercial flights. While on rotation, Project employees will be housed in a camp at the Project site, reducing the potential for migration to the Kitikmeot region. Any induced migration is expected to be focused within two communities: Cambridge Bay and Kugluktuk. However, the current state of housing demand, overcrowding, and limited services capacity requires that consideration be given to this potential impact.

The VSEC **Community Health and Well-being** was selected to guide the discussion of the anticipated indirect effects of the Project on individual and family social life. These indirect effects may arise as a result of other direct effects of the Project, namely employment, increased income, and changes to existing family routines. The discussion includes consideration for individual, family, and community health including mental health, physical health, and cultural well-being. The latter is related to potential changes in the typical routines of families that may enhance or detract from current levels of participation in traditional land use and other cultural activities. Consideration is given to the implications of these changes for food security, which is currently a topic of concern in the region and territory. Potential changes to public safety and crime levels are also discussed.

3.3.3 Valued Components Excluded from the Assessment

In addition to the VSECs included in the assessment, there is one VSEC proposed in the EIS guidelines (NIRB 2012b) that is excluded from the assessment as interaction with the Project is not anticipated: Population Demographics.

A description of potential change to regional population is described in the assessment of effects to Migration (Volume 6, Section 3.5.5.5), which indicates that population increase within the Kitikmeot region is primarily driven by natural population increase (high birth rate), with net migration, considering both migration from outside of the territory and from other regions of Nunavut, being much smaller in comparison (Statistics Canada, 2016). The Project anticipates negligible changes to migration to the Kitikmeot region or between communities within the Kitikmeot because:

- As specified in the IIBA, the Project has agreed to maintain multiple points of hire across the Kitikmeot region and to transport workers from their home community.
- The fly-in/fly-out nature of the operation means that there is no advantage for non-Kitikmeot employees to move to the Kitikmeot region.

This conclusion of a negligible effect to migration is supported by the results of the Hope Bay SEMP which, from 2013 to 2016, has not recorded any Hope Bay Project employees relocating to other communities within the Kitikmeot region due to work at the mine. Because there is no predicted

residual effect of the Project on population (via migration), there is no potential interaction on demographic characteristics such as age distribution, Inuit/non-Inuit population, etc.

In some instances, potential effects have been refined and considered as part of other effects that have the potential to interact with the VSECs included in the assessment. A rationale is provided below.

3.3.3.1 Potential Effects Excluded from the Assessment

A refined understanding of potential effects has enabled a focused analysis and scoping out of any aspect of an effect for which there is not expected to be an interaction with a VSEC. The aim of this approach was to clearly define the effects, how each effect is linked to the Project, and how each Project-induced effect is expected to interact with a VSEC. The rationale for the exclusion of certain potential effects is provided in Table 3.3-2.

Table 3.3-2. Potential Socio-economic Effects Excluded from the Assessment

VSEC	Potential Effect	Considerations and Rationale for Exclusion
Population Demographics	Potential for Project-induced demographic changes in population, migration, re-distribution and the effects of those changes, including interactions between local residents and non-residents.	A description of potential change to regional population is included in Migration (Volume 6, Section 3.5.5.5). Population increase within the Kitikmeot region is primarily driven by natural population increase with net migration being much smaller in comparison (Statistics Canada, 2016). The Project anticipates negligible changes to migration to the Kitikmeot region or between communities within the Kitikmeot because: the Project has agreed to maintain multiple points of hire across the Kitikmeot region and to transport workers from their home community; and the fly-in/fly-out nature of the operation means that there is no advantage for non-Kitikmeot employees to move to the Kitikmeot region. This effect is considered in related to the VSEC Migration, Housing, and Infrastructure and Services.
	Potential effects of fly-in/fly-out employment on population demographics.	Project employees will be housed in camps at site and the potential for interaction with regional population demographics is negligible.
	Potential effects from various Project phases, including unemployment as a result of temporary suspension of operations or mine closure.	In the case of a temporary closure of the Project, non-local employees would return home (outside of the region) and local employees are expected to remain at their usual residence. The potential for an effect on population demographics is negligible.
Economic Development	Potential impact on the traditional economic activities including hunting, fishing, and/or sport hunting and guiding.	This effect is considered in the Land Use Effects Assessment (Volume 6, Chapter 4) and is not included in this chapter.
	Potential impacts related to accessibility and removal of barriers for travelling, fishing, hunting/trapping, and other activities by local communities as a result of the construction and operation of the all-weather road.	This effect is considered in the Land Use Effects Assessment (Volume 6, Chapter 4) and is not included in this chapter.

VSEC	Potential Effect	Considerations and Rationale for Exclusion
	Provide a discussion of the effects of the Project on personal savings rate.	This effect is excluded as both quantitative and contextual data are unavailable. It is expected that, on average, increases in incomes as a result of Project-related employment will result in an increase in the personal savings rate.
Community Infrastructure and Public Services	Discussion of building new and updating existing structures including weather shields and outposts beyond the boundary of communities and along hunting/travelling routes and/or at hunting grounds which may facilitate local hunting activities/travelling in Project areas.	TMAC does not expect to construct weather shields or other structures at this time. However, TMAC has adopted a strategy to accommodate travelling land users passing through the Project area (see also Land Use Effects Assessment, Volume 6, Chapter 4).
	Assessment of the incremental costs imposed by the needs from the Project directly and/or indirectly on public infrastructure, services, including those caused by Project-induced demographic change.	This effect is considered in relation to the VSEC Migration, Housing, and Infrastructure and Services.
	Description of the extent and current capacity of local transportation systems and associated infrastructure.	TMAC does not anticipate using local transportation systems and associated infrastructure, other than periodic use of community airports for the transportation of local workers and goods and services from regional businesses. The potential for an effect on transportation systems and infrastructure is negligible.
	Assessment of the public health and environmental health needs and implications to the Proponents community initiatives.	The focus of the Proponents community investment initiatives to be included in Community Involvement Plan (Annex V8-5).
	A discussion of community access to Project infrastructure upon closure, including the all-weather road.	This effect is considered in the Land Use Effects Assessment (Volume 6, Chapter 4) and is not included in this chapter.
	A discussion of the potential to bring in freight for communities by return shipping, and likelihood to share shipping costs with local communities.	A specific discussion or evaluation is not required for the effects assessment. TMAC is adding to the customer base for marine transport companies in the central Arctic and supporting locally-based sealift companies. TMAC directly negotiates with Kitikmeot-based businesses to provide sealift transport services. NEAS and NSSI are both on the Kitikmeot Qualified Business Registry facilitated through the IIBA. Typically, servicing the Project is one of many other customer shipments into the Kitikmeot region (i.e., Hope Bay is one stop in addition to community stops). In the 2016 marine transport season, TMAC shared sealift costs with local communities, and expects that this practice will continue. Marine transport companies are responding to the new business from the Project by both chartering vessels and selling deck space. When deck space is sold, this adds to the revenue and lowers the costs for the community resupply, as it is just one of potentially several offloads within the region.
Employment	Discussion of culturally-sensitive workforce management practices that will meet both the Project's immediate labour force needs as well as the region's longer-term economic development needs.	A discussion of workforce management practices is provided in the Hope Bay Human Resources Plan (Annex V8-7).

VSEC	Potential Effect	Considerations and Rationale for Exclusion
Education and Training	Evaluation of training programs planned by the Proponent, the associated challenges and likelihood of success of trainees to satisfy the Project needs and regional economy development with consideration of cultural and language barrier.	A discussion of workforce management practices is provided in the Hope Bay Human Resources Plan (Annex V8-7).
	Discussion of the potential for longer term community capacity building programs, if any have been planned or will be planned and are anticipated to be implemented throughout the Project's lifetime, regarding how mine training plans can enhance the transferability of skills after the mine closure (e.g., management and HR skills, computer skills, heavy equipment experience, finance skills, etc.).	A discussion of workforce management practices is provided in the Hope Bay Human Resources Plan (Annex V8-7).
Community Health and Well-being	Changes to cultural integrity as a result of potential demographic change.	The Project is not expected to result in a level of in-migration that would alter the cultural composition of Kitikmeot communities. The potential for an effect is negligible.
	Linkages between increased incomes and STIs as well as other communicable diseases.	The discussion of management practices related to workplace conduct is included in the Hope Bay Human Resources Plan (Annex V8-7).
	Potential impacts of workplace discipline and cultural conflicts among Nunavummiut and southern workers, including those issues which may be related to or exacerbated by language barriers between employees.	A discussion of workforce management practices and mitigation measures including those related to language and cross-cultural employee orientation is provided in the Hope Bay Human Resources Plan (Annex V8-7).
	Topics For Discussion: Overview of the current financial management programs available in the potentially affected communities.	Implementation and use of financial management programs is discussed as mitigation for potential effects, and is presented in the Hope Bay Human Resources Plan (Annex V8-7).
	Topics For Discussion: Description of barriers to current financial management programs and any incentives that would be provided by the Proponent for healthy financial management.	Implementation and use of financial management programs is discussed as mitigation for potential effects, and is presented in the Hope Bay Human Resources Plan (Annex V8-7).
	Linkages between the Project and import/export of alcohol[63]	No pathways have been identified for a direct interaction between the Project and the import/export of alcohol and prohibited substances in the RSA. TMAC has enforced a zero-tolerance policy for workers on site. TMAC will not import/export alcohol and prohibited substances to communities in the RSA. TMAC has no access to personal import/export decisions of workers, and has no means to monitor personal import/export. In addition to these measures, TMAC is aware of and compliant with Nunavut's regulatory context relating to alcohol and illegal substances.

[63] The potential for an effect between the Project and import/export of alcohol was raised by INAC during the technical review of the draft EIS (INAC TRC 34).

3.4 SPATIAL AND TEMPORAL BOUNDARIES

The spatial boundaries selected to shape this assessment are determined by the Project's potential impacts on the socio-economic environment. Regional-level data are provided for the Kitikmeot region and for Nunavut, while community-level data is presented for each of the communities in the Kitikmeot region: Cambridge Bay (also known as Iqaluktuuttiaq), Kugluktuk (previously known as Coppermine), Gjoa Haven (also known as Uqsuqtuuq), Taloyoak (previously known as Spence Bay), and Kugaaruk (previously known as Pelly Bay). In some cases, depending on information availability, Nunavut-wide information is presented.

Temporal boundaries are selected that consider the different phases of the Project and their durations. The Project's temporal boundaries reflect those periods during which planned activities will occur and have potential to affect a VSEC.

The determination of spatial and temporal boundaries also takes into account the development of the entire Hope Bay Greenstone Bel. The assessment considers both the incremental potential effects of the Project, as well as the total potential effects of the additional Project activities in combination with the existing and approved Projects including the Doris Project and advanced exploration activities at Madrid and Boston.

3.4.1 Project Overview

The Madrid-Boston Project consists of proposed mine operations at the Madrid North, Madrid South and Boston deposits. The Madrid-Boston Project is part of a staged approach to continuous development of the Hope Bay Project, comprised of existing operations at Doris and bulk samples followed by commercial mining at Madrid North, Madrid South, and Boston deposits. The Madrid-Boston Project would use and expand upon the existing Doris Project infrastructure.

The Madrid-Boston Project is the focus of this application. Because the infrastructure of existing and approved projects will be utilized by the Madrid-Boston Project, and because the existing and approved projects have the potential to interact cumulatively with the Madrid-Boston Project, existing and approved projects are described below.

3.4.1.1 Existing and Approved Projects

Existing and approved projects include:

- the Doris Project (NIRB Project Certificate 003, NWB Type A Water Licence 2AM-DOH1323);
- the Hope Bay Regional Exploration Project (NWB Type B Water Licence 2BE-HOP1222);
- the Madrid Advanced Exploration Program (NWB Type B Water Licence 2BB-MAE1727); and
- the Boston Advanced Exploration Project (NWB Type B Water Licence 2BB-BOS1727).

The Doris Project

The Doris Project was approved by NIRB in 2006 (NIRB Project Certificate 003) and licenced by NWB in 2007 (Type A Water Licence 2AM-DOH0713). The Type A Water Licence was amended in 2010, 2011 and 2012 and received modifications in 2009, 2010, and 2011.

Construction of the Doris Project began in early 2010. In early 2012, the Doris Project was placed into care and maintenance, suspending further Project-related construction and exploration activity along the Hope Bay Greenstone Belt. Following TMAC's acquisition of the Hope Bay Project in March of 2013,

NWB renewed the Doris Project Type A Water Licence (Type A Water Licence 2AM-DOH1323), and TMAC advanced planning, permitting, exploration, and construction activities. In 2016, NIRB approved an amendment to Project Certificate 003 and NWB granted Amendment No. 1 to Type A Water Licence 2AM-DOH1323, extending operations from two to six years through mining two additional mineralized zones (Doris Connector and Doris Central zones) to be accessed via the existing Doris North portal. Amendment No. 1 to Type A Water Licence 2AM-DOH1323 authorizes a mining rate of approximately 2,000 tonnes per day of ore and a milling throughput of approximately 2,000 tonnes per day of ore. The Doris Project began production early in 2017.

The Doris Project includes the following components and facilities:

- The Roberts Bay offloading facility: marine jetty, barge landing area, beach laydown area, access roads, weather havens, fuel tank farm/transfer station, waste storage facilities and incinerator, and quarry;
- The Doris site: 280 person camp, laydown areas, service complex (e.g., workshop, wash bay, administration buildings, mine dry), two quarries (mill site platform and solid waste landfill), core storage areas, batch plant, brine mixing facilities, vent raise (3), air heating units, reagent storage, fuel tank farm/transfer station, potable water treatment, waste water treatment, incinerator, landfarm and handling/temporary hazardous waste storage, explosives magazine, and diesel power plant;
- Doris Mine works and processing: underground portal, overburden stockpile, temporary waste rock pile, ore stockpile, and ore processing plant (mill);
- Tailings Impoundment Area (TIA): Schedule 2 designation for Tail Lake with two dams (North and South dams), sub-aerial deposition of flotation tailings, emergency tailings dump catch basins, pump house, and quarry;
- All-season main road with transport trucks: Roberts Bay to Doris site (4.8 km, 150 to 200 tractor and 300 fuel tanker trucks/year);
- Access roads from Doris site used predominantly by light-duty trucks to: the TIA, the explosives magazine, Doris Lake float plane dock (previously in use), solid waste disposal site, and to the tailings decant pipe, from the Roberts Bay offloading facility to the location where the discharge pipe enters the ocean; and
- All-weather airstrip (914 m), winter airstrip (1,524 m), helicopter landing site and building, and Doris Lake float plane and boat dock.

Water is managed at the Doris Project through:

- freshwater input from Doris Lake for mining, milling, and associated activities and domestic purposes;
- freshwater input from Windy Lake for domestic purposes;
- process water input primarily from the TIA reclaim pond;
- surface mine contact water discharged to the TIA;
- underground mine contact water directed to the TIA or to Roberts Bay via the marine outfall mixing box (MOMB);
- treated waste water discharged to the TIA; and

- water from the TIA treated and discharged to Roberts Bay via a discharge pipeline, with use of a MOMB.

Hope Bay Regional Exploration Project

The Hope Bay Regional Exploration Project has been renewed several times since 1995. The current extension expires in June 2022. Much of the previous work for the program was based out of Windy Lake and Boston camps. These camps were closed in October 2008 with infrastructure either decommissioned or moved to the Doris site. All exploration activities are now based from the Doris site. Components and activities for the Hope Bay Regional Exploration Project include:

- operation of helicopters from Doris; and
- the use of exploration drills, which are periodically moved by roads and by helicopter as required.

Madrid Advanced Exploration

In 2017, the NWB issued a Type B Water Licence (2BB-MAE1727) for the Madrid Advanced Exploration Program to support continued exploration and a bulk sample program at the Madrid North and Madrid South sites, located approximately 4 km south of the Doris site. The program includes extraction of a bulk sample totaling 50 tonnes from each of the Madrid North and South locations, which will be trucked to the mill at the Doris site for processing and placement of tailings in the tailings impoundment area (TIA). All personnel will be housed in the Doris camp.

The Madrid Advanced Exploration Program includes the following components and activities.

- Use of existing infrastructure associated with the Doris Project:
  - camp facilities to support up to 70 personnel as required to undertake the advanced exploration activities;
  - mill to process ore;
  - TIA;
  - landfill and hazardous waste areas, particularly if closure and remediation becomes required for the Madrid Advanced Exploration Program infrastructure;
  - fuel tank farms; and
  - Doris airstrip and Roberts Bay facility for transport of personnel and supplies.
- Use of existing infrastructure at the Madrid and Boston areas:
  - borrow and rock quarry facilities: existing Quarries A, B, and D along the Doris-Windy all-weather road (AWR);
  - AWR between Doris and Windy Lake for transportation of personnel, ore, waste, fuel, and supplies; and
  - future mobilization of existing exploration site infrastructure, should it become necessary.
- Construction of additional facilities at Madrid North and South:
  - access portals and ramps for underground operations at Madrid North and at Madrid South;
  - 4.7 km extension of the existing AWR originating from the Doris to the Windy exploration area (Madrid North) to the Madrid South deposit, with branches to Madrid North, Madrid North vent raise, and the Madrid South portal;

- development of a winter road route (WRR) from Madrid North to access Madrid South until AWR has been constructed;
- borrow and rock quarry facilities; two quarries referenced as Quarries G and H;
- waste rock and ore stockpiles;
- water and waste management structures; and
- additional site infrastructure, including compressor building, brine mixing facility, saline storage tank, air heating facility, four vent raises, workshop and office, laydown area, diesel generator, emergency shelter, fuel storage facility/transfer station.

o Undertaking of advanced exploration access to aforementioned deposits through:

- continue field mapping and sampling, as well as airborne/ground/downhole geophysics;
- diamond drilling from the surface and underground; and
- bulk sampling through underground mining methods and mine development.

Boston Advanced Exploration

The Boston Advanced Exploration Project Type B Water Licence No. 2BB-BOS1217 was renewed as Water Licence No. 2BB-BOS1727 in July 2017 and includes:

o the Boston camp (65 person), maintenance shops, workshops, laydown areas, water pumphouse, vent raise, warehouse, site service roads, sewage and greywater treatment plant, fuel storage and transfer station, landfarm, solid waste landfill and a heli-pad;

o mine works, consisting of underground development for exploration drilling and bulk sampling, waste rock and ore stockpiles;

o potable water and industrial water from Aimaokatalok Lake; and

o treated sewage and greywater discharged to the tundra.

3.4.1.2 The Madrid-Boston Project

The Madrid-Boston Project includes: the Construction and Operation of commercial mining at the Madrid North, Madrid South, and Boston sites; the continued operation of Roberts Bay and the Doris site to support mining at Madrid and Boston; and the Reclamation and Closure and Post-closure phases of all sites. Excluded from the Madrid-Boston Project for the purposes of the assessment are the Reclamation and Closure and Post-closure components of the Doris Project as currently permitted and approved.

Construction

Madrid-Boston construction will use the infrastructure associated with Existing and Approved Projects. This may include:

o an all-weather airstrip at the Boston exploration area and helicopter pad;

o seasonal construction and/or operation of a winter ice strip on Aimaokatalok Lake;

o Boston camp with expected capacity for approximately 65 people during construction

o Quarry D Camp with capacity for up to 180 people;

o seasonal construction/operation of Doris to Boston WRR;

o three existing quarry sites along the Doris to Windy AWR;

- Doris camp with capacity for up to 280 people;
- Doris airstrip, winter ice strip, and helicopter pad;
- Roberts Bay offloading facility and road to Doris; and
- Madrid North and Madrid South sites and access roads.

Additional infrastructure to be constructed for the proposed Madrid-Boston Project includes:

- expansion of the Doris TIA (raising of the South Dam, construction of West Dam, development of a west road to facilitate access, and quarrying, crushing, and screening of aggregate for the construction);
- construction of a cargo dock at Roberts Bay (including a fuel pipeline, mooring points, beach landing and gravel pad, shore manifold);
- construction of an additional tank farm at Roberts Bay (consisting of two 10 ML tanks);
- expansion of Doris accommodation facility (from 280 to 400 person), mine dry and administrative building, water treatment at Doris site;
- expansion of the Doris mill to accommodate concentrate handling on the south end of the building facility and rearrangement of indoor crushing and processing within the mill building;
- complete development of the Madrid North and Madrid South mine workings;
- incremental expansion of infrastructure at Madrid North and Madrid South to accommodate production mining, including vent raise, access road, process plant buildings;
- construction of a 1,200 tpd concentrator, fuel storage, power plant, mill maintenance shop, warehouse/reagent storage at Madrid North;
- all weather access road and tailings line from Madrid North to the south end of the TIA;
- AWR linking Madrid to Boston (approximately 53 km long, nine quarries for permitting purposes, four of which will likely be used);
- all-weather airstrip, airstrip building, helipad and heliport building at Boston;
- construction of a 2,400 tpd process plant at Boston;
- all infrastructure necessary to support mining and processing activities at Boston including construction of a new 300-person accommodation facility, mine office and dry and administration buildings, additional fuel storage, laydown area, ore pad, waste rock pad, diesel power plant and dry-stack tailings management area (TMA);
- infrastructure necessary to support ongoing exploration activities at both Madrid and Boston; and
- wind turbines near the Doris (2), Madrid (2), and Boston (2) sites.

Operation

The Madrid-Boston Project Operation phase includes:

- mining of the Madrid North, Madrid South, and Boston deposits by way of underground portals and Crown Pillar Recovery;
- operation of a concentrator at Madrid North;

- transportation of ore from Madrid North, Madrid South, and Boston to the Doris process plant, and transporting the concentrate from the Madrid North concentrator to the Doris process plant;
- extending the operation at Roberts Bay and Doris;
- processing the ore and/or concentrate from Madrid North, Madrid South, and Boston at the Doris process plant with disposal of the detoxified tailings underground at Madrid North, flotation tailings from the Doris process plant pumped to the expanded Doris TIA, and discharge of the TIA effluent to the marine environment;
- operation of a concentrator at Madrid North and disposal of tailings at the Doris TIA;
- operation of a process plant and wastewater treatment plant at Boston with disposal of flotation tailings to the Boston TMA and a portion placed underground and the detoxified leached tailings placed in the underground mine at Boston;
- operation of two wind turbines for power generation; and
- ongoing maintenance of transportation infrastructure at all sites (cargo dock, jetty, roads, and quarries).

Reclamation and Closure

Areas which are no longer needed to carry out Madrid-Boston Project activities may be reclaimed during Construction and Operation.

At Reclamation and Closure, all sites will be deactivated and reclaimed in the following manner (see Volume 3, Chapter 5):

- Camps and associated infrastructure will be disassembled and/or disposed of in approved non-hazardous site landfills.
- Non-hazardous landfills will be progressively covered with quarry rock, as cells are completed. At final closure, the facility will receive a final quarry rock cover which will ensure physical and geotechnical stability.
- Rockfill pads occupied by construction camps and associated infrastructure and laydown areas will be re-graded to ensure physical and geotechnical stability and promote free-drainage, and any obstructed drainage patterns will be re-established.
- Quarries no longer required will be made physically and geotechnically stable by scaling high walls and constructing barrier berms upstream of the high walls.
- Landfarms will be closed by removing and disposing of the liner, and re-grading the berms to ensure the area is physically and geotechnically stable.
- Mine waste rock will be used as structural mine backfill.
- The Doris TIA surface will be covered waste rock. Once the water quality in the reclaim pond has reached the required discharge criteria, the North Dam will be breached and the flow returned to Doris Creek.
- The Madrid to Boston AWR and Boston Airstrip will remain in place after Reclamation and Closure. Peripheral equipment will be removed. Where rock drains, culverts or bridges have been installed, the roadway or airstrip will be breached and the element removed. The breached opening will be sloped and armoured with rock to ensure that natural drainage can pass without the need for long-term maintenance.

- A low permeability cover, including a geomembrane, will be placed over the Boston TMA. The contact water containment berms will be breached and the liner will be cut to prevent collecting any water. The balance of the berms will be left in place to prevent localized permafrost degradation.

3.4.2 Spatial Boundaries

The assessment of the potential effects of the Project on social and economic conditions considers two distinct sub-regional areas of interest – the west and east Kitikmeot region. Each Kitikmeot community is a pick-up-point for the Project which provides an equal opportunity for Project employment to all Kitikmeot residents. However, it is anticipated that Project contracting and procurement will be focused within communities with established goods and services providers that are located nearest to the Project. For that reason, the communities in the western Kitikmeot, Cambridge Bay and Kugluktuk, may experience the effects of the Project to more pronounced degree as compared to communities in the eastern Kitikmeot.

The socio-economic LSA is defined as the west Kitikmeot region and includes the communities of Cambridge Bay and Kugluktuk while the RSA also includes the eastern Kitikmeot region including Gjoa Haven, Taloyoak, and Kugaaruk. The LSA and RSA are shown in Figure 3.2-1 (Section 3.2.2.1 Socio-economic Study Areas).

The communities of Omingmaktok (Bay Chimo) and Kingaok (Bathurst Inlet) are no longer occupied year round and do not offer typical municipal services such as health and education services. For this reason, these are not included as study communities for the socio-economic effects assessment. This socio-economic effects assessment focuses on the five populated Kitikmeot communities. However, within the IIBA, TMAC provides transportation for workers to the Project should any workers choose to reside in Omingmaktok or Kingaok during certain times of the year.

3.4.3 Temporal Boundaries

The temporal boundaries for each VESC were defined in relation to planned activities over the lifetime of the Boston-Madrid Project within which a reasonable expectation of interaction socio-economic components can be predicted.

The Project represents a significant development in the mining of the Hope Bay Greenstone Belt. Even though this Project spans the conventional Construction, Operation, Reclamation and Closure, and Post-closure phases of a mine project, the Madrid-Boston Project is a continuation of development currently underway. The Project has four separate operational sites: Roberts Bay, Doris, Madrid (North and South), and Boston. The development of these sites is planned to be sequential. As such, the temporal boundaries of this Project overlap with a number of Existing and Approved Authorizations (EAAs) for the Hope Bay Project and the extension of activities.

For the purposes of the EIS, distinct phases of the Madrid-Boston Project are defined (Table 3.4-1). It is understood that construction, operation and closure activities will, in fact, overlap among sites; this is outlined in Table 3.4-1 and further described in Volume 3 (Project Description).

The Post-closure phase of the Madrid-Boston Project is scoped out of the socio-economic effects assessment as the primary drivers of socio-economic effects are employment and procurement, which will be limited during this period. Project activities during Post-closure include reclamation, monitoring, and reporting and will not generable a level of employment or spending that has potential to affect social and economic conditions (see Project Description Volume 3, Sections 5.6 and 5.7).

Table 3.4-1. Temporal Boundaries for the Effects Assessment for Socio-economic VSECs

Phase	Project Year	Calendar Year	Length of Phase (Years)	Description of Activities
Construction	1 - 4	2019 - 2022	4	• **Roberts Bay:** construction of access road (Year 1), marine dock and additional fuel facilities (Year 2 – Year 3); • **Doris**: expansion of the Doris TIA and accommodation facility (Year 1); • **Madrid North:** construction of concentrator and road to Doris TIA (Year 1 – Year 2); • **All-weather Road**: construction (Year 1 – Year 3); • **Boston**: site preparation and installation of all infrastructures including process plant (Year 2 – Year 5).
Operation	5 - 14	2023 - 2032	10	• **Roberts Bay**: sealift operations (Year 1 – Year 14) • **Doris**: processing and infrastructure use (Year 1 – Year 14); • **Madrid North:** mining (Year 1 – 13); ore transport to Doris process plant (Year 1 -13); ore processing and concentrate transport to Doris process plant (Year 2 – Year 13); • **Madrid South:** mining (Year 11 – Year 14); ore transport to Doris process plant (Year 11 – Year 14); • **All-weather Road**: operational (Year 4 – Year 14); • **Boston**: winter access road operating (Year 1 – Year 3); mining (Year 4 – Year 11); ore transport to Doris process plant (Year 4 – Year 6); and processing ore (Year 5 – Year 11).
Reclamation and Closure	15 - 17	2033 - 2035	3	• **Roberts Bay**: facilities will be operational during closure (Year 15 – Year 17); • **Doris**: camp and facilities will be operational during closure (Year 15 – Year 17); mine, process plant, and TIA decommissioning (Year 15 – Year 17); • **Madrid North:** all components decommissioned (Year 15 – Year 17); • **Madrid South:** all components decommissioned (Year 15 – Year 17); • **All-weather Road**: road will be operational (Year 15 – Year 16); decommissioning (Year 17); • **Boston**: all components decommissioned (Year 15 – Year 17).
Temporary Closure	NA	NA	NA	• **All Sites:** Care and maintenance activities, generally consisting of closing down operations, securing infrastructure, removing surplus equipment and supplies, and implementing ongoing monitoring and site maintenance activities.

The assessment also considers a Temporary Closure phase should there be a suspension of Project activities during periods when the Project becomes uneconomical due to market conditions. During this phase, the Project would be under care and maintenance. This could occur in any year of Construction or Operation with an indeterminate length (one to two year duration would be typical). The effects assessment for the VSECs economic development, business opportunities, and employment will include the phase Temporary Closure (Table 3.4-1).

3.5 PROJECT-RELATED EFFECTS ASSESSMENT

3.5.1 Methodology Overview

This assessment was informed by a methodology used to identify and assess the potential socio-economic effects of the Project and is consistent with the requirements of Section 12.5.2 of the Nunavut Agreement and the EIS guidelines (NIRB 2013a). The effects assessment evaluates the potential direct and indirect effects of the Hope Bay Project on the environment and follows the general methodology provided in Volume 2, Chapter 4 (Effects Assessment Methodology), and comprises a number of steps that collectively assess the manner in which Madrid-Boston and the Hope Bay Project will interact with the VSECs defined for the assessment (Section 3.3).

To provide a comprehensive understanding of the potential effects for the Project, the Madrid-Boston components and activities are assessed on their own as well as in the context the Existing and Approved Projects within the Hope Bay Greenstone Belt. The effects assessment process is summarized as follows:

1. Identify potential interactions between the Project and the VSECs, and the resulting potential effects.
2. Identify mitigation or management measures to eliminate or reduce the potential effects.
3. For the Madrid-Boston Project *in isolation of* the Existing and Approved Projects, characterize the potential incremental effects.
4. For the Madrid-Boston Project *in combination with* the Existing and Approved Projects, characterize the potential effects.
5. For *both* the Madrid-Boston Project in isolation and for the entire Hope Bay Project (Madrid-Boston in combination with the Existing and Approved Projects), characterize any residual effects (potential effects that would remain after mitigation and management measures have been applied).
6. Determine the significance of potential residual effects.

In order to characterize the potential socio-economic effects that could result from the interactions between the Project and VSECs, and to characterize residual effects, the analysis relies of the results of an economic impact analysis conducted to predict the impacts of the Project on employment, income, GDP, and government tax revenues (Section 3.5.3 and Appendix V6-3C). Information on other contributions made by TMAC to governments and Inuit organizations, such as those defined through the Framework Agreement and IIBA with the KIA, are also considered. These economic impacts are used as indicators for predicting indirect socio-economic impacts on other VSECs. In addition to economic modelling, other methods used to characterize the effects include use of: information available on the past experience of the Doris Project and other mine projects; comparison of potential changes in baseline conditions to socio-economic effects and points of criticality that are evidenced in the

literature; and professional judgement. The effects assessment relies on both qualitative and quantitative information.

3.5.2 Identification of Potential Effects

Project activities and components mostly likely to interact with the socio-economic environment are those that relate to engagement of a workforce (TMAC employees and contractors) and the procurement of goods and services by the Project. Potential interactions between the Project's activities and components by phase, and the VSECs and potential effects are presented in Table 3.5-1. Interactions identified that may result in potential effects that are either positive (marked with "P") or negative (marked with "N") are carried forward into the characterization of potential effects in Section 3.5.4.

The review and analysis of baseline data, the Project description, the results of public and stakeholder consultation, the CRI reports, and the EIS Guidelines (2012) resulted in the identification of potential Madrid-Boston Project effects on the socio-economic environment. Effects are primarily understood as the result of an interaction between Madrid-Boston components or activities and a VSEC. Employment is considered one of the main pathways of impact that may alter the current socio-economic environment, as well as the procurement of goods and services by the Madrid-Boston Project in the Kitikmeot region. Employment and procurement are considered substantial benefits and has the potential to enhance the regional labour force, regional businesses, individual and family income, the need for retail and other secondary services, and other aspects of the socio-economic environment within Kitikmeot communities.

The review of potential effects in some instances refined the effect to enable a more focused analysis or scoped out an aspect of the effect for which there is not expected to be an interaction with a VSEC. The aim of this approach was to clearly define effects, how each effect is linked to the Madrid-Boston Project, and how Project-induced effects are expected to interact with a VSEC. The rationale for the inclusion of potential effects is provided below.

Economic Development

Changes to economic growth – this effect will consider Project contributions to territorial GDP and tax revenues accruing to the federal and territorial governments during Construction and Operation. Changes to economic growth at Closure will also be assessed. This effect also considers the tax revenues to government, funds TMAC pays through the IIBA (e.g., for training and business development), and the revenues and royalties that will be paid to NTI and the KIA related to the use IOL, advancing mining operations, and other activities.

Business Opportunities

Changes to local business growth - this effect is defined to include the opportunities for Inuit and northern businesses as a result of Project procurement and as enhanced by implementation of the IIBA. This effect will consider the potential for existing business expansion and/or diversification of goods and services, as well as the potential for new or additional businesses to emerge.

Employment

Changes to employment opportunities and income – this effect is the direct result of Project employment and procurement and is focused on these Project benefits at the regional, territorial, and national levels. This effect also considers the estimated amount of personal income the Project will provide to regional, territorial, and national levels.

Table 3.5-1. Project Interaction with Socio-economic VSECs

Project Component/ Activity	Economic Development	Business Opportunities	Employment			Education and Training		Mitigation, Housing, and Infrastructure and Services			Community Health and Well-being		
	Changes to economic growth	Changes to local business growth	Changes to employment opportunities and income	Changes to labour force capacity	Competition for local labour	Changes to demand for education and training programs	Changes in perceptions of education and employment	In-migration to the Kitikmeot Region	Changes to the demand for housing	Changes to the demand for local services	Changes to family stability	Changes to family spending	Changes to food security and cost of living
Construction													
Employment and labour	P	P	P	P	N	P	P	N	N	N	P/N	P/N	P/N
Procurement of goods and services	P	P	P	P	N	P	P	N	N	N	P/N	P/N	P/N
Operation													
Employment and labour	P	P	P	P	N	P	P	N	N	N	P/N	P/N	P/N
Procurement of goods and services	P	P	P	P	N	P	P	N	N	N	P/N	P/N	P/N
Reclamation and Closure													
Employment and labour	N	N	N	N		P	P				P/N		
Procurement of goods and services	N	N	N	N		P	P				P/N		
Post-closure													
Employment and labour													
Procurement of goods and services													
Temporary Closure													
Employment and labour	N	N	N										
Procurement of goods and services	N	N	N										

Notes: P = Positive; N = Negative and non-mitigatable; Blank = no interaction

Changes to labour force capacity – this effect is defined as the potential for changes to the skills and experience of the regional labour force as a result of the requirements of Project employment (i.e., education levels, skills, and labour force experience) and participation in the Project.

Competition for local labour – this effect considers the potential for currently employed residents of the Kitikmeot region to leave their employment for mine-related employment. The higher-wages offered for mine-related work may entice those currently employed in the Kitikmeot or may change existing salary and compensation expectations. This effect also considers the ability of local employers to retain their employees (e.g., hamlet or Government of Nunavut employees).

Education and Training

Changes to the demand for education and training programs – this effect considers the capacity of the regional education system to accommodate the potential increased demand for local accredited education and training programs. Increased demand for programs and courses is anticipated due to mine-related employment opportunities. Consideration is also given to the types of education and training programs and courses available in the Kitikmeot region.

Changes in perceptions of education and employment – this effect considers the integration of traditional and western education values that has occurred to date and considers the motives of youth and their participation in education, and the Project's effect on these perceptions.

Migration, Housing, and Infrastructure and Services

In-migration to the Kitikmeot region – this effect considers the potential for the Project to result in spin-off (indirect or induced) employment wherein non-local individuals may relocate to the region to obtain employment that has been created locally due to economic growth associated with the Project. Direct Project employment is not expected to result in in-migration as workers will be housed at site in camps, and the Project will have multiple points of hire where location of residence is not a factor in determining eligibility for employment.

Changes to the demand for housing – this effect considers the potential for Project-related in-migration or changes in employment and income status of individuals to result in effects on housing demand. This effect focuses on the potential for indirect or induced Project employment to affect local housing demand.

Changes to the demand for local services – this effect considers the potential for Project-related in-migration to increase the demand for local services, many of which currently operate at capacity. This effect focuses on the potential for indirect and induced Project employment to affect the demand for local services.

Community Health and Well-being

Changes to family stability– the effect considers the ability of local families and others to adapt to the lifestyle of fly-in/fly-out (FIFO) rotation work associated with Project employment. Consideration is given to absent family members and implications for children, childcare, spousal relationships, and gender roles. Implications for the mental and physical health of workers and their families are also considered.

Changes to family spending – this effect considers the relatively recent introduction of the wage economy and implication for increased incomes on individual and family spending patterns as a result of mine-related employment. Increased income as related to family consumption and housing subsidy eligibility, as well as the linkages between increased income and increased levels of gambling,

substance abuse, domestic violence, family violence, and sexually transmitted infections (STIs) are also considered. This may also, in turn, lead to additional demands on local services, such as health and social services, due to an increase in these activities.

Changes to food security and cost of living – this effect considers the potential for changes to traditional harvesting activities and local food costs and discusses the contribution of traditional livelihoods to community and individual well-being.

3.5.2.1 Socio-economic VSECs, Effects and Indicators

The indicators selected to inform the assessment of the potential effects of the Project (including cumulative and transboundary effects) on the VSECs are identified in Table 3.5-2. The selection of indicators was informed by public consultation, the TK report (Banci & Spicker 2016), and the CRI reports (Cameron and Gabel 2015a; Conference Board of Canada 2016) (Appendix V6-3B), and is based on scientific methods as well as professional judgement.

Table 3.5-2. Socio-economic Effects and Indicators by VSEC

VSEC	Potential Effect	Indicator
Economic Development	Changes to economic growth	Nunavut and Canada GDP
		Payments to the KIA and NTI (e.g., royalties, exploration and production lease rents, land tenure payment, water compensation, and IIBA implementation payments)
		Nunavut Payroll Tax
		Nunavut Petroleum Tax
		Corporate tax payments to governments
		Other tax benefits
Business Opportunities	Changes to local business growth	Number of Kitikmeot Qualified Businesses
		Value of contracts awarded to Kitikmeot based and Inuit Owned businesses
		Number of new businesses
		Sales (e.g., supplies and services)
Employment	Changes to employment opportunities and income	Number of Kitikmeot residents with employment
		Project-related employment
		Indirect and induced jobs
		Wages
		Unemployment rate
		Number of unemployed
		Regional income/tax filers with employment income
		Number of social assistance recipients
	Changes to labour force capacity	Number of individuals with work experience
		Number of individuals with education and other skills
	Competition for local labour	Transferrable skills and experience in the local labour force (e.g., truck drivers)
		Project-related employment in the Kitikmeot region
		Wages
Education & Training	Changes to demand for education and training programs	Number of certificate programs and courses available to Kitikmeot residents
		Number of Kitikmeot residents enrolled in programs and courses
	Change in perceptions of education and employment	Public school truancy rate
		Public school enrollment
		Secondary school graduates

VSEC	Potential Effect	Indicator
Migration, Housing, and Infrastructure and Services	In-migration to the Kitikmeot Region	Nunavut annual components of migration (i.e., Interprovincial in/out migrants, non-permanent residents, net migration)
	Changes to demand for local services	Number of social services case files
		Number of health clinic visits
		Number of police calls to service
		Project related in-migration
		Project related employment
	Changes to the demand for housing	Number of public housing units by community
		Public housing waitlist by community
		Number of privately-owned units by community
		Number of dwellings that are crowded
		Project related in-migration
		Project related employment
Community Health and Well-being	Changes to family stability	Project related employment
		Project related employment by gender
	Changes to family spending	Project related employment
		Number of criminal violations by community
		Number of impaired driving violations
		Number of drug violations
		Gambling activity levels
	Changes to food security and cost of living	Number of individuals participating in traditional harvesting and prevalence of sharing
		Cost of RNFB food basket
		Level of country foods consumption

3.5.3 Economic Impact Modeling

An economic impact model was used to estimate the direct, indirect, and induced benefits of the Madrid-Boston Project, as well as that of the Approved Projects (primarily consisting of the Doris Project). Each of these can be distinguished as follows:

- Direct impacts are the employment, personal income, GDP and government tax revenue generated directly by Madrid-Boston and the Hope Bay Project, including the impacts generated by industries directly contracted to supply the on-site goods and services used by the Project.
- Indirect impacts are the employment, personal income, GDP and government tax revenue associated with all industries that are ultimately supplying the goods and services used by the industries supplying the Project, and includes all transactions to the beginning of the supply chain (excluding direct on-site suppliers to the Project and the Project itself).
- Induced impacts are the employment, personal income, GDP and government tax revenue associated with economic activity because of workers spending their incomes on goods and services, including those directly and indirectly employed because of the Project.

The DYNATEC model used is based on Statistics Canada's Input-Output Model of the economies of Canada and the provinces and territories, but incorporates econometric modules to allow for dynamic, non-linear simulations of the likely effects. With the use of econometric modules, the linear behaviour of the base input-output model is reduced to more closely mimic the real economy. A key characteristic of the model is that it is dynamic and is able, through each iteration of revenues and

expenditures, to show how the economic impacts are distributed on a yearly basis. This provides for a more realistic understanding of the actual annual economic benefits as the initial expenditures work their way through the economy.

The current version of the model uses the 2013 dataset of Statistics Canada's Input-Output Model, enhanced with data from various sources dating from 2011 to 2015. The core of the model operates at a level of aggregation consisting of 295 commodities and 117 industries. Both open and closed versions of the model were run. The open model is used to estimate indirect effects (effects from inter-industry purchases of goods and services), while the closed version is used to estimate induced effects (effects from spending of after-tax household income, primarily from wages and salaries, taking into account the propensity to save).

In addition to the model's ability to simulate the dynamic nature of the economy, a key characteristic of the model is its ability to provide estimates of the distribution of the effects by region (i.e., for the three regions of Nunavut, including the Kitikmeot region). The model does this through a mathematical allocation that takes into account the characteristics of existing industries and business within each region, current economic structures and supplier relationships, and employment and skill base profiles.

The output statistics of the economic impact modelling are provided in constant 2017 Canadian dollars and include:

- employment;
- personal income;
- GDP; and
- government tax revenues.

The detailed results of the economic impact model for the Madrid-Boston Project are provided in Appendix V6-3C (*Madrid-Boston Project: Economic Impact Model Report*).

The economic impact model is not able to estimate the direct business taxes or royalties paid by TMAC for the Madrid-Boston Project. This includes payments to the KIA and NTI consisting of royalties, exploration and production lease rents, land tenure payments, water compensation, and IIBA implementation payments, as well as corporate tax payments to the federal and provincial/territorial governments. The economic impact model also does not estimate payments made directly to the GN for Payroll Tax (in accordance with the Nunavut *Payroll Tax Act (1993c)*and regulations), Petroleum Tax (in accordance with the Nunavut *Petroleum Products Tax Act (1988a)* and regulations) or Property Tax (in accordance with the *Property Assessment and Taxation Act (1988b)* and regulations). This information is estimated as part of the Hope Bay Project's financial model and is reported separately in Section 3.5.5.1 (Economic Development).

3.5.4 Mitigation and Adaptive Management

The following sections detail monitoring plans and adaptive measures, as well as mitigation measures designed to enhance Project benefits and to reduce or eliminate the potential adverse effects of the Project. Once these measures are taken into account the end result, or expected residual effect, is characterized in Section 3.5.6.

3.5.4.1 Inuit Impact and Benefit Agreement

The previous owner of the Hope Bay Project, Miramar Mining Corporation, and the KIA reached agreement in 2006 on an IIBA related to the existing Doris Project. A key feature of this agreement was the establishment of an Implementation Committee made from representatives of both parties. From 2007, this committee met frequently and regularly to consider Inuit employment, contracting, training, and other Project-related matters. Kitikmeot Inuit are key Project stakeholders, and as such, this Implementation Committee has been instrumental in addressing a number of real and potential Project impacts to the satisfaction of TMAC and the KIA.

In accordance with Article 26 of the Nunavut Agreement, in March 2015, TMAC entered into a new IIBA with the KIA for the Hope Bay Project. This agreement supersedes the Doris North IIBA and will be applicable to future phases over the 20 year term of the agreement. Common to both the Doris North and Hope Bay IIBA, TMAC and the KIA have jointly established an IIBA Implementation Committee whose purpose is to ensure that the provisions of the IIBA are met.

The IIBA sets out principles and methods to, among other purposes, maximize Inuit training, employment and business opportunities arising from the Operation of the Project, and provide a mechanism through which effective communication and cooperation can take place.

Key features of the IIBA include provisions for, among others:

- 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, under certain conditions, of a Business Development Fund.

3.5.4.2 Proposed Monitoring Plans and Adaptive Management

The Hope Bay Project has an existing Socio-economic Monitoring Program (SEMP) that will accommodate the activities that are the subject of this assessment of the Madrid-Boston proposal. The SEMP defines a number of indicators that have been selected based on the impact predictions and mitigation measures in the Doris North FEIS (Miramar 2005) and recently modified to reflect changes in planned development activities that have occurred since. For each social and economic indicator, specific measures, data requirements, and data sources have been identified, and data collection and reporting is ongoing. The SEMP allows for both early detection of adverse effects on VSECs and reporting of impact and benefit objectives for the Project.

As part of the SEMP, TMAC works in collaboration with other stakeholders including the Government of Nunavut (GN), Indigenous and Northern Affairs Canada (INAC), the KIA, and the communities of the Kitikmeot region. A Socio-economic Monitoring Working Group for the Hope Bay Project, with membership from TMAC, the GN, INAC and the KIA, is responsible for developing and overseeing the SEMP. A Terms of Reference for the SEMP outlines each member's roles and responsibilities with regards to socio-economic monitoring throughout the life of the Project. TMAC is also committed to ongoing participation in the Kitikmeot Socio-economic Monitoring Committee (Kit-SEMC) to report results of the SEMP and receive feedback and input regarding any revisions to the SEMP or adaptive

management and mitigation that may be required in the event unanticipated impacts are identified. TMAC prepares annual SEMP reports and will continue to do so throughout the life of the Project. Reports are submitted to NIRB and shared with the wider Kit-SEMC.

The existing SEMP will be modified, if necessary and as appropriate, to monitor the predicted impacts characterized in the EIS, as well as regional concerns identified by the Kit-SEMC where relevant to the Project. Included in any necessary and appropriate future modifications to the existing SEMP will be direction provided by the Department of Economic Development and Transportation to standardize socio-economic monitoring by mine operators in Nunavut. The review of the SEMP will be done in collaboration with the Hope Bay Project Socio-economic Monitoring Working Group.

3.5.4.3 Mitigation Measures for Specific VSECs and Potential Effects

This section details mitigation measures proposed for each VSEC to reduce or eliminate the potential negative interactions with the Project, and measures designed to enhance Project benefits.

The Community Involvement Plan (Annex V8-5) is an important component of TMAC's Environmental Management System (EMS). Specific communication processes, methods and schedule, as well as stakeholder contacts, will be determined as needed and appropriate, based on the issue or initiative in question. Specific issues or initiatives may be associated with mitigation of any of the potential Project effects on VSECs as described below. The CIP is a 'living document'. To ensure continuous improvement, the suitability and effectiveness of the CIP will be periodically reviewed, as done for all management plans that form part of the EMS.

<u>Economic Development</u>

The effects of the Project on local, regional, territorial, and national economic development are anticipated to be positive. The Project will make contributions to GDP, territorial and federal tax bases, as well as royalties and other payments to NTI and the KIA. These contributions facilitate a greater degree of economic activity than would be possible without the Project. As a result, effects of the Project on economic development associated with increases in GDP, government tax revenue and other payments during the Construction and Operation phases of the Project are expected to be positive and do not require mitigation measures. Measures to enhance Project's contributions to economic development in the Kitikmeot region include TMAC's commitments to maximizing business and employment opportunities, capacity building, as well as monetary contributions to Inuit associations as defined by the new Framework Agreement and IIBA with the KIA. Measures to enhance the benefits of the Project on economic development are further described by the Human Resources Plan (Annex V8-7). These measures are based on industry best practice and those that have been refined based on the experience of the Doris Project to date.

The reduction and eventual removal of Project contributions to GDP, government tax revenue and other payments during Reclamation and Closure, and Post-Closure, is considered as a natural end to all mining and other industrial/business operations. There are no specific mitigation measures to eliminate such effects; however, TMAC's communication of Project schedule with local and regional governments and businesses can help to prepare them for the gradual change and allow governments and other organizations, such as the KIA and NTI, to secure other sources of revenue. Planned engagement activities are described by the Community Involvement Plan (Annex V8-5).

Business Opportunities

Project contribution to local business growth during the Construction and Operation phases is a positive effect of the Project that does not require mitigation measures. Measures to enhance this beneficial effect include:

- provide assistance, feedback, information and lead time to contractors from the Kitikmeot communities on bids and bidding policies;
- require and monitor local content plans on major bids;
- waive bond provisions at tender for Inuit owned businesses;
- provide annual business opportunities forecast; and
- promote awareness of procurement opportunities within the Kitikmeot region.

TMAC will communicate Project's schedule to ensure that local governments, local and regional businesses and other interested institutions/organizations are aware of Project activities as well as any opportunities that can contribute to business growth in the Kitikmeot region. Additionally, as described in Section 3.5.4.2, through the IIBA, TMAC is committed to promoting and maximizing business opportunities for the engagement of Kitikmeot Qualified Businesses in the development and operation of the Hope Bay Project. These include bid preparation training program for Inuit and offering contracts open only to Kitikmeot Qualified Businesses. The IIBA includes provisions for the establishment of a Business Development Fund, the intent of which is to invest in building the capacity for Inuit business development in the Kitikmeot. As defined within the IIBA, a TMAC Liaison will work with the appropriate TMAC department to, among other responsibilities, assist TMAC to maximize Kitikmeot Qualified Business procurement by identifying businesses interested in procurement opportunities, considering opportunities for capacity building and development and assisting Kitikmeot Qualified Businesses to access available business opportunities.

The reduction and eventual removal of Project contributions to business growth at the Reclamation and Closure phase, and the Post-closure phase, is considered as a natural end to all mining and other industrial or business operation. There are no specific mitigation measures that could eliminate this effect; however, TMAC's communication of Project's activities and schedule with local and regional governments and businesses can help to alleviate this effect. Planned engagement activities are described by the Community Involvement Plan (Annex V8-5). Business once serving the Project will have time to gradually adjust their operations to prepare for reduction in business contracts or obtain new business contracts from other providers in the region.

Employment

Changes to employment opportunities and income as well as changes to labour force capacity, during the Construction and Operation phase, are considered as beneficial effects of the Project as they will increase employment and personal income, as well as contribute to the skill level and experience of the local and regional labour force. Benefit enhancement measures are described within the Human Resources Plan (Annex V8-7) and include the provisions of the IIBA. Enhancement measures for these effects and measures for addressing potential gaps in education and training include:

- give Kitikmeot Inuit and other Nunavut Inuit resident in the Kitikmeot region, followed by all other Kitikmeot and Nunavut Inuit, first opportunity for employment;
- build cultural awareness and enforce harassment policies;
- promote awareness of employment opportunities within Kitikmeot communities;

- collaborate with training institutions;
- develop and implement a Recruitment Strategy;
- collaborate and partner with relevant agencies and contractors to ensure skill requirements are being met; and
- collaborate with education and training providers to develop training programs geared toward the long-term employment of women in non-traditional occupations.

Education and training initiatives will allow a greater proportion of Nunavummiut to meet the requirements for employment with the Project. Other mitigation measures include initiatives for training with the Nunavut Arctic College and collaboration with the KIA. Recent TMAC activities include, but are not limited to, the following:

- participation on the Cambridge Bay Community Readiness Committee preparing the community for future developments (Conference Board of Canada 2016);
- participation in on the KIA ASETS Program Working Group aiming to allocate ASETS training funding to the most beneficial effect;
- participation in the Nunavut Mine Training Roundtable tasked with allocating Government of Nunavut Mine Training Funding; and
- support of a joint venture between TMAC's drilling contractor, Geotech Drilling, and Kitikmeot Corporation to train Inuit drillers for both surface and underground exploration drilling.

TMAC also will develop:

- a Human Resource Strategy that addresses training and education;
- specified areas of training;
- Career Development Plans for Inuit employees;
- Inuit Training Targets that are subject to review and adjustment by the IIBA through the Implementation Committee;
- Community Information and Career Awareness Sessions in the Kitikmeot; and
- Kitikmeot Secondary School achievement awards.

TAMC will communicate with the Department of Education headquarters staff on any planned initiatives relating to youth employment in their Human Resources Plan, and other programs that may relate to education, in order to identify common points of interest and action that would help integrate the Proponent's activities into the existing education program, and communication and delivery plans. Communication or collaboration between TMAC and the Department of Education is to be consistent with the provisions of the 2015 Hope Bay IIBA, including those related to training and education, and recognize that, as defined by the IIBA, training and educational support is a shared responsibility between TMAC and the KIA.

To the extent that such communications are consistent with and not limited by TMAC's obligations under the 2015 Hope Bay IIBA, TMAC will provide the GN updated information regarding the labour force needs of the Madrid-Boston Project, should the Project receive regulatory approval and the decision is made by TMAC to proceed with the construction of the Project.

At Project Reclamation and Closure, and Post-closure, to help employees transition to new employment, TMAC will develop and implement a Workforce Transition Plan that will:

- Support training and career development opportunities prior to Reclamation and Closure, including worker training programs as part of worker recruitment and on the job training to enhance worker job expertise.
- Implement measures prior to Reclamation and Closure to assist employees to identify opportunities for career succession planning and employment, including providing job search assistance to workers seeking the service to maximize the number of workers that find alternative suitable employment.
- Identify skills acquired during employment with the Project and match the identified skills to similar positions available at Reclamation and Closure, and Post-Closure, as well as alternative industries.
- Assist employees in identifying ongoing employment and training opportunities in the LSA and RSA that will require existing or complementary skills, including assisting workers in identifying available external resources.

These measures will contribute to Project employees' abilities to transition to other employment once Operation ends. The above measures will also be implemented to mitigate potential adverse effects associated with Temporary Closure. However, it is recognized that a lack of lead time prior to the business decision being made to enter into a Temporary Closure phase may limit the extent to which the measures may be fully implemented prior to a reduction in direct Project employment.

With respect to the competition for labour, there are no specific measures that TMAC can implement in isolation to eliminate the competition for labour other than the measures already listed including training Inuit workers and developing a Recruitment Strategy. These activities will help develop the skill and experience level of the workers in the region, increasing the size of the skilled labour force available. In order to minimize the extent to which completion for labour may occur, TMAC is committed to support employment opportunities in the Kitikmeot region. Benefit enhancement measures are described within the Human Resources Plan (Annex V8-7) and include the provisions of the IIBA. For example, TMAC's involvement in training Inuit workers and developing a Recruitment Strategy will help develop the skill and experience level of the workers in the region, increasing the size of the skilled labour force available. As part of the IIBA, TMAC has committed to maximizing employment benefits by prioritizing the hiring and training of Kitikmeot Inuit.

TMAC is committed to ongoing participation in the Kitikmeot Socio-economic Monitoring Committee (Kit-SEMC). TMAC will report on results of the SEMP and receive feedback and input regarding any adaptive management and mitigation that may be required in the event unanticipated impacts are identified. Through TMAC's participation in the Kit-SEMC, there is an opportunity for ongoing monitoring of socio-economic effects, including potential changes to labour competition, due to the Madrid-Boston Project. Engagement with the Kit-SEMC regarding employment and other socio-economic impact will support regional monitoring efforts.

Education and Training

Changes to the demand for education and training programs, as well as changes in perceptions of education and employment are positive effects of the Project. The effects will occur primarily during the Construction and Operation phases. Proposed enhancement measures focus primarily on the hiring of Inuit workers and supporting training to increase the size of the available skilled labour pool to better meet Project requirements. TMAC will share information on training opportunities with the

Kitikmeot communities, the IIBA Implementation Committee, and other agencies responsible for delivery of training and education programming to support the efficient and effective delivery of programming. The partnership of industry, the KIA, the GN, and education and training institutions has the potential to provide advanced education opportunities for local Inuit and, as a result, increase the size of the available resources with the needed skill base in the Kitikmeot region to help meet longer-term hiring requirements.

As defined by the IIBA, TMAC will pay into a Training and Education Fund if Inuit Employment Targets are not met, and there will be shared support of training and education between TMAC and the KIA. Through the work of the Implementation Committee, key provisions of the IIBA that are particularly relevant include:

- Setting of annual and long-term training targets (including apprenticeships) that are achievable by TMAC using commercially reasonable efforts;
- Creating, maintaining and annually updating a list of relevant education and training opportunities for Inuit; and
- Annually evaluating and reporting on the Inuit Training Target achievements, Inuit training and recruitment plans, improving compliance with Inuit Training Targets, and funded activities (among others).

As outlined in the Human Resources Plan (Annex V8-7), the Human Resources Strategy will identify barriers to employment and advancement at the Project, and will include talent management initiatives such as training, career planning, and advancement. TMAC's training will include on-the-job training and skills development across a range of work areas. Career development plans will be developed for all Inuit employees.

TMAC will host a community information and career awareness session in all Kitikmeot communities at least annually. This will serve to encourage Inuit to attain the skills and education qualifications necessary to take advantage of employment opportunities. The first annual TMAC Community Information Tour was hosted in October and November 2017 in each of the five Kitikmeot communities (Volume 2, Section 3.3). Information was provided to communities on: labour needs of the Project; skills, behaviours and qualifications required for employment at the Project; available training opportunities and educational support programs; and career opportunities in related fields (e.g., science, technology, professional services).

During the 2017 Community Information Tour, TMAC also met with representatives of the GN Department of Education, Kitikmeot School Operations, and high school principals. Discussions focused on obtaining input as to how to best position future TMAC support of secondary school achievement awards and promotion of a science based curriculum delivery. The results of these discussions will inform planned 2018 Kitikmeot high school engagements. TMAC will continue to engage GN representatives of relevant departments and agencies on training development and career awareness information.

TMAC also participated in the planning the 2017 Kitikmeot Career Fair with representatives of the GN Department of Family Services. TMAC will also sponsor competitions and achievement awards at the secondary school level in fields relevant to or related to mining sector careers, during Operation.

TMAC hosted a Nunavut Mine Training Roundtable and funded a diamond driller training program at Hope Bay in 2017. TMAC will continue to advocate and support the use of these available funds for relevant training both within the company and through contractors. TMAC contacted representatives of

the Departments of Family Services, Economic Development and Transportation (ED&T) and Nunavut Arctic College (NAC) for support and advice on training options available within Nunavut for TMAC employees with specific training objectives identified through Career Development Plans. Representatives of ED&T and NAC responded to this request for information.

TMAC contacted the Nunavut Apprenticeship Certification Unit for input into the TMAC Career Development Planning process. TMAC has also contacted representatives of NAC regarding the importance of continuing to plan and design for a Nunavut Mine Training Center, and has provided NAC with a listing of priority mine training gaps for Nunavut derived from analysis of Hope Bay labour force position data. TMAC will continue to engage GN representatives of relevant departments and agencies regarding participation and support for the provision of training.

Migration, Housing, and Infrastructure and Services

The Project will have multiple points of hire, and as such the location of residence is not a factor in determining eligibility for employment. Project workers will be accommodated at site in camps while on rotation. As a provision of the IIBA, TMAC provides air transportation for its Inuit employees, who are residents of Kitikmeot communities, to and from the point of hire and the Project site. In fact, all Kitikmeot residents, Inuit and non-Inuit, will be provided with transport from their home community to site if employed by the Project. For these reasons, a direct effect of the Project on in-migration to the Kitikmeot region is expected to be avoided. This conclusion is supported by the results of the Hope Bay SEMP which, from 2013 to 2016, has not recorded any Hope Bay Project employees relocating to other communities within the Kitikmeot region due to work at the mine.

As assessed, there is the potential for the Project to result in spin-off (indirect or induced) employment wherein non-local individuals may relocate to the region to obtain employment that has been created locally due to economic growth associated with the Project. However, this effect is expected to be minimal. TMAC has not identified any mitigation that is required for this potential effect.

Similarly, for changes to the demand for housing and changes to the demand for local services, no specific mitigation is required. However, as defined within the Community Involvement Plan (Annex V8-5). TMAC will maintain communications with service providers within the Kitikmeot communities over the life of the Project, and share information to assist in the development of collaborative adaptive management measures, should unanticipated impacts arise and mitigation be required. Further, as discussed above, the Hope Bay SEMP allows for early detection of adverse effects on VSECs and provides a forum to identify and discuss arising issues with governments, the KIA, and community stakeholders.

Community Health and Well-Being

Across the Kitikmeot region, there are programs in place to promote community well-being, including various wellness programming, health programming, and community and social services (see Volume 6 Section 3.2.3; Appendices V6-3A and V6-3B). Additional measures are to be implemented to mitigate Project-related effects on community health and well-being, focused on the Construction and Operation phases.

To mitigate changes to family stability, changes to family spending, and changes to food security and cost of living, the IIBA has a number of provisions including:

- Instituting an Employee and Family Assistance Program (EFAP) to provide Inuit employees and their families with services to assist them with dealing with personal problems, family matters, mental health concerns, and alcohol, drug and gambling dependencies;

- Serving country foods on site, commensurate with the level of demand and nutritional needs of Inuit employees;
- Maintaining a drug and alcohol policy which includes a "zero tolerance" at the Project;
- Providing on-site access to communications facilities to allow communication between Inuit employees and their spouses and families; and
- Providing country food kitchens and cultural activities at the Project as determined by the Implementation Committee and as space permits.

TMAC will reach out to third parties to deliver financial management programs such as financial literacy, financial planning and personal budgeting as identified in the Human Resources Plan (Annex V8-7). TMAC will also track statistics regarding the delivery of the programming, and provide updates on program participation to the Kitikmeot Socio-economic Monitoring Committee. Third parties will be engaged to provide the necessary expertise in financial literacy training, and may include financial institutions, post-secondary education institutions (e.g., Nunavut Arctic College) and/or government. In particular, TMAC will approach GN Family Services (or other GN department as appropriate) to solicit input and/or participate in the delivery of programming to Project workers.

In addition, a TMAC Liaison will work with the appropriate TMAC department and supervisors to, among other responsibilities: act as a liaison with the Inuit employees of TMAC; identify employee counselling needs as appropriate; develop ongoing consultation with Inuit employees of TMAC to identify their needs, issues and concerns; and assist in identifying and developing wellness initiatives.

Note that the extent to which TMAC will serve country foods through its camp kitchens is dependent on the level of demand and needs of Inuit employees, as well as the availability of supply. To date, TMAC has been guided on this topic by the Nunavut Public Health Act (2003a) which previously prohibited the serving of non-inspected catered food; and the Nunavut Wildlife Act (2003b) which previously prohibited the use of wildlife for commercial purposes without the use of commercial tags. Additionally, under the federal Fisheries Act (1985), which restricted any person from buying, selling or possessing fish in contravention of the Act or regulations. These pieces of legislation have required TMAC to serve country food only from federally licensed processing facility using approved quotas for game and fish, such as Kitikmeot Foods (Cambridge Bay). These legislative requirements significantly limit the availability of country foods and have, to date, prevented TMAC from being able to secure a reliable supply. TMAC will provide country foods to Inuit employees through camp kitchens only if a reasonably priced supply is available from a licensed processing facility (e.g. Kitikmeot Foods) under approved quotas for game and fish. It is not predicted that the Project will result in additional harvesting of country foods.

TMAC is aware of a new trend toward support for government and other institutions in Nunavut to obtain and safely provide country foods to Nunavummiut. TMAC will review and consider the newly created country food guidelines "Serving Country Food in Government-Funded Facilities and Community Programs" (NFSC 2017) and will monitor additional and future guidelines pertaining to work camps. TMAC has provided a Country Food Kitchen at Doris to allow personnel to store and consume personally harvested and owned country food. This Country Food Kitchen and personal harvest is not subject to the above regulations, if kept separately from commercial food preparation areas. The Country Food Kitchen provides food storage and cooking space, and is available for workers to access while on site. TMAC intends to continue this practice to allow Inuit workers to consume country foods while on site.

In 2017, TMAC engaged with the GN on the topic of sexual health, and will include sexual health awareness as part of worker orientation for employees and contractors, and will provide on-site access to contraceptives. In 2016, TMAC provided logistical support to the Cambridge Bay Men's Group on the land retreat conducted on the north side of Melville Sound. TMAC will continue to assist similar community wellness initiatives on a case by case basis as logistically possible.

In sum, these measures are designed to mitigate changes to the health and well-being of workers and their families.

3.5.5 Characterization of Potential Effects

This section describes and characterizes each potential socio-economic effect identified in Section 3.5.2. The mitigation and management measures identified in Section 3.5.4 are applied, and any residual effects identified. Residual effects are the effects that are remaining after mitigation and management measures are taken into consideration. If the implementation of mitigation measures eliminates a potential effect and no residual effect is identified on that VSEC, the effect is eliminated from further analyses. If the proposed mitigation measures are not sufficient to eliminate an effect, a residual effect is identified and carried forward for additional characterization and a significance determination in Section 3.5.6.

3.5.5.1 Economic Development

Madrid-Boston Project expenditures during the Construction and Operation phases have the potential to contribute to the economic growth and development in the LSA and the RSA as a whole through contributions to the territorial GDP, as well as the federal and territorial government tax revenue. TMAC is also expected to make payments to the KIA and the NTI including royalties, exploration and production lease rents, land tenure payment, water compensation, IIBA implementation payments and others payments. TMAC will also be required to make direct payments to the GN in the form of Payroll Tax, Petroleum Tax and Property Tax. Additional contributions to GDP and to federal and provincial/territorial tax revenue will take place across Canada.

GDP provides an aggregate measure of economic production, or in other words, the market value of all goods and services produced by the economy during a specific period. Tracking growth changes in GDP provides a good indicator of economic health. Project contributions to GDP, therefore, indicate an increase in an overall economic production and, as a result, contributions to economic growth. Government revenue finances the provision of public goods and services. An increase in contributions to the government revenue can improve the ability of governments to provide public goods and services and consequently support the socio-economic needs of residents. Finally, other financial contributions, such as those to the KIA, the NTI and the GN, help to promote the social, economic and cultural well-being of Inuit in Nunavut.

Mineral development provides opportunities for employment while promoting economic development and investment in the community (Cameron and Gabel 2015b). There are also opportunities for business contracts and increases in business revenue. Further, spin-off opportunities that are associated with mining are seen as a major benefit of resource developments; however, communities often require support and planning in order to take full advantage of those opportunities (Cameron and Gabel 2015b). Project contributions to economic development are mainly expected during the Construction and Operation phases, with reduction or full removal of those benefits during Reclamation and Closure.

Changes to Economic Growth

Characterization of Madrid-Boston Potential Effect

Construction

Total Madrid-Boston Project expenditures during the Construction phase are estimated at $861.4 million, including $419.1 million in capital expenditures (CAPEX) and $442.3 million in operating expenditures (see Appendix V6-3C for more detail). CAPEX are expected to occur primarily within Alberta and Ontario. Some expenses are also expected in British Columbia, the Northwest Territories, and Nunavut. Further, it is expected that process equipment and some infrastructure purchases will be made via direct import.

The economic impact model provides an estimation of total (direct, indirect and induced) GDP impacts in Canadian provinces and territories, and for the three regions in Nunavut (Qikiqtaaluk, Kivalliq, and Kitikmeot). The total GDP impact of the Madrid-Boston Construction phase in Canada is estimated at $808.0 million, with $44.0 million estimated for 2019, $142.5 million predicted for 2020, $247.4 million predicted for 2021, and $275.8 million for 2022. Most GDP impacts associated with construction are expected to dissipate by 2029. GDP impacts are expected to be most felt in Alberta ($206.5 million), Ontario ($182.9 million), and British Columbia ($120.1 million); GDP impacts in Nunavut are estimated at $68.4 million. In Nunavut, of the $68.4 million in GDP impacts, $41.0 million is predicted for the Kitikmeot region, $25.3 million is predicted for the Qikiqtaaluk, and $2.0 million for the Kivalliq (Table 3.5-3; see Appendix V6-3C for more detail). Of the total impacts in the Kitikmeot, $34.11 million will be contributed from direct Madrid-Boston Project activities, $3.6 million from indirect and $3.2 million from induced activities (see Appendix V6-3C for more detail).

Table 3.5-3. GDP and Tax Revenue (Millions of Dollars), Nunavut

	Construction				Operation			
		Tax Revenue				Tax Revenue		
Region	GDP	Federal	Territorial	Total	GDP	Federal	Territorial	Total
Qikiqtaaluk	$25.3	$2.3	$1.0	$3.3	$28.6	$2.0	$0.8	$2.9
Kivalliq	$2.0	$0.2	$0.1	$0.3	$14.5	$1.2	$0.5	$1.7
Kitikmeot	$41.0	$4.2	$1.5	$5.7	$202.3	$21.5	$7.7	$29.2
Total Nunavut	**$68.4**	**$6.7**	**$2.6**	**$9.3**	**$245.4**	**$24.7**	**$9.1**	**$33.8**

The economic impact model provides estimates of indirect and induced tax revenues to territorial, provincial and federal governments as a result of the economic activity generated by the Madrid-Boston Project in Nunavut and across Canada (Appendix V6-3C). The economic model also estimates the direct tax revenues derived from workforce payroll, which are remitted to the Canada Revenue Agency (i.e., personal incomes taxes paid by workers).

As a result of the construction of the Madrid-Boston Project, the economic impact model estimates that a total of $146.2 million will be contributed to government tax revenue in Canada, including $80.0 million in federal and $66.3 million in provincial and territorial taxes. For 2019, the government tax revenue is estimated at $8.8 million; it is predicted to be $26.5 million in 2020, $45.3 million in 2021, and $48.1 million in 2022, with contributions dissipating by 2029. By province, highest impacts on the provincial tax revenue will be felt in Alberta ($35.5 million), Ontario ($34.9 million), Newfoundland and Labrador ($21.2 million), and British Columbia ($20.4 million). The benefit of the construction of the Project to the GN from taxes as estimated by the economic impact model is predicted at

$2.6 million, with $1.5 million coming from the economic activity in the Kitikmeot region (Table 3.5-3; see Appendix V6-3C for more detail).

In addition to the tax revenues estimated by the economic impact model, TMAC will be required to remit Payroll Tax and Petroleum Tax directly to the GN during the Construction phase. Payroll Tax is imposed based on a rate of 2% of the gross remuneration of all employees who work in Nunavut. Based on a total direct personal income of $304.2 million as estimated by the economic impact model (Appendix V6-3C), the total Payroll Tax payable by TMAC to the GN during the Construction phase is approximately $6.1 million.

During the Construction phase, total fuel consumption by the Madrid-Boston Project is estimated to be 98.6 million litres. The majority of diesel use will be for non-motive use, mainly power generation. Applying the current tax rate of 3.1 cents/litre for non-motive diesel, total revenue to the Government of Nunavut from the Petroleum Tax is estimated to be $3.1 million. This is a conservative estimate as motive diesel fuel use, which may comprise 15-20% of total fuel use, imposes a higher tax rate of 9.1 cents/litre.

Project's contribution to economic growth during the Construction phase is considered as a positive effect.

Operation

Total operating expenditures (OPEX) for the Operation phase is estimated at $2,723.0 million, plus an additional $368.6 million in CAPEX. Of the total OPEX during the Operation phase, the majority will be spent on mining, followed by general and administrative (G&A) expenses, processing, and surface activities (see Appendix 6V-3C for more detail).

For Operation, the total GDP impacts of the Madrid-Boston Project are estimated at $3,191.1 million, with $258.0 million predicted for the first year of the Operation phase (2023), increasing to a high of $423.1 million in 2028, thereafter decreasing to $123.2 million in the last year of Operation (2032). Although the Operation phase is anticipated to be 10 years in duration, the injection of capital into territorial and national economies is predicted to have effects on GDP that continue past the Operation phase, with impacts dissipating completely by 2039 because of time lags associated with indirect and induced impacts. GDP impacts of the Operation phase are expected to be most felt in Alberta ($730.3 million), Newfoundland and Labrador ($704.7 million), Ontario ($518.5 million), British Columbia ($460.6 million), and Quebec ($269.7 million), followed by Nunavut ($245.4 million). Of the total GDP impacts in Nunavut, $202.3 million will benefit the Kitikmeot region, $28.6 million is predicted for the Qikiqtaaluk, and $14.5 million for the Kivalliq (Table 3.5-3; see Appendix V6-3C for more detail). Of the total impacts in the Kitikmeot, $163.8 million will be contributed from direct Madrid-Boston Project activities, $24.7 million form indirect and $13.8 million from induced activities (see Appendix V6-3C for more detail).

Additionally, during the Operation phase, $587.0 million will be contributed to the government tax revenue in Canada, with $319.3 million benefiting the federal and $267.7 million going to the provincial and territorial governments. Total tax contributions are expected to peak in 2028 at $75.5 million, with all benefits fully dissipating by 2039. Highest impacts at the provincial level will be felt in Newfoundland and Labrador ($76.0 million), Ontario ($48.1 million), Alberta ($47.0 million), British Columbia ($34.0 million), and Quebec ($31.7 million). The total benefit to the Government of Nunavut, as a result of Madrid-Boston operation, is predicted by the economic impact model at $9.1 million, with $7.7 derived from the economic activity in the Kitikmeot region (Table 3.5-3; see Appendix V6-3C for more detail).

In addition to the tax revenues estimated by the economic impact model, TMAC will be required to remit Payroll Tax and Petroleum Tax directly to the GN during the Operation phase. Payroll Tax is imposed based on a rate of 2% of the gross remuneration of all employees who work in Nunavut. Based on a total direct personal income of $1,403.7 million as estimated by the economic impact model (Appendix V6-3C), the total Payroll Tax payable by TMAC to the GN during the Operation phase is approximately $28.1 million.

During the Operation phase, total diesel fuel consumption by the Madrid-Boston Project is estimated to be 362.4 million litres. The majority of diesel use will be for non-motive use, mainly power generation. Applying the current tax rate of 3.1 cents/litre for non-motive diesel, total revenue to the Government of Nunavut from the Petroleum Tax is estimated to be $11.2 million. This is a conservative estimate, as motive diesel fuel use, which may comprise 15-20% of total fuel use, imposes a higher tax rate of 9.1 cents/litre.

Additional taxes, royalties and other fees that are paid directly by the operator during the Operation phase, as estimated by TMAC, include:

- an estimated $144.3 million in payments to the KIA and NTI (in sum consisting of royalties, exploration and production lease rents, land tenure payments, water compensation, and IIBA implementation payments); and
- an estimated $256.6 million in corporate tax payments to the federal and provincial/territorial governments as well as $32.7 million in non-production based royalties to the federal government.

Estimates of royalty payments, taxes and other sums are prospective and are based on assumptions of gold price, foreign exchange rates, tax rates, and various other economic factors. Should these factors change, the amounts could differ from those estimated here.

Project's contribution to economic growth during the Operation phase is considered as a positive effect.

Reclamation and Closure

As Madrid-Boston production comes to an end, and it enters the Reclamation and Closure phase, most contributions to the economic development will gradually decrease. The closure costs are estimated at $42.7 million; however, economic modeling does not estimate economic impacts associated with those costs. Further, there will be some employment opportunities throughout the Reclamation and Closure phase, decreasing over the phase. The Madrid-Boston Project's direct contributions to GDP and government tax revenue end with cessation of direct expenditures, while the indirect and induced contributions to GPD and government tax revenue will gradually decrease and eventually dissipate a number of years later. All other contributions associated with production, including payments to the KIA and NTI, will come to an end once the Project ceases production.

A decrease in the Project's contribution to economic growth during the Reclamation and Closure phase is considered as an adverse effect when compared with Operation; however, there will still be a net positive economic benefit compared to the baseline condition without the Madrid-Boston Project, and the decrease in benefits with the move into Closure and Reclamation does not negate the positive impacts provided by the Project during the Construction and Operation phases.

Temporary Closure

During any Temporary Closure phase that may occur (e.g., a business decision is made in the future to suspend operation and move into care and maintenance pending improved economic conditions), there would be a decrease in expenditures resulting in a loss of Project contributions to GDP and tax revenues accruing to the federal and territorial governments. Royalties and other payments to the Inuit associations (i.e., KIA and NTI), including those payments defined by the Framework Agreement and the IIBA, are also expected to decrease close to pre-Project baseline levels as many are linked to expenditures, employment levels, and mine production amounts. As with Reclamation and Closure, a decrease in Project's contribution to economic growth during Temporary Closure is considered an adverse effect when compared with Construction or Operation. All contributions to economic growth will not cease, however, as ongoing maintenance activities will be required at site meaning a reduced level of ongoing employment and procurement of goods and services by the Project.

Characterization of Hope Bay Project Potential Effect

The Doris Project completed construction and began production in early 2017. In addition, the Madrid Advanced Exploration Project and other ongoing exploration activities are planned for the Hope Bay Greenstone Belt. These expenditures were separately modeled in order to understand the economic impacts of these components.

Due to construction and exploration expenditures in 2015 and 2016, total economic impacts of the Hope Bay Project are estimated to be $143.5 million in GDP contributions across Canada, including $12.2 million in Nunavut and $9.7 million in the Kitikmeot Region. Due to Doris operation and other Hope Bay Project exploration expenditures planned from 2017 to 2021, total GDP impacts are predicted to be an additional $473.3 million across Canada, including $49.6 million in Nunavut and $37.5 million in the Kitikmeot region.

The corresponding tax revenues for the same periods are estimated to be a total of $25.0 million across Canada, including $14.3 million in federal and $10.7 million in provincial and territorial taxes, due to expenditure in 2015 and 2016. For the Doris operation, $87.5 million will be contributed to the government tax revenue in Canada, with $48.7 million benefiting the federal and $38.8 million going to the provincial and territorial governments. The total benefit to the Government of Nunavut due to the Approved Projects is predicted at $3.7 million in tax revenues, with $2.9 derived from the economic activity in the Kitikmeot region.

As for the proposed Madrid-Boston Project, TMAC will also be required to remit Payroll Tax and Petroleum Tax directly to the GN during the operation of the Doris mine.

As with Madrid-Boston, there are additional taxes, royalties and other fees that will be paid directly by the operator during the construction and operation of Doris. As estimated by TMAC, these include:

- an estimated $69.5 million in payments to the KIA and NTI (in sum consisting of royalties, exploration and production lease rents, land tenure payments, water compensation, and IIBA implementation payments); and
- an estimated $22.4 million in corporate tax payments to the federal and provincial/territorial governments.

In sum, the complete Hope Bay Project will provide significant GDP and tax revenue contributions to the Government of Nunavut, as well as the federal government and other territorial and provincial governments across Canada.

Residual Effect of Changes to Economic Growth

The Madrid-Boston Project is expected to have beneficial residual effects on economic growth and development through contributions to GDP and to federal and provincial government tax revenue. These effects are expected to be felt in the LSA, the RSA, Nunavut, and Canada as a whole, during the Construction and Operation phases. Given the substantial contributions of the Project in terms of expenditures and employment, increased economic growth is anticipated to have a positive residual effect on the Economic Development VSEC. The Project has the potential to reshape the economy of the Kitikmeot, as one that is increasingly experienced and diverse, and able to support various types of development.

Approaching the end of the Operation phase, the beneficial effects will start to dissipate with complete removal of all beneficial effects expected by 2039. At Reclamation and Closure, as well as for a short time during Temporary Closure, the Madrid-Boston Project's contributions to economic growth will decrease as a result of an end to production activities. The eventual removal of GDP and tax benefits with and following Post-Closure is an inevitable characteristic of resource development projects. The identified mitigation will assist in easing this transition for communities, Inuit organizations, and government. **No residual negative effect on the Economic Development VSEC is predicted because of a reduction to economic growth during Reclamation and Closure and during Temporary Closure.**

3.5.5.2 Business Opportunities

The Madrid-Boston Project, through the provision of business contracts to businesses in the LSA and the RSA, will support economic prosperity and create new economic opportunities. New businesses may be created to provide goods and services not presently available in the LSA or the RSA. Also, existing businesses may have the potential to expand or diversify as a result of local Project expenditures, expenditures by suppliers and expenditures by workers directly employed by the Madrid-Boston Project, or those benefiting from indirect and induced worker income within the Kitikmeot region. The effect of an increase in business opportunities is expected to occur during the Construction and Operation phases of the Madrid-Boston Project, with benefits being reduced during the Reclamation and Closure phases, and ceasing during the Post-Closure phase.

Changes to Local Business Growth

Characterization of Madrid-Boston Potential Effect

Construction

The construction of the Madrid-Boston Project is expected to provide contracting business opportunities that will help existing businesses grow and expand in capacity. Also, new businesses may be created if there is demand for specific goods or services not already available in the LSA or the RSA. Total expenditures over the Construction phase, a four-year period beginning in 2019 and ending in 2022, are estimated at $861.4 million, included CAPEX and OPEX during that phase. Although most capital required for mining will be sourced from outside of Nunavut such as mine and surface equipment purchases, an estimated $70.8 million (or an average of $17.7 million per year) is expected to be spent directly on suppliers within the Kitikmeot region (Table 3.5-4).[64] Some construction activities at the Madrid-Boston Project for which local and regional contractors may be hired include

[64] This estimate comes from the economic model report and it approximates the direct value of sales or the value of contracts awarded to businesses in the LSA and the RSA. The estimate is consistent with previously awarded contracts by TMAC to local and regional businesses as summarized in the section.

construction of the all-weather road from Madrid to the Boston Site, expanding infrastructure at Boston such as the accommodations camp, as well as other activities related to mine development and construction of shared infrastructure.

Table 3.5-4. Sales in Nunavut by Region (Millions of Canadian Dollars)

	Construction			Operation		
	Direct	**Indirect**	**Induced**	**Direct**	**Indirect**	**Induced**
Qikiqtaaluk	$7.1	$21.1	$24.6	$0.0	$36.6	$28.2
Kivalliq	$0.0	$2.5	$2.1	$0.0	$23.8	$19.9
Kitikmeot	$63.8	$10.0	$25.2	$236.0	$22.5	$148.3
Total Nunavut	$70.8	$33.7	$52.0	$236.0	$82.8	$196.4
Canada	$770.7	$666.3	$693.9	$2,797.0	$2,278.5	$2,756.9

Indirect and induced spending also has the potential to increase opportunities for businesses in the LSA and the RSA. The economic model provides an estimate of the value of indirect and induced sales that are associated with economic activity derived from spending by suppliers and workers spending their incomes on goods and services, including those directly and indirectly employed because of the Madrid-Boston Project. This type of spending will also help existing businesses grow, with businesses responding to a higher demand for goods and services as a result of an increase in business revenue and personal income.

The Construction phase of Madrid-Boston is expected to contribute $666.3 million in indirect and $693.9 million in induced sales across Canada (Table 3.5-4). With respect to indirect sales, largest benefits are expected in Alberta ($232.9 million) and Ontario ($227.8 million), Quebec ($74.9 million), and British Columbia ($60.5 million). Nunavut is expected to benefit in $33.7 million in indirect sales, of which $10.0 million will take place in the Kitikmeot region and $21.1 million in the Qikiqtaaluk region (Table 3.5-4).

Largest induced sales impacts are expected in Ontario ($167.9 million), Alberta ($159.8 million) and British Columbia ($110.0 million). In Nunavut, $52.0 million is expected to benefit the territory in induced sales, of which $25.2 million is predicted for the Kitikmeot region (Table 3.5-4). Industries most likely to benefit from indirect and induced sales include businesses/institutions serving households, transportation, retail trade, food services and accommodation, rental businesses and financial institutions. Summarizing, indirect and induced activity is expected to benefit the Kitikmeot region in a total of $36.2 million in sales of various types (or an average of $12.1 million per year). These are substantial contributions to the regional economy that will help existing businesses to prosper and new businesses to develop.

An increase in business opportunities for businesses in the LSA and the RSA during the Construction phase is considered as a positive effect of the Madrid-Boston Project.

Through the IIBA, TMAC promotes and maximizes opportunities for the employment of Inuit and the engagement of Kitikmeot Qualified Businesses in the development and operation of the Hope Bay Project (KIA & TMAC 2015). Kitikmeot Qualified Businesses are Inuit owned firms that are located in the Kitikmeot Region and recognized by the KIA as a business capable of doing work for TMAC (for a detailed listing see Section 3.2.3.6). All other Inuit Owned Firms or entities not on the Registry are counted separately, and are also expected to continue to benefit from contracting opportunities.

As outlined in the IIBA, Kitikmeot Qualified Business Contracts represent contracts for goods and services only open to bids from the Kitikmeot Qualified Businesses, whereas Open Contracts are for the

provision of goods and services not provided by Kitikmeot Qualified Businesses. TMAC, in collaboration with the KIA and other appropriate agencies, will work to establish a bid preparation training program for Inuit. Contracts open only to bids from Kitikmeot Qualified Businesses are described in detail in Section 3.2.6.3.

Operation

Similarly, Project spending during the Operation phase has the potential to provide opportunities for local and regional business growth. Total direct sales during Operation are estimated at $2,797.0 million. Depending on Project requirements, an estimated $236.0 million (or an average of $23.6 million per year) is expected to be spent in the Kitikmeot region. This amount represents the approximated value of contracts to regional businesses.

Indirect and induced sales for the Operation phase are, respectively, estimated at $2,278.5 million and $2,756.9 million for Canada. Largest indirect impacts are expected in Alberta ($947.2 million), Ontario ($469.0 million), Quebec ($360.5 million), and British Columbia ($232.6 million). In Nunavut, $82.8 million is expected to benefit the territory in indirect sales, of which $22.5 million is predicted for the Kitikmeot region and $36.6 million is predicted for the Qikiqtaaluk region (Table 3.5-4).

Largest induced impacts are expected in Newfoundland and Labrador ($596.5 million), Alberta ($540.6 million), Ontario ($524.7 million), British Columbia ($419.8 million), and Quebec ($241.6 million). In Nunavut, $196.4 million is expected to benefit the territory in induced sales, of which $148.3 million is predicted for the Kitikmeot region (Table 3.5-4). Industries expected to benefit from indirect and induced sales include transportation, repair and maintenance, support activities for mining, rental and real estate, financial institutions, retail and wholesale trade, accommodation and food services. Summarizing, the economic model estimates that $170.8 million (or approximately $17.1 million per year) is expected to benefit the Kitikmeot region in indirect and induced sales.

An increase in business opportunities for businesses in the LSA and the RSA during the Operation phase is considered as a positive effect of the Madrid-Boston Project.

Reclamation and Closure

During Reclamation and Closure, there will be limited business opportunities related to reclamation and closing of Madrid North, Madrid South and Boston mines. It is expected that of the $42.7 million in closure cost, a portion will be awarded to Kitikmeot Qualified Businesses and other Inuit Owned and Nunavut businesses. However, overall this phase will see a decrease in business opportunities as a result of production activities coming to an end. It is expected that businesses previously supplying the Madrid-Boston Project will have time to adjust their respective capacities or work with other mining developments and exploration companies in the region, although this will be dependent on the economic conditions at the time. Nevertheless, a decrease in the Project's contributions to business opportunities during the Reclamation and Closure phase is expected and is considered as an adverse effect. This decrease, however, does not negate the positive impacts provided by the Madrid-Boston Project during the Construction and Operation phases.

Temporary Closure

During any Temporary Closure phase that may occur, procurement opportunities for Inuit and northern businesses will decrease because of the decrease in Project expenditures. As with Reclamation and Closure, the resulting decrease in local business growth during Temporary Closure will result in an adverse effect when compared with Construction or Operation. The ability of LSA and RSA businesses to replace the lost business will be dependent on the economic conditions at the time and the market opportunities with other projects in the region. All business opportunities will not cease, however, as

ongoing maintenance activities will be required at site meaning a reduced level of ongoing employment and procurement of goods and services by the Madrid-Boston Project.

Characterization of Hope Bay Project Potential Effect

Prior to Madrid-Boston and for the operation of Doris, there will be substantial additional expenditures. From 2015 through 2021, CAPEX and OPEX expenditures are estimated to be a total of about $527 million. This represents significant additional business opportunities in Nunavut and the Kitikmeot region.

There has been a recent increase in local and regional business capacity, particularly in Cambridge Bay (see Section 3.2.3.6), which may serve as an indication of new business opportunities arising as a result of the Hope Bay Project. With respect to new businesses in the territory, in 2014, there were 53 registered Inuit firms in the business registry maintained by NTI (Section 3.2.3.6). Eight additional firms were added to the registry in 2015, and there are currently approximately 63 registered firms.

Although the value of future contracts awarded to business in the LSA or the RSA cannot be determined at this point, previous direct spending of the Doris Project on RSA suppliers offers a general sense of potential future spending. Kitikmeot Qualified Businesses and Inuit-owned businesses were awarded a total of $17.5 million in contracts in 2014 and $29.7 million in 2015. For 2016, this increased to a total of $53.6 million, with $47.7 million of that total going to Kitikmeot Qualified Businesses. Similar or greater contributions are expected over the Construction and Operation phases of the Madrid-Boston Project.

Residual Effect of Changes to Local Business Growth

The Madrid-Boston Project is expected to contribute to the growth of the local business capacity through the provision of contracts to Kitikmeot Qualified Businesses as well as other Inuit and non-Inuit businesses in the Kitikmeot region. Enhancement measures described in Section 3.5.5.4 (Business Opportunities) will help to support the development and growth of local businesses throughout Project Construction and Operation. Given Project needs to procure goods and services from local and regional suppliers, **changes to the local business growth are anticipated to have a positive residual effect on the VSEC Business Opportunities**.

At Reclamation and Closure and Temporary Closure, Project's contributions to local business growth will be reduced and eventually removed (during and following Post-closure) as a result of cessation of Project procurement of goods and services. Compared with Operation, there will be a negative residual effect because of a reduction in local spending during Reclamation and Closure and during Temporary Closure. Through the provisions of the IIBA, TMAC will work with the KIA and other stakeholders to enhance local business capabilities and the benefits realized by businesses within the region during Construction and Operation. Although Project-related business opportunities will be reduced during Reclamation and Closure and eventually cease at the end of mine life, **the Project is predicted to have an overall beneficial effect on local business development and growth. No negative residual effect is predicted**.

3.5.5.3 Employment

Changes to Employment Opportunities and Income

Madrid-Boston Project Construction and Operation have the potential to increase employment and personal income through the provision of direct employment opportunities, as well as through the contribution to the creation of indirect and induced employment opportunities. At Reclamation and Closure, there will be a reduction in employment opportunities and the associated personal income.

This reduction will continue throughout the Post-closure phase, with all direct Madrid-Boston employment ceasing at the end of that phase. This section considers potential changes in employment opportunities and income, as well as their effect on the regional and territorial unemployment levels and other indicators.

One way in which the Project can affect economic indicators is through increasing employment levels during the Construction and Operation phases; a decrease in those levels can be the expected during Reclamation and Closure.

Through the provision of employment and income during the Construction and Operation phases, the Madrid-Boston Project also has the potential to reduce the number of people who require social assistance. Recent data indicates that the number of social assistance recipients continued to increase for the Kitikmeot Region from 3,082 in 2011 to 3,432 in 2013, representing an 11% increase (Table 3.5-5). Similar trend was reported for most Kitikmeot communities, with the exception of Cambridge Bay. Between 2012 and 2013, the number of social assistance recipients increased in all Kitikmeot communities with the highest increase in Cambridge Bay (24%), followed by Gjoa Haven (9%), Kugluktuk (9%), Taloyoak (5%) and Kugaaruk (45%; Table 3.5-5).

Table 3.5-5. Number of Social Assistance Recipients, 2010 to 2013

	2010	2011	2012	2013
Kitikmeot	**3,133**	**3,082**	**3,136**	**3,432**
Cambridge Bay	481	455	428	529
Gjoa Haven	822	835	838	915
Kugaaruk	477	479	529	550
Kugluktuk	702	680	704	766
Taloyoak	651	633	637	672

Source: (NBS 2014e)

TMAC has committed, under the IIBA, to maximizing employment benefits in the LSA and the RSA. Under the IIBA signed in March of 2015, TMAC highlights Inuit employment preference which means that if there are two or more equally matched Inuit and non-Inuit candidates, TMAC will hire Inuit candidates (KIA & TMAC 2015). As outlined in the IIBA, priority to hiring employees at the Hope Bay Project is in the following order:

1. Kitikmeot Inuit and other Nunavut Inuit resident in the Kitikmeot region;
2. All other Kitikmeot and Nunavut Inuit;
3. Residents of the Kitikmeot region; and
4. All others.

TMAC also works closely with the Implementation Committee to identify recruitment strategies that will maximize Inuit employment at the Hope Bay Project and to meet or exceed the Inuit Employment Targets. Points of hire will include the communities for Kugluktuk, Cambridge Bay, Gjoa Haven, Taloyoak, and Kugaaruk, as well as Kingaok and Omingmaktok. TMAC also will show preference for employing qualified Inuit students from the Kitikmeot communities to other summer employment candidates (KIA & TMAC 2015).

Characterization of Madrid-Boston Potential Effect

Construction

The Madrid-Boston Project is estimated to create 1,162 person-years in CAPEX-related employment, plus an additional 1,114 person-years in OPEX employment, for a total of 2,276 person-years in direct employment over the four-year Construction phase (Table 3.5-6). It is further estimated that of the total direct employment, the Kitikmeot region will benefit in 23 person-years of employment in 2019, 69 person-years in 2020, 102 person-years in 2021, and 94 person-years in 2022, for a total of 289 person-years over the Construction phase (approximately 90% of all direct employment opportunities in Nunavut are expected to take place in the Kitikmeot region; Appendix V6-3C). Overall, the majority of direct employment is expected to benefit the province of Newfoundland and Labrador (538), British Columbia (423), Alberta (389), and Nunavut (321; Appendix V6-3C).

Table 3.5-6. Direct Project Employment (person-years) during the Construction Phase (2019 to 2022)

Area	Year 1 2019	Year 2 2020	Year 3 2021	Year 4 2022
CAPEX Workforce	165	352	385	260
OPEX Workforce	10	170	367	567
Total	**175**	**522**	**752**	**827**

Additional employment benefits will be created in supplier industries and further back in the supply chain as a result of workers spending. The economic model estimates that the Madrid-Boston Project will create 3,003 person-years in indirect and 1,734 person-years in induced employment opportunities across Canada (Table 3.5-7). Of that, 150 indirect and 96 induced person-years of employment will be created in Nunavut, with most indirect impacts benefiting the Qikiqtaaluk region (97 person-years) followed by the Kitikmeot region (48 person-years; Table 3.5-7). Indirect and induced employment impacts will dissipate by 2029 (Appendix V6-3C).

Table 3.5-7. Total Employment (person-years) and Personal Income Impacts during the Construction Phase

	Direct Employment	Indirect Employment	Induced Employment	Total
Employment:				
Canada	2,281	3,003	1,734	7,018
Nunavut	321	150	96	567
Qikiqtaaluk	32	97	34	163
Kivalliq	0	5	9	14
Kitikmeot	289	48	52	389
Income:				
Canada	$304.2	$187.9	$115.9	$608.1
Nunavut	$42.6	$10.6	$6.3	$59.5
Qikiqtaaluk	$8.5	$7.4	$4.2	$20.1
Kivalliq	$0.0	$0.4	$0.9	$1.3
Kitikmeot	$34.1	$2.9	$1.2	$38.2

The increase in direct, indirect and induced employment during the Construction phase will be associated with an increase in personal income. Direct employment is expected to contribute $304.2 million in personal income across Canada, with annual average earnings are estimated at $133,000. Further, an estimated $187.9 million will be earned in indirect income, with average earnings of $62,600, and $115.9 million in induced personal income with average earnings of $66,800 (Table 3.5-7).

Nunavut is expected to benefit in $59.5 million in personal income impacts. Further, in the Kitikmeot region, $34.1 million in personal income benefits is predicted for those with direct employment; an additional $2.9 million in indirect and $1.2 million in induced personal income will benefit the region. These will add up to substantial income benefits that will likely increase both the median and average incomes.

In sum, direct employment opportunities averaging an estimated 72 jobs for workers from the Kitikmeot region, have the potential to increase the number of employed, and reduce the regional unemployment rate by up to 3% (from about 28% to 25%, all else being equal); this is assuming that all hired employees come from the pool of the unemployed. This would also be expected to reduce the number of social assistance recipients. The additional indirect and induced opportunities in the Kitikmeot region have the potential to further reduce the unemployment rate and the number of social assistance recipients.

Increases in jobs and personal income are the most frequently mentioned benefits of working at a mining operation, as reported by Kugluktuk residents through their "Community Readiness Initiative" (see Section 3.2.3.10; (Cameron and Gabel 2015b). Income is not only seen as a necessary source for workers and their families, but higher income also has the ability to improve workers' self-esteem and provide a sense of contributing to the community (Cameron and Gabel 2015b).

An increase in employment opportunities and personal income throughout the Construction phase is considered as a positive effect of the Madrid-Boston Project.

Operation

During the Operation phase, the Madrid-Boston Project will hire up to about 1,100 workers during peak production, plus additional workers associated with CAPEX, for a total of 9,487 person-years of direct employment for the phase (Table 3.5-8). Workers will be hired as mine contractors and in processing, surface operations, mine supervision and technical staff, maintenance, site administration, and off-site support. Direct employment impacts are predicted to be most felt in Newfoundland and Labrador (3,746), followed by British Columbia (1,507) and Nunavut (1,100; see Appendix V6-3C for details). Further, of the 1,100 person-years of direct employment created in Nunavut, virtually all of it is expected to take place in the Kitikmeot region (Appendix V6-3C).

Table 3.5-8. Direct Project Employment (person-years) during the Operation Phase (2023 to 2032)

Area	Year 5 2023	Year 6 2024	Year 7 2025	Year 8 2026	Year 9 2027	Year 10 2028	Year 11 2029	Year 12 2030	Year 13 2031	Year 14 2032	Total
CAPEX Workforce	273	80	54	143	72	181	109	60	46	2	1,020
OPEX Workforce	748	1,025	1,094	1,097	1,095	1,106	848	608	567	279	8,467
Total	**1,021**	**1,105**	**1,148**	**1,240**	**1,167**	**1,287**	**957**	**668**	**613**	**281**	**9,487**

The Operation phase of the Madrid-Boston Project will further create 10,380 person-years in indirect and 6,649 person-years in induced employment across Canada (Table 3.5-9). Of those, 510 indirect and 362 induced person-years of employment will be created in Nunavut (Table 3.5-9). The Kitikmeot

region will benefit in 306 person-years in indirect and 111 person-years in induced employment. Employment benefits are also anticipated for the Qikiqtaaluk and the Kivalliq (Table 3.5-9). Indirect and induced employment impacts associated with the Operation phase will dissipate by 2035 (Appendix V6-3C).

Table 3.5-9. Total Employment (person-years) and Personal Income Impacts during the Operation Phase

	Direct Employment	Indirect Employment	Induced Employment	Total
Employment:				
Canada	9,484	10,380	6,649	26,514
Nunavut	1,100	510	362	1,973
Qikiqtaaluk	0	177	183	360
Kivalliq	0	28	68	96
Kitikmeot	1,100	306	111	1,517
Income:				
Canada	$1,403.7	$607.5	$445.5	$2,456.7
Nunavut	$163.8	$35.6	$23.6	$223.0
Qikiqtaaluk	$0.0	$11.1	$10.5	$21.6
Kivalliq	$0.0	$2.8	$8.0	$10.8
Kitikmeot	$163.8	$21.8	$5.1	$190.6

The increase in direct, indirect and induced employment during the Operation phase will be accompanied by an increase in personal income. Direct employment is expected to contribute $1,403.7 million in personal income across Canada, including $163.8 million in benefits to Nunavut. Annual average earnings for direct Project employment in Canada are estimated at $148,000. An estimated $607.5 million will be earned in indirect income, with average earnings of $58,500 per year, and $445.5 million in induced personal income with average earnings of $67,000 (Table 3.5-9). For Nunavut, the total personal income impact for the Operation phase is estimated at $223.0 million, with $190.6 million earned in the Kitikmeot region (Table 3.5-9).

In total, with 1,100 person-years of direct employment in the Kitikmeot region created over the Operation phase (an average of 110 jobs per year), and $163.8 million in direct personal income effect (and average of $16.4 million per year or $148,900 per job), the Madrid-Boston Project has potential to increase the employment levels and reduce the unemployment rate. If all positions were filled by those who are currently unemployed, the unemployment rate would decrease by as much as 4.5%. It is expected that a number of currently unemployed will find employment with the Project or associated with spin-off employment in the communities. Further, those who transition from current employment to employment with Madrid-Boston will be likely replaced by the currently unutilized labour. Direct employment would be also expected to reduce the number of social assistance recipients. Indirect and induced employment opportunities in the Kitikmeot region have the potential to further reduce the unemployment rate and the number of social assistance recipients.

An increase in employment opportunities and personal income throughout the Operation phase is considered as a positive effect of the Madrid-Boston Project.

Reclamation and Closure

Although it is currently unknown how many person-years of employment will be created at the Madrid-Boston Project during Reclamation and Closure, it is expected that there will be a substantial drop in employment opportunities compared with Operation. There is potential for the unemployment rate and number of people receiving social assistance to increase; however, the extent to which this will occur is difficult to predict and will be determined by the number of other projects and employment opportunities available in the region at that time (year 2033 or later) and the ability of individuals to transition to other employment. Although some indirect and induced employment is expected to continue throughout this phase, with most employment expected to dissipate by 2039 for Canada and 2035 for Nunavut, there will be fewer opportunities and reduced personal income.

A decrease in employment opportunities and personal income throughout the Reclamation and Closure phase is considered as an adverse effect of the Madrid-Boston Project. However, that does not negate contributions to employment and personal income that took place throughout the Construction and Operation phases, but is rather seen as an inevitable end to a mining operation.

Temporary Closure

During any Temporary Closure phase that may occur, there will be a loss of direct, indirect and induced employment and associated personal incomes within the RSA, as well as across the territory and nationally. Compared with Operation (Table 3.5-9) employment will be substantially reduced but will not cease, however, as ongoing maintenance activities will be required at site meaning a reduced level of ongoing employment and procurement of goods and services. As with Reclamation and Closure, the resulting decrease in employment opportunities and income during Temporary Closure will result in an adverse effect when compared with Construction or Operation. The ability LSA and RSA workers to find alternative employment will be dependent on the economic conditions at the time and the employment opportunities with other projects in the region.

Characterization of Hope Bay Project Potential Effect

Additional employment and income benefits are predicted due to the development and production of the Doris mine, as well as other planned exploration activities associated with the Hope Bay Project. Excluding Madrid-Boston, Hope Bay is expected to create a total of 5,724 person-years of direct, indirect and induced employment across Canada.

Total employment impacts for 2017, the first year of Doris Project operation, are estimated at 822 person-years. In 2018, 1,139 person-years of employment will be created, falling to 1,107 person-years of employment in 2019 and 793 in 2020, and dissipating thereafter. Largest employment benefits are expected to be created in Ontario, Alberta and British Columbia, followed by Quebec and Newfoundland and Labrador. In Nunavut, the operation of the Doris Project will create an estimated 444 person-years of direct, indirect and induced employment of which 374 person-years are predicted for the Kitikmeot region, or an average of about 75 jobs (full-time equivalent) from 2017 through 2021.

Similarly, total personal income benefits of the operation of Doris are estimated at $337.4 million for Canada. In Nunavut, of the $38.5 million in total personal income impact, $32.6 million is predicted for the Kitikmeot region.

Residual Effect of Changes to Employment Opportunities and Income

The Madrid-Boston Project is expected to increase employment and income levels within the Kitikmeot Region and Nunavut, as well as elsewhere in Canada throughout the Construction and Operation phases. Enhancement measures described in Section 3.5.5.4 (Employment) will facilitate local hiring efforts and help to maximize local employment levels. The provision of employment opportunities and

increases in personal income has the potential to result in substantial positive benefits for the Kitikmeot. **As a result, a positive residual effect on the VSEC Employment is predicted during Construction and Operation**.

Approaching the end of the Operation phase and throughout the Reclamation and Closure phase, there will be a gradual decrease in employment opportunities, and the associated personal income, that can temporarily increase local and/or regional unemployment levels. Despite the mitigation measures described in Section 3.5.5.4 (Employment) to reduce this effect, a **negative residual effect of a decrease in employment opportunities and income during the Reclamation and Closure phase is predicted. Similarly, a negative residual effect is predicted for any Temporary Closure phase**.

Changes to Labour Force Capacity

The Madrid-Boston Project, through the provision of employment opportunities, has the potential to change the skills and experience of the territorial and regional labour force and contribute to building labour force capacity. TMAC, under the IIBA, agreed to supporting training opportunities for Inuit (KIA & TMAC 2015). TMAC's human resources strategy will contain talent management initiatives such as training, career planning and advancement. The strategy will also contain specific measures to maximize Inuit employment, training and advancement and meeting or exceeding Inuit Training Targets. The IIBA specifies that TMAC may include on-the-job technical training and skills development in a variety of areas including underground mining, surface operations, mill processing, geotechnical and environmental. Career development plans will also be developed for all Inuit employees. TMAC and the KIA will encourage the government and local agencies to develop and provide training related to trades within the Kitikmeot high school system and off-site education and training programs aimed at preparing Inuit for employment in mining and related fields (KIA & TMAC 2015). Additionally, a Training and Development Fund will be developed to promote relevant post-secondary education to which TMAC will contribute $15,000 initially followed by yearly contributions of up to $100,000 (KIA & TMAC 2015). Those employed by the Project will gain years of work related experience that will help them obtain other jobs once operations cease.

As described in Section 3.2.3.4, of those who were employed in 2016 in the Kitikmeot region, 20% held occupations in 'sales and service', 18% in 'trades, transportation and equipment operation', 22% in 'education, law, social, community and government', and 11% in 'business, finance and administration' (Section 3.2.3.4, Table 3.2-2). By industry, of the 2,855 in the labour force, 21% were in 'public administration', 13% in 'educational services', 11% in 'retail trade', 10% in 'construction' and 2% in 'mining and quarrying', with the remaining working in other industries (Statistics Canada 2017d).

Data provided in Section 3.2.3.5 is used to determine the effects of the Madrid-Boston Project on the employment by skill level and on the labour force capacity.

Characterization of Madrid-Boston Potential Effect

Construction

During the Construction phase, direct employment opportunities at the Madrid-Boston Project will include construction employment (up to 385 jobs) as well as production employment (up to 567 jobs; see Table 3.5-6). Construction jobs will require mostly workers with a Skill Level C and B (classification according to the National Occupational Classification, or NOC system); however, the specific demand by skill level cannot be determined at this time as it will depend on the needs of the specific suppliers contracted for construction-related activities. Additional demand for workers at various skill levels will come from indirect and induced employment opportunities.

The economic model estimates that, over the Construction phase, the Project will provide 567 person-years of direct, indirect and induced employment in Nunavut, including 390 person-years of employment in the Kitikmeot region (Appendix V6-3C). It is further estimated by the economic model that of the total direct employment, the Kitikmeot region will benefit in 23 person-years of employment in 2019, 69 in 2020, 102 in 2021, and 94 in 2022, for a total of 289 direct person-years of employment (Appendix V6-3C). It is expected that some of the workers hired for the Construction phase will be hired to fill construction jobs, whereas others will be hired to fill production jobs. As a result, an estimated 289 person-years of direct work experience will benefit residents in Nunavut, with all workers obtaining some form of on-the-job training (with most workers receiving multiple training sessions). Although the construction period is relatively short, with fewer training opportunities provided, the labour force capacity in the Kitikmeot region is expected to increase as a result of the Madrid-Boston Project.

The effect of an increase in the labour force capacity as a result of Project direct, indirect and induced employment opportunities created over the Construction phase is a positive effect.

Operation

Based on requirements for workers to fill positions related to Operations, as defined by the Hope Bay Project Prefeasibility Study (TMAC, 2015), about 10% of workers are expected to be required to have Skill Level A, 45% Skill Level B, 35% Skill Level C, and 10% of workers to have Skill Level D.[65] Workers will be required for operations, maintenance and surface operations, milling, mining including mine crew maintenance, geology, management, environment, cementation, and administration. In total, up to an estimated 1,100 operation positions with different skill levels and areas of expertise will be available with the Madrid-Boston Project.

Compared with Construction, the Operation workforce is larger and employed for a longer period of time (up to 10 years). From the economic model, an estimated 1,100 person-years[66] of direct work experience will benefit residents in Nunavut, with all workers obtaining on-the-job training. As a result, the labour force capacity in the Kitikmeot region is expected to increase substantially as a result of the Project.

Table 3.5-10 compares estimated labour supply (Table 3.2-11, Section 3.2.3.5), as indicated by the number of unutilized workers (those 'unemployed' and 'not in the labour force'), to the total Madrid-Boston Project labour demand based on an assumed maximum production workforce of 1,100 (years 2025 through 2028; Table 3.5-8). As estimated, there are about 2,000 unutilized workers in the Kitikmeot region of Nunavut, with about one-third of those being unemployed and two-thirds not in the labour force. Of the unutilized workers, an estimated 20 have skill level A, 310 have Skill Level B, 170 have Skill Level C, and 1,495 are classified as Skill Level D. In the wider Nunavut Territory, there are an estimated 10,590 unutilized workers, again with about one-third of those unemployed, and two-thirds not in the workforce.

[65] It should be noted that these estimates are approximations only and are subject to revision and refinement as Madrid-Boston Project design and planning progresses. As such, the estimates reported here should be treated as approximations only.

[66] Note that the correspondence of the direct employment estimate for Kitikmeot residents, in person-years for the whole of the Operation phase, to the maximum number of operations workers required in a given year for the Project (as given in the previous paragraph) is a coincidence only. The two estimates are not the same measure.

Table 3.5-10. Labour Demand less Labour Supply

Category	Supply of Unutilized Workers		Project Demand	Supply Less Demand	
	Nunavut	Kitikmeot		Nunavut	Kitikmeot
Unemployed Labour Force					
Skill Level A (university education)	50	5	110	(60)	(105)
Skill Level B (college education or apprenticeship training)	725	140	495	230	(355)
Skill Level C (secondary school and/or occupation-specific training)	485	65	385	100	(320)
Skill Level D (on-the-job training is usually provided)	2,090	415	110	1,980	305
Total	**3,350**	**625**	**1,100**	**2,250**	**(475)**
Total Unutilized Labour (unemployed and not in the labour force)					
Skill Level A (university education)	155	20	110	45	(90)
Skill Level B (college education or apprenticeship training)	1,605	310	495	1,110	(185)
Skill Level C (secondary school and/or occupation-specific training)	1,280	170	385	895	(215)
Skill Level D (on-the-job training is usually provided)	7,550	1,495	110	7,440	1,385
Total	**10,590**	**1,995**	**1,100**	**9,490**	**895**

Notes:
Madrid-Boston Project labour demand estimates are preliminary. Numbers may not add up due to rounding.

As shown, at the regional level, there are not enough unutilized workers, both unemployed and those not in the labour force, to meet labour requirements at Skill Levels A, B, and C. At the territorial level, there are not enough unemployed workers to meet Madrid-Boston Project labour demand at Skill Level A. For this reason, although concerted efforts will be made by TMAC to maximize Inuit and Nunavut employment on the Project, the majority of the workers will need to be sourced from outside of the Kitikmeot region and Nunavut. Only those of Skill Level D currently have the potential to be sourced from the Kitikmeot region.

The economic model predicts that during the Operation phase 1,973 person-years of total (direct, indirect and induced employment) will be created in Nunavut, including 1,517 person-years of total employment in the Kitikmeot region (Appendix V6-3C). Of the total employment, 1,100 person-years of direct employment will be created in the Kitikmeot region (all direct employment impacts in Nunavut are predicted for the Kitikmeot region; Appendix V6-3C). That is, it would be expected that on average, approximately 110 Project employees at various skill levels would be hired from the Kitikmeot. However, this section looks at the total potential employment of Nunavummiut to utilize the currently unutilized labour force and maximize training and employment opportunities for the residents of the LSA and RSA.

For planning purposes, is assumed that Nunavummiut may represent from 5% to 30% of positions during the Operation phase, depending on the work area (e.g., mining, processing, surface operations, general & administration). As in the case of other mining projects, some of required workforce at the Project will be sourced from outside of Nunavut, especially if the Project's requirements by skill level

cannot be met. Potential provinces from which labour could be sourced include Newfoundland and Labrador, British Columbia, Ontario, and Alberta.

High and low hiring scenarios of Nunavummiut in the Kitikmeot region are explored to assess the existing suitability of the regional labour force to meet Project labour requirements (Table 3.5-11). Under the low hiring scenario, it is assumed that 10% of the Project workforce at Skill Levels B and C are from the Kitikmeot; for Skill Level D, it is assumed that 30% of all positions will be filled. Under the high hiring scenario, it is assumed that 30% of the Project's workforce at Skill Levels B and C are from the Kitikmeot, with all positions being filled at Skill Level D (Table 3.5-11). Given the lack of regional and territorial workers available at Skill Level A, it is modestly assumed that 5% at the low scenario and 10% at the high scenario will be hired at Skill Level A. Skill Level A workers are mainly assumed to leave their current occupations and seek employment at the mine. In sum, it is assumed that for the low scenario approximately 12% of the total workforce (all skill levels) will be comprised of Nunavummiut, and for the high scenario it is assumed that approximately 35% of the total workforce will be Nunavummiut. Further, in the Kitikmeot region, 90% of residents are Inuit and this proportion is used to estimate the proportion of Inuit employment (Statistics Canada 2017d). All estimates are considered at the peak of Madrid-Boston Project operations when approximately 1,100 production workers are expected to be required.

Table 3.5-11. High and Low Hiring Scenarios for Kitikmeot Workers

Category	Inuit		Total		Total Project Demand
	Low	High	Low	High	
Skill Level A (university education)	5	10	6	11	**110**
Skill Level B (college education or apprenticeship training)	45	134	50	149	**495**
Skill Level C (secondary school and/or occupation-specific training)	35	104	39	116	**385**
Skill Level D (on-the-job training is usually provided)	30	99	33	110	**110**
Total	**115**	**347**	128	**386**	**1,100**

Achievement of the high hiring scenario is evidenced by other projects in Nunavut. For example, in 2014 the Meadowbank mine reported to have Inuit representation of 31%; the company noted that this employment level was a result of extensive training and support programs in the region (Rogers 2014). The high and low scenarios are presented in Table 3.5-11.

At the *low hiring scenario*, and only considering the skill levels of unemployed workers (Table 3.2-11), the Kitikmeot region has the potential to meet Project labour demand at Skill Levels B, C and D. A few workers are expected to be available at Skill Level A. If some additional workers are enticed to enter the labour force because of the employment opportunities, the Kitikmeot has the potential to meet all regional labour demands as shown in Table 3.5-11.

At the *high hiring scenario*, and only considering the skill levels of unemployed workers (Table 3.2-11), the Kitikmeot region only has the potential to meet Project labour demand at Skill Level D (although Skill Level B is close to meeting the assumed demand). If one also considers the residents that are not currently part of the labour force, the Kitikmeot region has the potential to meet Project labour demand at Skill Level A, B, and D; however, it would be expected that many who have the right skill level would not have the background and experience required for the job. Also, the vast availability of

unutilized workers at Skill Level D provides substantial potential to train those workers to qualify for positions at Skill Levels C or B. In such a case, strong emphasis on supporting appropriate training opportunities for trade occupations is required. Finally, most Skill Level A workers would need to be sourced from outside of the territory. Additional demand for workers at various skill levels will come from indirect and induced employment as well as from the replacement of workers who decide to leave their current positions for employment at the Project. The demand from indirect and induced effects cannot be estimated as there is not enough information on the types of jobs that would be created.

In general, the Project has potential to tap into the unutilized labour market in the Kitikmeot region, and through the provision of on-the job training as well as the support of other training opportunities, increase the labour force capacity in the region. The number of jobs created under the low hiring scenario (Table 3.5-11) is consistent with estimates of the economic model (Section 3.5.3; Appendix V6-3B) that predicts an average of 110 direct Madrid-Boston Project jobs created for residents of the Kitikmeot Region. Based on the high hiring scenario, an estimated 386 workers would benefit from direct employment and related training opportunities and on-the-job experience. Labour force capacity could also increase as a result of previously discouraged job seekers re-entering the labour pool as a result of new job opportunities, and workers employed as a result of direct and indirect employment opportunities created by the Madrid-Boston Project.

The effect of an increase in the labour force capacity as a result of direct, indirect and induced employment opportunities created over the Operation phase of the Project is considered a positive effect.

Reclamation and Closure

Over the Reclamation and Closure phase of the Madrid-Boston Project, there will be a reduction in Project employment, as well as in indirect and induced employment opportunities. As such, Madrid-Boston's contributions to building the labour force capacity in the region will cease. However, work-related experience and increased capacity gained throughout the Operation phase will help workers in the Kitikmeot region obtain new employment.

The effect of a decrease in Project contributions to building regional labour force capacity during the Reclamation and Closure phase is considered as an adverse effect. However, this effect is not expected to negate benefits created during the Construction and Operation phases, and it is perceived as a typical outcome common to the close of operations.

Characterization of Hope Bay Project Potential Effect

In addition to Madrid-Boston, the Approved Projects are estimated to provide to Nunavut a total of 444 person-years of total employment benefits (including direct and spin-off employment) from 2017 onwards, primarily associated with Doris mine production. This will add further to the work experience and labour force capacity within Nunavut and the Kitikmeot region.

Direct employment by Doris is estimated to be about 180 person-years for Kitikmeot region workers, primarily from 2017 to 2021, for an average of about 36 workers per year. This will be in addition to the hiring estimates of the Madrid-Boston Project provided above (Table 3.5-11). The job skills and experience gained will be similar to that resulting from Madrid-Boston.

Residual Effect of Changes to Labour Force Capacity

During the Construction and Operation phases, the Madrid-Boston Project is expected to increase the capacity of the labour force in the Kitikmeot region. At present, Kitikmeot residents face a number of barriers to employment including gaps in education and a lack of work-related experience. The

Project, through the provision of direct and indirect employment, on-the-job training as well as supporting other training opportunities, has the potential to increase the ability of individuals to engage in the wage economy. Enhancement measures described in Section 3.5.5.4 (Employment) will support training opportunities and skill development to maximize employment of Inuit from the LSA and the RSA. As a result, **the increased capacity of the labour force is anticipated to have a positive residual effect on the Employment VSEC during Construction and Operation. During Reclamation and Closure, the Madrid-Boston Project's contributions to increasing labour force capacity will no longer continue, but no negative residual effect is predicted**.

Competition for Local Labour

Competition for local labour may result from the shortage of skilled workers, such as those with Skill Level A, B and C, and workers leaving their current jobs to find Madrid-Boston Project-related employment in hopes of earning higher wages. Madrid-Boston is expected to offer relatively well-paying jobs and will require workers with skills and experience also required by other employers in the LSA and the RSA. A number of workers hired for the Project will include hires from the Doris Project (RPA 2015). Competition for local labour could take place during the Construction phase and at the beginning of the Operation phase when hiring takes place to fill the remaining available positions; no competition during the Reclamation and Closure and the Post-Closure phases is expected. MiHR estimates that in 2013, 2,215 people worked in Nunavut's mining industry; of the total employment, there were approximately 1,075 workers in the mineral extraction sector and over 1,140 workers in exploration and mining support services (MiHR 2014). The demand for workers will largely stream from mineral extraction, followed by mineral exploration and mining support services (MiHR 2014). In Nunavut, there is a high percentage of workforce who work in the territory but live elsewhere (MiHR 2014). In fact, despite the strong emphasis to hire from the local labour force, it is estimated that nearly three quarters of Nunavut's workforce is from outside of Nunavut. The need to supplement the local workforce comes from the remoteness of mining operations, a small population size, and a lack of infrastructure and housing, as well as education gaps (MiHR 2014). In mining, Indigenous people are often employed in entry-level and labourer positions with potential barriers to employment including the level of educational attainment (education and skill do not meet entry requirements). Limited employer awareness of how to find and recruit Inuit workers is also at play (MiHR 2014).

As described in Section 3.2.5.4, employment opportunities in the Kitikmeot region are limited and include mainly the public sector (e.g., GN, hamlet, health services, education services). Employment opportunities within the private sector include retail (e.g., the Northern Store and Co-op), accommodations, and employment with local construction companies (e.g., carpenter, equipment mechanic, excavator operator, and maintenance technician).

MiHR's hiring requirements forecast estimates that, over the next decade (by 2024), Nunavut's mining industry will require 1,120 hires or 112 hires per year on average (under the baseline scenario). Most of this requirement is expected to come from the replacement of existing workers that leave the industry (mainly due to reasons unrelated to retirement) (MiHR 2014). Occupations highest in demand are likely to include trades and production, followed by demand for support workers, supervisors and coordinators, and technical occupations, as well as human resources and financial occupations (MiHR 2014). More specifically, the top five occupations with notable hiring requirement are:

- heavy equipment operators (except crane);
- heavy-duty equipment mechanics;
- truck drivers;
- drillers and blasters; and

- geological and mineral technologists and technicians.

MiHR also prepared an available talent forecast that refers to the new entrants to Nunavut's labour pool. New entrants to the mining industry are mostly individuals who just completed high school or post-secondary school and are planning to join the workforce. New entrants may also include international or interprovincial migrants, or those who are changing occupations or re-entering the workforce (MiHR 2014). The forecast predicts that, over the next ten years (up to 2024), the mining industry in Nunavut will attract a modest 120 new entrants or 12 new entrants per year; this is based on historical rates for the mining industry and its ability to attract workers for specific positions from the broader labour pool (MiHR 2014). Given that the demand for selected occupations is estimated to be six times (790) the number of new entrants, it is expected that there will be a substantial talent gap (MiHR 2014). This talent gap is expected to vary for different occupations and may contribute to competition for labour in the territory.

Section 3.2 describes baseline conditions for labour and employment, and identifies that there are challenges with labour supply, specifically for skilled and experienced labour. However, unemployment rates are high and there is a sizable available labour force, as detailed in Sections 3.2.5.4 and 3.2.5.5. The most recent employment data from 2016 indicates that the average unemployment rates were 28% in the Kitikmeot region and 22% in Nunavut. Taloyoak had the highest unemployment rate (i.e., 40% with 155 unemployed) and Cambridge Bay had the lowest unemployment rate (i.e., 17% with 160 unemployed). Based on earlier studies of unemployment, reasons identified for unemployment include lack of jobs, caring for children and elder relatives, spending time on the land hunting or fishing, illness or disability, and waiting for recall or for another job to begin (E. Cameron, and C. Gabel 2015). In general, employment opportunities in the Kitikmeot region within the private sector are limited. Private sector employment opportunities that are available include general labour and skilled trade jobs.

Characterization of Madrid-Boston Potential Effect

Construction

The Construction phase of the Madrid-Boston Project will require up to 567 production workers and up to 385 workers with construction related skills and experience. The economic model predicts that, of the total Project-related employment during Construction, the Kitikmeot Region will benefit in 23 person-years in direct employment in 2019, 69 person-years in 2020, 102 person-years in 2021, and 94 person-years in 2022 (Section 3.5.3; Appendix V6-3C). That is, on average an estimated 72 workers hired for the Madrid-Boston Project during the Construction phase would be from the Kitikmeot region. Some of these jobs would be labourer positions, with workers possibly hired from the unutilized labour pool (unemployed workers), workers with Skill Level D or workers not currently participating in wage economy. However, other jobs would be filled by workers currently holding other occupations in the region. This could put strain on employers in the LSA and the RSA, as they would be unlikely to compete with wages offered at the Project, and would be required to find and train new employees, a process that can be costly.

The effect of the potential competition for labour is not expected to affect professional occupations in health, education, financial or legal institutions. Such positions are typically well-paid and are not affected by high turnover rates. Rather, it would be expected that workers with transferrable skills and experience, typically holding occupations related to trades, transportation, heavy equipment operation, natural resources, and construction would be interested in Project-related employment. Also, occupations in maintenance, repair, janitorial and kitchen services may experience some demand. Given a shortage of skilled workers in the Kitikmeot region and the wider Nunavut, the

Madrid-Boston Project will need to source some labour from other provinces and territories including Newfoundland and Labrador, British Columbia and Alberta.

There is potential for some currently employed residents of the Kitikmeot region to leave their employment for mine-related employment. However, employment with the Madrid-Boston Project is finite in nature and individuals who have invested in their education to obtain employment (skilled workers) are, not expected to leave their permanent employment for temporary employment, particularly during the Construction Phase, which has a limited duration of four years.

Further, although the Madrid-Boston Project will pay a range of salaries, depending on the required skill level, position and experience, the average earnings for the Construction phase is estimated at $133,000 per year. As described earlier in this section, the median/average salary for residents in the Kitikmeot region is noticeably lower. Wage differences can further contribute to the competition for local labour and temporarily affect the ability of local businesses to provide goods and services and/or earn revenue if they are unable to find qualified workers at wages they can afford to pay.

The Madrid-Boston Project also has the potential to increase employment levels and reduce the unemployment rate. This is because it is expected that a number of currently unemployed and underemployed will find employment with the Madrid-Boston Project or associated with spin-off employment in the communities. Further, those who transition from current employment to employment with the Project may be replaced by the currently unutilized labour. Therefore, the potential for the Madrid-Boston Project to cause the resignation of currently employed people living in RSA communities is expected to have a net-negligible effect. The number of individuals in the Kitikmeot region who have trades or apprenticeship certifications has increased in recent years as has the number of students in pre-trades, trades, and apprenticeship programs (see Section 3.2.5.3), thus increasing the pool of skilled labour in the region. Should individuals decide to leave their current employment for employment with the Project, their current positions with organizations in the communities may be filled by local skilled workers. In sum, the Project will bring much-needed employment opportunities to the Kitikmeot region.

TMAC is committed to ongoing participation in the Kitikmeot Socio-economic Monitoring Committee (Kit-SEMC). TMAC will report on results of the SEMP and receive feedback and input regarding any adaptive management and mitigation that may be required in the event unanticipated impacts are identified. Through TMAC's participation in the Kit-SEMC, there is an opportunity for ongoing monitoring of socio-economic effects, including potential changes to labour competition, due to the Madrid-Boston Project and other industrial development projects in the region. Engagement with the Kit-SEMC regarding employment and other socio-economic impact will support regional monitoring efforts.

Potential competition for local labour during the Construction phase is considered an adverse effect of the Madrid-Boston Project.

Operation

During the Operation phase, the Madrid-Boston Project will hire up to a peak of approximately 1,100 workers. The economic model predicts that on average 110 workers will be from the Kitikmeot region (Section 3.6.2). However, further investigation of local employment impacts under the high hiring scenario predicts that more workers could be from the region. Most workers hired for operations at the Doris mine (up to 344 workers) will likely continue working for the Hope Bay Project; therefore, the competition for local labour will involve hiring workers for the additional positions required for Madrid-Boston operations.

Jobs related to operations will include positions in the following areas:

- management, supervisory and administrative;
- health, safety and first aid;
- mining (engineers, technicians, miners, heavy equipment operators, drillers, bolters);
- geology (geologists, technicians, helpers);
- milling (metallurgists, technicians, operators);
- environment (coordinators, technicians); and
- maintenance and surface operations (electricians, mechanics, plant operators, millwrights, maintenance clerks, warehousemen, and other tradesmen and labourers).

In general, there are few jobs that require specialized skillsets that they are not transferable to other industries. As identified by MiHR, transferable skills include, for example, those related to supervisory and managerial roles as they required common skills such as organizing, controlling, directing, evaluating, developing and implementing procedures and policies, hiring and assigning work, and administering. These skills are transferable among sectors including exploration, mining, agriculture, automotive, supply, tourism, construction, forestry, petroleum, military, printing and even fish harvesters (MiHR 2015). For workers without work experience trying to get employed in mining, transferable skills can include communication skills, working autonomously, working under direction, being a fast learner, working safely, being adaptable to different conditions and hardworking, as well as team work and leadership. Other skills needed for miners include technical work and thinking (operating and maintaining equipment and conducting repairs as needed), being able to apply workplace safety measures, being physically capable, as well as a problem solver and a decision maker.

The average annual earnings for the Operation phase is estimated at $148,000, with ranges from $40,000 per year and up, which is again above the average/median employment income in the region. This can serve as an incentive for qualified workers to leave their current jobs and find Project-related employment. This effect is primarily expected at the beginning of the Operation phase as TMAC seeks to fill available positions. However, the removal of skilled local workers from the local labour pool can affect the prosperity of local businesses in similar ways as described above. As a result, potential competition for local labour during the Operation phase is considered an adverse effect of the Madrid-Boston Project.

Characterization of Hope Bay Project Potential Effect

From 2017 to 2021, the Existing and Approved Projects (primarily Doris) are estimated to employ on average 36 workers (full-time equivalent) from the Kitikmeot region. This is in addition to the estimated average of 72 workers hired for the Madrid-Boston Project during the Construction phase. The total demand for workers in the Kitikmeot region is expected to be approximately 108 (FTE) over this period (2017 to 2021), approximately equal to the 110 workers predicted for the Madrid-Boston Operation phase. Average worker earnings are expected to be similar across the Hope Bay Project, differing according to the job position and requirements. It is the overlap between the Construction phase of the Madrid-Boston Project with the Doris Project and exploration activities that will further increase the competition for labour within Nunavut and, more specifically, the Kitikmeot region. The potential effect will be as described above for the Madrid-Boston Project, but of higher magnitude.

Residual Effect of Competition for local labour

Throughout the Construction and Operation phases, the Madrid-Boston Project has the potential to increase competition for local labour with specific skills (e.g., truck drivers and heavy equipment operators currently residing in Kugluktuk and Cambridge Bay). Construction will overlap with the additional worker demand from production at the Doris Project. Competition for workers with higher, more specialized skill levels can also occur due to the lower supply of such workers. While Project employment may be perceived as presenting a viable opportunity for those presently employed, this effect is not expected to be widespread. Some competition for local employment may also be expected from the replacement of workers who leave current positions to work at the mine or from the demand for workers for indirect employment opportunities. As a result, **a negative residual effect on the VSEC Employment due to competition for labour is predicted for the Construction and Operation phases**.

3.5.5.4 Education and Training

Changes to Demand for Education and Training Programs

Employment opportunities created by the Project are expected to increase the demand for education and training programs by Kitikmeot residents. Individuals in the labour force are expected to seek out local education and training so that they better qualify for both direct employment opportunities with the Madrid-Boston Project and indirect employment opportunities with suppliers that may be based in the Kitikmeot communities. The NAC provides a range of post-secondary education and training programs, and TMAC and the KIA have established an IIBA that includes provisions to support local education and training initiatives (KIA & TMAC 2015). Existing NAC program offerings that will be particularly relevant include introductory trades and pre-trades programs, pre-employment programs, as well as some certificate programs (e.g., camp cook). The pre-trades program is offered within the Kitikmeot region and prepares high school students for the entrance exam for the Nunavut Trades Training Centre in Ranking Inlet. Academic studies programs focused on the improvement of skills to meet basic employment needs, such as the ABE program, are also expected to be in demand. Program offerings in each community are dependent on there being sufficient local student interest, as well as the availability of the necessary funding and availability of qualified instructors and classroom space. Many programs, such as those offered by the Nunavut Trades Training Centre, often run under capacity. This effect is predicted to be positive, because the increased demand will result in an increased utilization of the existing programming offered in the Kitikmeot region and elsewhere (e.g., trades schooling in Rankin Inlet) and support a demand-driven development of programs available to residents.

With the GN's recent provision of information describing the variety of occupations related to the mining industry, the government has been able to inform residents of the type of tasks, responsibilities, and credentials required to work at a mine (see Section 3.2.5.3), and thus support local residents' ability to prepare for employment opportunities with the Project.

TMAC has and continues to support successful training initiatives in the Kitikmeot region (i.e., drillers assistant training; see Section 3.2.5.3).

Though not shown to be related to the Madrid-Boston Project, 2016 census data indicates an increase in the proportion of Kitikmeot residents with trades/apprenticeship certificates from one tenth to one third (Section 2.3.5.3). This implies that regionally, residents have participated in education and training to a greater extent than in the past. Demand for this training may be linked to the general need for local trades people in communities, opportunities offered by the Doris mine, or opportunities offered at other existing and possible future mines in the region (e.g., Back River Project, and Ekati and Diavik mines).

Characterization of Madrid-Boston Potential Effect

Construction

Construction phase employment opportunities are expected to drive the demand for education and training programs. Many of those engaged in employment with the construction of the Doris Project are expected to be retained as employees during the construction of the Madrid-Boston Project (and may also be transferred and become Doris operations employees). Additional opportunities are also expected to be available to Kitikmeot residents. On-the-job training will be provided, which may reduce the demand for local education and training to some extent. TMAC has proactively provided information regarding the type of employment opportunities that will be available to prepare local residents interesting in obtaining Project employment.

Demand for education and training programs is expected to be greatest before and during the Construction phase as local residents prepare to obtain long-term employment during the Operation phase of the Project. The increased demand for education and training may result in a greater utilization, availability, and diversity of training programs and is not anticipated to affect education infrastructure or administration. The Project is expected to support an increase in funding resources available to the NAC and others in the longer term as governments work to enhance the capabilities of local educational institutions.

Other potential effects related to the demand for education and training may include an increased demand for trades and other mine employment related programs at the high school level. Each of the Kitikmeot high schools already provide some form of trades courses or a formal pre-trades program; there are a number of drivers supporting the provisions of this type of programming in the Kitikmeot. Drivers include fulfilling the need for local trades people by the hamlets, the LHOs, local construction contractors, private businesses, and the mining industry. Through programming currently offered in secondary schools, it is expected that there will be an increase in mining sector relevant education tracts, in particular the introduction to trades and technology tract.

Operation

Because of the longer duration of the Operations phase (approximately 10 years), there is expected to be a continued increased demand for education and training. The increased demand is expected to be focused within areas related to Madrid-Boston Project employment including: management, supervisory and administrative; health, safety and first aid; mining (engineers, technicians, miners, heavy equipment operators, drillers, bolters); geology (geologists, technicians, helpers); milling (metallurgists, technicians, operators); environment (coordinators, technicians); and maintenance and surface operations (electricians, mechanics, plant operators, millwrights, maintenance clerks, warehousemen, and other tradesmen and labourers). This increase demand is expected to utilize existing available programming offered within the Kitikmeot region (e.g., pre-trades, camp cook), but will also provide an opportunity for the NAC to expand into other programs as the demand warrants. Residents seeking more advanced education and training to take advantage of more senior positions available with the Madrid-Boston Project may need to leave the region to pursue this (e.g., trades training in Rankin Inlet, other technical college and university level training offered in southern regions of Canada).

Reclamation and Closure

During Reclamation and Closure, there is expected to be a decrease in the demand for education and training associated with the Project within the Kitikmeot region corresponding to the decrease in employment opportunities compared to Operation. However, as there will be ongoing employment, the effect is still expected to be positive. Many workers from Operation are expected to be retained for

the Reclamation and Closure phase, as there will be a continued reliance on skills related to mining (e.g., heavy equipment operators), environment, and surface operations, among others. But some job descriptions and required skill sets will differ to meet reclamation work needs. This is expected to result in a change in the types of education and training demanded. Some requirements will be met through on-the-job training by TMAC and through its working relationships with the KIA and NAC programming needs will be identified and developed to the extent possible to support the further development of the skills and experience of the regional workforce.

Characterization of Hope Bay Project Potential Effect

Many of the same job skills and educational experience that were required for the initial production at the Doris mine will be required for the Operation of the Madrid-Boston Project. Given that the start of production at Doris preceded Madrid-Boston Operation, there has been a longer time period for potential employees to prepare, and as such a longer duration in the demand for many of the same types of education and training programs. This has provided a longer timeframe for the development of education programs to serve the needs of Kitikmeot residents. Overall, with the Hope Bay Project including Madrid-Boston, the demand for education and training programs is expected to be somewhat higher and of longer duration. This is expected to result in a further increase in the capacity of the local labour force and employment benefits realized as part of the longer-term benefits represented by the development of the Hope Bay Greenstone Belt.

Residual Effect of Changes to Demand for Education and Training Programs

During Construction and Operation phases, and to a lesser extent during Reclamation and Closure, the Madrid-Boston Project has the potential to increase the demand for education and training programs among residents of the Kitikmeot region. While on-the-job training will be provided by TMAC, demand for local and education and training programs is expected to increase. The partnerships that have been established between industry, the KIA, the GN and institutions to provide education and training programs will be critical to the ability of the Madrid-Boston Project to meet training needs. In addition, the IIBA includes measures to ensure Inuit Training Targets are met and the Human Resources Plan includes career development planning for all Inuit employees. Regular information will also be provided to Kitikmeot residents about the qualifications required to access Madrid-Boston Project employment. **There will be a positive residual effect on education and training due to changes to the demand for programs as a result of the Madrid-Boston Project**.

Change in Perceptions of Education and Employment

For historical and cultural reasons, obtaining a western education is not highly valued among the older generation of Inuit (Pauktuutit Inuit Women of Canada 2006b; Inuit Tapiriit Kanatami 2007, 2014). This has led to an overall lack of community-level support for education. In combination with this, there are limited local job opportunities and many youth have not been able to experience the benefits of an education (e.g., obtaining a high school diploma is not necessarily associated with an increase in the likelihood of obtaining meaningful employment). However, the connection between formal education and employment opportunities within the Kitikmeot and other regions of Nunavut is becoming more established. With the increase in employment opportunities available to Kitikmeot residents afforded by the Madrid-Boston Project, there is expected to be a further re-enforcement of the direct link between education and employment, and a positive change in school attendance and completion. This is expected to be reflected in a number of statistics, such as a reduction in the high public school truancy rate (recently averaging from about 21 to 25% across the region) and an increase in the relatively low school enrollment and number of secondary school graduates (numbers being highly variable over the years, from lows of 11 to highs reaching 34 to 39 across the region from 2001 to

2015[67]). An indication of this change in perceptions, although not shown to be directly related to the Project, is evidenced in the Socio-economic Monitoring Program reporting for the Doris Project (e.g., 34 graduates in 2014 in the Kitikmeot region, 12 in Cambridge Bay alone).

Characterization of Madrid-Boston Potential Effect

Construction

During Construction, the Project is expected to have positive impacts on perceptions of education and employment among Inuit, including:

- increased understanding and experience of the connection between formal education and employment;
- potential increased school attendance and graduation rates (particularly at the high school level); and
- increased interest in education and training programs.

While there are a growing number of examples of training leading to employment available across Nunavut (e.g. Doris, Mary River, and Meadowbank), Kitikmeot residents have typically not had direct experience with educational attainment leading to employment, particularly in the eastern communities. Limited employment opportunities in the LSA and RSA may contribute to the perception that the completion of high school or other education and training programs is not necessarily linked to employment and income benefits. These perceptions are reflected in rates of attainment of post-secondary education which are well below the Canadian average. The proportion of the Canadian population with post-secondary credentials is 55.3%, as compared to 32.5% in the Kitikmeot region (Statistics Canada 2017d) (Statistics Canada 2016c). While lower, the rate of attainment of post-secondary education shows an increase of 4.5%, compared to 2011 (i.e., 28.0% of Kitikmeot residents had post-secondary credentials in 2011 compared to 32.5% in 2016 (Statistics Canada 2012b) (Statistics Canada 2017d). Project employment opportunities and the indirect effects of the Project (i.e., increased economic activities within communities) are expected to support this trend.

Operation

The positive effect of a change in perceptions of education and employment is expected to be further enhanced through Operation. With the longer-term, permanent employment that will be offered by the Madrid-Boston Project, it is expected that local youth will see and experience the benefits of education. As awareness of the skills required to become employed by the Madrid-Boston Project increases through sponsored programs, youth are expected to become more aware of the link between education and employment (i.e., completing high school or other training programs leading to employment). In addition to these programs, tangible examples can also play a role in changing perceptions. For youth, in particular, the presence of parents or other adults in the community who are employed by the Madrid-Boston Project can support the perception that formal education is valuable through modeling.

Reclamation and Closure

It is anticipated that the Project will operate for approximately 10 years. During this period, it is likely that a more robust system of education and training to support employment in mining and related areas will become established, and that many Kitikmeot residents will have experienced the

[67] This includes 13 graduates from Kugluktuk in 2015, which represents the highest number of graduates in any year on record (Section 3.2.5.3)

connection between education and training, and employment first hand. By Reclamation and Closure, it is expected that the Madrid-Boston Project will have had long-term positive effects on the perceptions of the value of formal education in relation to employment. Although the number of jobs available during this phase will be substantially lower than during Operation, a positive perception is expected to persist as many workers continue to be employed by the Project and employment and training shifts focus to those skills required for Reclamation and Closure. Also, when laid off mine workers have the skills to transition to other employment, the perception that education and training coupled with work experience having long lasting positive effects will be enhanced.

Characterization of Hope Bay Project Potential Effect

With the additional demands for workers and the additional business opportunities associated with the Hope Bay Project, including the Doris Project, the Madrid-Boston Project, and associated exploration activities, there will be a further positive change in perceptions of education and employment throughout the Kitikmeot region. The Hope Bay Project represents a real opportunity for local residents, most positions requiring post-secondary education or training. It is expected that those residents that do obtain work with the Hope Bay Project will provide a real example of the benefits of education and employment success.

Residual Effect of Change in Perceptions of Education and Employment

The Madrid-Boston Project, and the Hope Bay Project as a whole, provides an important opportunity during the Construction and Operation phases and to a lesser extent, the Reclamation and Closure phase, to establish the link between completing education and training programs and obtaining employment. The Operation phase is expected to provide longer-term, more direct opportunity to illustrate this connection as Kitikmeot residents who have obtained employment during Construction will serve as examples or models for other potential employees. Additionally, there are more longer-term permanent employment opportunities available during Operation. Production at the Doris Project, which preceded the Operation phase of the Madrid-Boston Project, will extend and enhance this effect. In addition, during Operation, TMAC-sponsored initiatives to increase awareness of mining sector careers have the potential to reinforce the link between education and employment. TMAC hosted career workshops in each of the Kitikmeot communities in October 2017. **A positive residual effect of change in perceptions of education and employment is predicted on the VSEC Education and Training**.

3.5.5.5 Migration, Housing, and Infrastructure and Services

<u>In-migration to the Kitikmeot Region</u>

The population increase seen within the Kitikmeot region in recent years is driven by natural population increase (high birth rate); net migration is much smaller in comparison, considering both migration from outside of the territory and from another regions of Nunavut (for the Kitikmeot region from 2014 to 2015, natural population increase was estimated to be 82 individuals while net migration was 12 individuals) (Statistics Canada 2016b).

Due to the Project there is expected to be a negligible increase to in-migration to the Kitikmeot region or between communities within the Kitikmeot primarily because of two factors: 1) the agreement under the IIBA to maintain multiple points of hire across the Kitikmeot region and to transport workers from their home community (i.e., moving to a community closer to the Hope Bay Project like Cambridge Bay has no locational advantage); and 2) the fly-in/fly-out nature of the operation, meaning that non-Kitikmeot employees have no advantage by moving to the Kitikmeot region.

Further, options for relocation to the Kitikmeot region, by an employee from elsewhere in Nunavut or Canada, are limited due to the scarcity of available, quality housing in the communities. New or expanding Project-related businesses, including businesses that supply the Madrid-Boston Project and businesses that provide goods and services to local residents, have the potential to result in influx as these businesses bring in workers with the necessary skills and experience from elsewhere. It is expected that any in-migration associated with the Madrid-Boston Project will be for skilled workers, not locally available. This may be a concern for indirect Project-related employment (i.e., suppliers to the Project) as required skills are typically greater and more specialized than for induced employment (e.g., retail-level jobs). However, the number of jobs this represents is modest, with many positions (in particular, induced employment opportunities) expected to be filled by current residents. Finally, recent increases to educational attainment and the education profile of Kitikmeot residents, as shown in the 2016 census, indicate that local employers may be able to source a portion of skilled employees from the Kitikmeot communities.

Characterization of Madrid-Boston Potential Effect

Construction

During Construction, in-migration to the Kitikmeot region is expected to be negligible. The economic model predicts the total number of indirect jobs created in the Kitikmeot region to be approximately 48 person-years over the four years of construction, or an average of about 12 full-time jobs in supplier industries (see Table 3.1-7 in Appendix V6-3C). Total number of induced jobs is estimated to be approximately 52 person-years or an average of about 13 full-time jobs over the Construction phase. It is expected that many of these positions will be filled by residents of the Kitikmeot region. Any in-migration will be negligible compared to the current size of the population and existing labour force.

The total number of direct employment for Kitikmeot residents is approximately 289 person-years, or about 72 full-time jobs per year. This estimate includes contractors that will be working on site. This is a conservative estimate because it does not take into account measures to enhance employment of local residents and the provisions of the IIBA, with actual employment of Kitikmeot residents likely to be greater. Nevertheless, there is not expected to be in-migration with direct workers, again because of the use of multiple points of hire and fly-in/fly-out operation with on-site camp facilities. This conclusion is further supported by the results of the Hope Bay Project SEMP which, from 2013 to 2016, has not recorded any Hope Bay Project employees relocating to other communities within the Kitikmeot region due to work at the mine.

Operation

The economic model predicts that the total number of indirect jobs created in the Kitikmeot region to be approximately 306 person-years over approximately 10 years of Operation, or an average of about 31 full-time jobs in supplier industries (see Table 3.2-7 in Appendix V6-3C). Total number of induced jobs is estimated to be approximately 111 person-years or an average of about 11 full-time jobs over the Operation phase. It is expected that many of these positions will be able to be filled by current residents.

The total number of direct employment for Kitikmeot residents is approximately 1,100 person-years, or about 110 full-time jobs per year. Again, this estimate includes contractors that will be working on site and is a conservative estimate because it does not take into account measures to enhance employment of local residents and the provisions of the IIBA.

Similar to the Construction phase, a small or negligible change in Kitikmeot population due to in-migration is anticipated during Operation. Migration between communities within the Kitikmeot region is also expected to be negligible.

Characterization of Hope Bay Project Potential Effect

As with Madrid-Boston, the Hope Bay Project as a whole is predicted to have a negligible or small effect on the Kitikmeot population due to in-migration. As previously discussed, direct Project employment has not and is not expected to result in in-migration. The key Project design features and mitigation to remove the incentive for workers to relocate are the fly-in/ fly-out nature of the development, and maintaining multiple points of hire.

Over the next five years (to 2022), the economic model estimates that the additional indirect and induced employment due to the Approved Projects results in about 50 jobs (FTE). This is in addition to the estimated 25 jobs (FTE) during the Construction phase of the Madrid-Boston Project. During Operation of the Madrid-Boston Project, it is estimated that there will be 42 indirect and induced jobs (FTE) generated throughout the Kitikmeot region. Thus, overall, the Hope Bay Project is predicted to result in about 75 to 90 spin-off jobs created in the RSA. Given the high unemployment rates and relatively low labour force participation rates within the Kitikmeot region, and given that many of these jobs will not require specific training and education (e.g., service industry), this is not expected to change the prediction of a small change in the Kitikmeot population due to in-migration. Further, in-migration to any one particular community, specifically Cambridge Bay, is expected to be minimal because of the Hope Bay Project.

Residual Effect of In-migration to the Kitikmeot Region

Due to the fly-in/fly-out nature of the operation and multiple points of hire, in-migration to the Kitikmeot region because of direct Madrid-Boston Project employment during is expected to be negligible. Transportation for Inuit employees will be provided from their point of hire to site, eliminating the need for employees to move from their home community to access employment. Employees from elsewhere in Nunavut and Canada are expected to report directly to the Madrid Boston Project site, avoiding any potential impacts on Kitikmeot communities. With respect to indirect and induced Madrid-Boston Project-related employment in the Kitikmeot region, the economic impact model predicts that these impacts will be modest during Construction (an average of about 25 additional full-time jobs), but higher during Operation (about 42 jobs during Operation). Similar to the Doris Project, regional employment during Madrid-Boston Construction is expected to be similar to the Operation phase. Many of these are expected to be filled by current residents. **No negative residual effect of in-migration to the Kitikmeot region is predicted**.

Changes to the Demand for Housing

The predominant housing tenure in Nunavut is public, government-subsidized housing. Approximately 57% of the Territory's population lives in public housing, administered by the NHC (NHC 2017; Statistics Canada 2017d).. Public housing supply in Nunavut is not capable of meeting current demand. Calls for an additional 3,000 housing units date back to 2004, and despite $500 million invested, the need for housing has not declined. In 2013, Inuit Tapiriit Kanatami (ITK) estimated Nunavut as a whole was in need of 3,300 houses to address the current housing shortage and an additional 250 units annually thereafter (Inuit Tapiriit Kanatami 2014).

As of the 2016 census, there were 430 occupied private dwellings in Kugluktuk, 540 in Cambridge Bay, 285 in Gjoa Haven, 230 in Taloyoak, and 175 in Kugaaruk (Statistics Canada 2017d). The majority of dwellings are rented—about 75% in Cambridge Bay, 80% in Kugluktuk and Kugaaruk, 88% in Gjoa Haven, and 91% in Taloyoak. Of those who rent, between 87 and 95% reside in subsidized housing. Notably, the

percentage of renters in subsidized housing is lowest in the western communities (87-89%) and highest in the eastern communities (90-95%) (Statistics Canada 2017d).

Recent census data and 2017 community-based research highlights overcrowded conditions in the Kitikmeot region (Appendix V6-3B; (Statistics Canada 2017d). Overcrowding is due to a high natural population growth rate, limited available housing stock, and a backlog of new home development. The LHOs track overcrowding through a public housing registry and triangulate this information using utility records (i.e., water, fuel delivery, and septic service; Appendix V6-3B).

In 2017, public housing waitlists[68] in the Kitikmeot included 450 people in Kugaaruk, 200 in Taloyoak, and 115 in Gjoa Haven (Appendix V6-3B*)*. In Cambridge Bay, there are currently 90 individuals and families on the waitlist (North 2017). Other residents l are eligible for public housing but have not applied; reasons provided for not applying include frustration with the waitlist system or lack of planning ahead for potential future need (Appendix V6-3B). The typical wait-time for public housing in the Kitikmeot communities was reported to be around seven to eight years (Appendix V6-3B), though a recent news article cites wait times as long as 10 years in Cambridge Bay (North 2017).

The NHC plans to establish additional public housing in three of the five Kitikmeot communities where the need for housing has been assessed as highest in the territory (Section 3.2.5.7). However, and as similar to the Nunavut-wide trend, the development of new units is not expected to fully meet demand in the Kitikmeot.

Overcrowding in public housing units has been identified as a "clear non-medical health indicator for Inuit" (Inuit Tapiriit Kanatami 2007, 2014). While it is not known whether four people per household necessarily represents overcrowding in all cases, census data for the Kitikmeot region indicates that more than 50% of households in Gjoa Haven, Taloyoak, and Kugaaruk have four or more persons. In Kugluktuk and Cambridge Bay the proportion of four or more-person households is slightly lower at 45% and 37%, respectively. Overall, there are more households in the Kitikmeot region with four or more persons (52%) compared to the territorial average (46%), and there is also a higher percentage of two-or-more family households (17%) as compared to the territorial average (12%) (Statistics Canada 2017d).

NHC has recently implemented changes to the Public Housing Rent Scale (PHRS), which determines the level of public housing subsidy households receive. Previously, a change in employment status (from unemployed to employed) resulted in such an acute increase in rent that acted as a disincentive to employment. The new system focuses on enabling continued employment to support wealth accumulation through gradual increases in rent (or reductions in subsidy).

In the Kitikmeot region, private housing represented less than a fifth of all units in 2016 (17%). Staff housing is typically provided for those who relocate to Nunavut from elsewhere in Canada; however, this type of housing is mostly available to public sector employees (e.g., GN employees, teachers, nurses, etc.). There is also a shortage of staff housing for GN employees in the Kitikmeot which has affected the ability of the GN to hire and retain employees. Private sector businesses typically provide housing for workers that have relocated from other parts of Canada. For example, local construction contractors are developing properties that for use by non-local employees, in exchange for rent or as part of an employment contract (Appendix V6-3B). In fact, securing suitable housing for workers is a primary consideration before employment commitments are made. Businesses building and operating

[68] Data was not collected for Cambridge or Kugluktuk during the 2017 Community Research Program due to the availability of participants.

their own staff housing is a proven and successful human resource strategy in Cambridge Bay. This prevents any impact on the existing public housing stock.

Skilled workers from other Kitikmeot communities may relocate to Cambridge Bay for work with a supplier to the Madrid-Boston Project. In this situation, it is likely that the employer will provide housing, meaning that there would be no increase in the demand for public housing in the LSA.

Consider the following scenarios: 1) A skilled Kitikmeot resident from Gjoa Haven is hired by a local construction contractor in Cambridge Bay. The resident was eligible for public housing but is also offered private housing for rent through the employer. The individual would then be presented with the options of private housing or placing their name on the six- to seven-year waitlist for public housing in Cambridge Bay. 2) A skilled southern worker obtains employment with a local construction contractor in Cambridge Bay. This person is not eligible for public housing and must seek and obtain private housing through their employer. These possible scenarios identify the challenges associated with housing, and exemplify how Project-related employment is unlikely to result in in-migration due to the challenges associated with housing workers.

Employment increases and in-migration associated with induced economic impacts at the retail level are more likely to result in increases in public housing demand within the LSA. However, that in-migration could also have the effect of freeing-up public housing in another community within the RSA. For example, induced impacts at the retail level refer to, for example, the development of new stores and restaurants or to the expansion of existing businesses (e.g., which need more staff). While there may exist some limited potential that Inuit from outside the LSA, who are eligible for public housing, would move to obtain these jobs, it is much more likely that local residents of Cambridge Bay will obtain these jobs. This is evidenced over the past few years as additional businesses have been developed and existing businesses have expanded in Cambridge Bay with the development of CHARS. In fact, fewer people relocated to Cambridge Bay as a result of the induced economic development that occurred with CHARS (i.e., the 2016 census indicates that 80 people moved within the past year) in comparison to number of individuals who relocated to Cambridge Bay between 2010 and 2011 (i.e., the 2012 NHS indicated that 135 people relocated to Cambridge Bay within the year prior to the NHS; (Statistics Canada 2012b, 2017d).

Characterization of Madrid-Boston Potential Effect

Construction

As previously noted, negligible in-migration to the Kitikmeot region is expected due the Project; similarly negligible in-migration to LSA communities (Cambridge Bay and Kugluktuk) from elsewhere within the Kitikmeot region for employment opportunities at the Project is expected. For this reason, it is not expected that Kitikmeot communities will experience population influx-induced demand for housing. However, changes in income due to increased Project-related employment among Kitikmeot residents is expected to impact housing rent costs for those living in public housing and, potentially, may result in a change in demand for other housing types (e.g., those with employment income may opt for private rental homes). The impact is not expected to be negative as the NHC now has numerous policies in place to ensure there can be a gradual transition for any public housing tenant who obtains employment. For example, the rent for public housing will never exceed one-third of a tenant's income, regardless of the level of income.[69] During pre-construction and construction, an increase in

[69] Public housing tenants earning $80,000 or may pay rent equivalent to 30% of annual income. Those earning $40,001 to $80,000 pay 25%, those earning $22,881 to $40,000 pay 30%, and those with an income of less than $22,881 pay $60 per month (NHC 2017).

participation in education and training programs is expected among Kitikmeot residents. Those employed by the Madrid-Boston Project who are also full-time students, attending pre-trades and trades courses, or other academic upgrading, will be exempt from the new system of PHRS rental assessments. This period of exemption may provide an incentive, encouraging Kitikmeot residents to seek employment and participate in education and training programs. In the case of NHC tenants who take advantage of this opportunity, housing demand will likely remain constant in the near term, but may change slowly over time in step with career progression or advancement.

In cases where Madrid-Boston Project employees are subject to rental assessments due to a change in employment status, increases will be limited to 25% of the new rent assessed per year, up to the maximum of one-third of the tenant's income. This system provides an increased opportunity for Madrid-Boston Project employees to gradually save employment earnings, which will potentially change their demand for different types of housing over time (e.g. a change from public to private housing). That is, with rent increases of up to 25% annually, the rent collected will be manageable and will still allow workers to choose to set aside income as savings. Over time, should workers rental payments for public housing increase to the point at which it is similar to market rent, the worker may be able to transition from public to private housing. Note that the public housing rental payment will always be manageable because it will not surpass the amount defined by CMHC as constituting 'affordable housing' (i.e., one-third of income).

Operation

As with Construction, in-migration to the Kitikmeot region because of the Project, or to LSA communities (Cambridge Bay and Kugluktuk) from elsewhere within the Kitikmeot region, is expected to be negligible. For this reason, it is not expected that Kitikmeot communities will experience population influx-induced demand for housing.

Despite current overcrowding, the limited number and high cost of private market rental units and the high cost of construction (i.e. to build a private home), leave Kitikmeot residents with few alternative housing options. As the Madrid-Boston Project moves into Operation, those Kitikmeot residents who have been consistently employed through the Construction phase may have accumulated enough wealth to seek alternative housing arrangements. As additional Kitikmeot residents gain employment during Operation, they too may seek alternative housing options as they accrue savings.

Financial management planning will be an important factor for changes in housing demand within Kitikmeot communities. Increased income does not necessarily translate to increased savings towards housing, particularly in communities where private home ownership is uncommon. However, the need for financial management programming in the Kitikmeot communities is well documented and there are a number of programs at the high schools and the NAC that are focused on developing life skills, including aspects of financial management (see Section 3.2.5.3).

Despite the need for additional public housing units and the potential for Madrid-Boston Project employees to direct savings towards other housing options, the overall impact of changes to the demand for housing due to the Madrid-Boston Project is expected to be minimal. Analysis of 2011 and 2016 census and National Household Survey (NHS) data in the Kitikmeot region indicate an increase in the number of private dwellings between 2011 and 2016 in Cambridge Bay, Kugluktuk, and Gjoa Haven (between a 2% and 13% increase across communities). These increases occurred during a period where Doris Project spending and employment varied, indicating that other independent factors also play a role in changes in housing demand (ERM 2015).

Characterization of Hope Bay Project Potential Effect

Consideration of potential changes to the demand for housing due to the Hope Bay Project, including the Madrid-Boston Project, does not substantively change the conclusions of the assessment for the Madrid-Boston Project. As previously discussed, consideration for the Doris Project indicates an extension of the potential effect over a longer time period, with effects during the Madrid-Boston Construction phase being similar to the Operation phase. Mitigation identified for Madrid-Boston is in place for the Hope Bay Project. There is expected to be an additional positive effect with workers being consistently employed through the production period at the Doris mine and the Construction and Operation phases of the Madrid-Boston Project, further enhancing the ability of workers to accumulate wealth and seek alternative housing arrangements. RSA residents that gain work related to the Hope Bay Project, and who reside in public housing, will likely see their rental rates rise over time. However, overall this is not expected to have an effect on the demand for public housing.

Residual Effect of Changes to the Demand for Housing

The Madrid-Boston Project is predicted to have a negligible effect on in-migration to the Kitikmeot region or relocation from other communities within the region (e.g., from eastern communities to Cambridge Bay or Kugluktuk). With consideration of the Madrid-Boston and Hope Bay Project, this is not predicted to change appreciably. Private sector businesses that experience business growth because of the Project will typically provide housing for their workers that relocate from the South or elsewhere, preventing any effect on the public housing stock. For workers who gain employment with Madrid-Boston and the Hope Bay Project and are currently residing in public housing, they will experience a gradual effect on rental costs, in accordance to the NHC rent scales and policy. Notwithstanding, the change in rental costs is not expected to have a negative residual effect on either the incentive for employment or the demand for public housing. As employees continue to access regular income, there is potential for changes in preference for housing type and tenure (i.e., shift in preference from public housing to private accommodations). Impacts related to changes to the demand for housing are expected to be minimal overall, and may result in a relatively small and gradual but positive shift in housing tenure and potentially in local perceptions of housing. Should the level of impact change over time, it will be collaboratively addressed through measures outlined in TMAC's Community Involvement Plan (Annex V8-5). **No negative residual effect of changes to the demand for housing is predicted.**

Changes to the Demand for Local Services

The Kitikmeot communities are served by a range of services including health care, social services, police and emergency services, and local infrastructure.

All communities in the Kitikmeot have a health centre. Regionally, health care centre visits decreased during the 2004 to 2012 period and then increased in 2014 to the highest number of recorded visits in a decade at 6.6 visits per capita (NBS 2016b). In 2015, visits per capita decreased to 5.7. Many factors influence health care centre visits and each community has different utilization rates. Over the 2004 to 2013 period, Kugluktuk, Cambridge Bay and Gjoa Haven had lower rates of health centre visit per capita than Taloyoak and Kugaaruk. In 2015, Kugaaruk and Taloyoak had higher rates of health centre visits per capita in comparison to Gjoa Haven, Cambridge Bay, and Kugluktuk.

The social assistance case load in the Kitikmeot region generally increased between 2002 and 2012, with large increases in Kugaaruk and Kugluktuk, but relatively small increases in Cambridge Bay and Gjoa Haven. However, between 2012 and 2013, the regional caseload increased by 15%, with large increases in both Kugaaruk and Cambridge Bay. While monthly caseloads in each community vary due to a number of factors, per capita caseload rates are consistently lower in Cambridge Bay, the region's largest community (ERM 2015). Current statistics describing social assistance provision in the Kitikmeot

region are unavailable; however, recent community-based research indicates the number of income assistance recipients has decreased across the Kitikmeot in recent years. This is attributed, in part, to a new electronic case management system that tracks recipients and makes income assistance recipients more accountable (Appendix V6-3B).

Changes in population, employment, access to alcohol and drugs, and other complex factors contribute to the number of police calls received in each community on an annual basis. With respect to access to drugs and alcohol, Cambridge Bay recently voted in favor of establishing a local wine and beer store. Legal access to alcoholic beverages with a lower alcohol content may serve to reduce the extent to which higher alcohol content beverages are consumed, potentially also reducing related incidence of violence and binge drinking. This has been exemplified in Iqaluit, where following the opening of a beer and wine store in Iqaluit, the number of RCMP calls related to alcohol decreased and despite high community utilization of alcohol before and after the opening of the wine store (Hopper 2017). Statistics indicate that regionally, there was an increase in police calls over the 2010 to 2014 period; specifically within Cambridge Bay, there was an increase in police calls between 2010 and 2012, while between 2013 and 2014 calls decreased (ERM 2015). Over the period of 2010 to 2014, the communities in the region, and particularly Cambridge Bay have experienced change (e.g., CHARS), and the fluctuations in police calls is not attributed to any specific factor(ERM 2015).

All communities in the Kitikmeot Region have hamlet-supplied water and sewer services. Qulliq Energy Corporation (QEC) provides electricity to all Nunavut communities with diesel plants in all communities. Satellite internet and phone services are available across the Kitikmeot region, along with high-speed internet service which is expected to be upgraded in the coming years. Further federal funding was allocated in early 2017 to improve internet services in the territory.

Characterization of Madrid-Boston Potential Effect

Construction

Due to the fly-in/fly-out nature of the operation and the predicted negligible impact on in-migration to LSA and RSA communities because of the Madrid-Boston Project, changes to demand for local services are expected to be minimal as any changes will be influenced primarily by existing Kitikmeot region residents in ways that are similar to continuing trends.

The Madrid-Boston Project has the potential to change the demand for health care services in Kitikmeot communities as the health conditions of employees may change during employment, due to individual choices. The Project is not expected to directly result in changes to health care demand, because: 1) Project employees who are not Kitikmeot residents will continue to access health services in their home communities and will not interact with communities the Kitikmeot region (i.e., will not be using health services in local Kitikmeot communities); and 2) Project employees who are Kitikmeot residents will have access to health care services while at site, potentially reducing the annual number of health care visits in the region. However, the determinants of health are diverse and previous fluctuations in health care centre usage in Kitikmeot communities have not been directly linked to previous project activity (i.e., Doris Project) (ERM 2015). Some Project employees may elect to engage in high risk behaviours while off site and off rotation (e.g., alcohol and drug use); these choices are individual and it is not expected that the majority of employees will participate in these types of behaviours. However, demand for health care services may be indirectly affected by the Madrid-Boston Project should additional support be required for those employees who choose to engage in high risk behaviour. Project employees will have access to an EFAP which may provide an alternative to some health centre services for Project employees and their families.

Social assistance caseloads in Kitikmeot communities may also be affected by the Madrid-Boston Project depending on the employment opportunities available to each community. During periods of employment such as during the Construction phase, caseloads may experience a modest decrease; however, the need for social assistance is likely to fluctuate as Madrid-Boston employment levels and individual employment patterns fluctuate.

In some cases, income earned through Madrid-Boston Project employment may be indirectly linked to substance consumption and abuse. As employees and their families have access to income, there is potential for an increase in demand for police services related to alcohol and drugs (e.g., domestic violence) in Kitikmeot communities. However, it is expected that the majority of employees will experience positive benefits of increased income and not engage in high risk behaviours, unproductive spending, or potentially criminal activities.

Operation

Effects similar to those described above for the Construction phase are anticipated during the Operation phase. However, with higher levels of Madrid-Boston Project employment during this phase, there may be further decreases in the demand for social assistance.

Characterization of Hope Bay Project Potential Effect

As with the Madrid-Boston Project, changes to demand for local services due to the Hope Bay Project are expected to be minimal as any change will be influenced by Kitikmeot residents, similar to current trends. With the additional employment impacts associated with the Doris Project and exploration activities during the Construction phase of the Madrid-Boston Project, effects are predicted to be similar to the Operation phase because employment and income effects will be similar. With the identified mitigation, a negative residual effect is not predicted. However, there is expected to be a further positive effect of a reduction in the demand for social assistance.

Residual Effect of Changes to the Demand for Local Services

During Construction and Operation there is potential for change to the demand for local services, including health care, social services and police services. However, change to demand for these types of services depends on a myriad of factors within each community that are unrelated to the Madrid-Boston Project or the Hope Bay Project. Project-related impacts in this area are expected to be minimal and indirect, and any change will be influenced primarily by existing Kitikmeot residents in ways that are similar to current trends in infrastructure and service use. Should unforeseen impacts be identified, they will be addressed through measures outlined in TMAC's Community Involvement Plan (Annex V8-5). **No negative residual effect of changes to the demand for local services is predicted.**

3.5.5.6 Community Health and Well-being

Changes to Family Stability

Due to the fly-in/fly-out nature of the Madrid-Boston Project and workers being away from home while on shift (typically a two-week on/ two-week off rotation), the Project has the potential to affect family stability among households with one or more employees. The potential for one or more household members to be away from the family for an extended period may be disruptive to family life, particularly as Inuit cultural places high value on close relationships with extended family members.

TMAC is committed to employment equity and increasing the share of women in the workforce; however, in consideration of historical experience of the mining sector, most Project employees are predicted to be male. The Canadian mining industry average was approximately 16% female

participation in 2012 (MiHR 2013). TMAC employment associated with the Doris Project has exceeded this average, although construction-related employment by contractors has had a lower share of women in the workforce (ERM 2015). As a result of the primarily male workforce, it is expected that Madrid-Boston Project employment will result in an increased burden on women in the household. This has implications for children and childcare, spousal relationships, and gender roles. It also has the potential to adversely affect the mental and physical health of individuals. The number of household members expected to be employed and the types of relationships affected (e.g. marital and parental) are both factors in assessing overall impact.

Throughout all phases of the Project, TMAC will provide all Kitikmeot residents, Inuit and non-Inuit, with transport from their home community to site if employed by the Project. Provision of direct transportation to and from the Project site reduces transit time (i.e., time away from families), and also eliminates the need for workers to overnight in other communities, and as such, may contribute to reducing spousal tension associated with loneliness or jealousy.

Characterization of Madrid-Boston Potential Effect

Construction

Both positive and negative effects on family stability are predicted during the Construction phase. Madrid-Boston Project employment and the associated increase in income may have a positive effect on family stability, as increased income has potential to increase in standard of living, and decrease challenges associated with providing financially for the family. However, with a family member working away from home there is expected to be a shift in household responsibilities and resources (e.g., ability of the Project worker to participate in childcare and the running of the household will decrease overall).

In two-parent families where one or more parent is employed by the Madrid-Boston Project, household responsibilities may fall solely to the parent who is not on rotation. In single-parent families, rotation schedules may put undue pressure on other family members (e.g. grandparents, siblings) to pick up additional household responsibilities, including childcare. However, there has been an increase in the availability of childcare options within the LSA, which provides options to families. Current research indicates that childcare facilities in the LSA are fully utilized, however with the implementation of childcare infrastructure and services within the LSA, there is potential for increases to the capacity of childcare facilities (Section 3.2.5.6).

The negative implications of fly-in/fly-out work rotation schedules can include stress on the family members who remain at home caused by the need to make independent decisions, worry about the family member who is away, loneliness, supporting younger children's adjustment to a parent coming and going, and family violence and break-ups (InterGroup Consultants 2005).

The work rotation schedule can also cause strain on personal relationships (e.g., common law or marital relationships) due to periods of separation and a reduction in opportunities for regular communication. Tension in personal relationships in the form of loneliness, jealousy, and feelings of distrust, have the potential to result in anger and associated negative behaviours (Maksimowski 2014).

A need for daycare services may arise in order to better support working families with children. Availability of day care services within Kitikmeot communities are currently utilized at capacity and vary by community (Section 3.2.5.6), and it is anticipated that fly-in/fly-out worker rotation schedules will only increase demand for these services.

Over time, and with the right supports in place, families may also experience some positive effects of a fly-in/fly-out worker rotation schedule including, for example, extended time with family while off rotation, and income to support purchase of equipment for land based activities to be undertaken with family members, and to obtain country foods.

Operation

Effects of the Madrid-Boston Project on community health and well-being due to changes to family stability during the Operation phase will be as described above for the Construction phase.

Reclamation and Closure

During Reclamation and Closure, it is expected that most Inuit employees will choose to remain in their home community within the Kitikmeot region. As Madrid-Boston Project employment is reduced post-operation, employees will likely experience a period of adjustment as they transition from the fly-in/fly-out worker rotation schedule to other opportunities, possibly in the community or with other projects. Both positive and negative changes in family stability may occur during this transition. Potential negative implications include increased stress associated with decreased employment income and any associated negative behaviours that may arise. Potential positive implications include the ability to reconnect with family members and the ability to be more present and active in family life, as well as to leverage the experience at the mine for other opportunities. Madrid-Boston employees will have work experiences to share, and will have modelled employment behaviours to their family members. Employment experience is expected to transfer to other opportunities that continue to support family members, following Reclamation and Closure.

Characterization of Hope Bay Project Potential Effect

Given that total employment and income levels with the Hope Bay Project will be similar to the Operation phase of the Madrid-Boston Project, but beginning in 2017 and extending through the Madrid-Boston Construction period, the assessment of the potential changes to family stability does not appreciably change. The longer duration of opportunities provided by the Hope Bay Project will allow more time for workers and their families to adjust to and benefit from the lifestyle of employment. Potential negative effects include increases in stress on family relationships and individuals, changes in roles and responsibilities, and increases in resulting negative behaviours. TMAC has implemented a number of measures to mitigate negative effects throughout the life of the Hope Bay Project.

Residual Effect of Changes to Family Stability

Changes to family stability are anticipated during Madrid-Boston Project Construction and Operation, and during the operation of the Hope Bay Project, primarily due to the fly-in/fly-out worker rotation schedule and the social stressors that this can add to the family with the separation and periodic re-introduction of the family member upon return from a work rotation. Potential impacts are wide-ranging and include, but are not limited to, increased tension in marital and parental relationships, increased need for childcare services, increased potential for negative behaviours (e.g., gambling, alcohol and drug use) as a coping mechanism, increased stressors on mental health, and increased potential for family violence and break-up. Measures have been identified, including an EFAP, to mitigate potential adverse effects. Communications facilities will be available on site to help maintain connections between Project employees and their families. In addition, a TMAC Liaison will be responsible for ongoing consultation with Inuit employees to identify specific needs and support the active management of any employee issues that arise. Positive effects of changes to family stability during Construction and Operation will also occur as a result of the Madrid-Boston Project, primarily due to increases in household income and associated increase in standards of living and ability to provide financially for the family. But overall, **changes to family stability during Construction and**

Operation are predicted to result in a negative residual effect on the VSEC Community Health and Well-being.

During Reclamation and Closure, similar issues are expected to arise as identified during Construction and Operations, although for different reasons. With a reduction in employment, the loss of work, changes in the time spent at home, and changes in family roles and responsibilities are again expected to result in social stressors in the home and within the extended family. However, Project employees will have gained valuable work experience and are expected to be more employable following their experience with the Project. That is, many Madrid-Boston employees are expected to be able to obtain employment throughout the rest of their lives in comparison to the outlook for future employment without the work experience provided by the Project. Should there be a loss of income that is not replaced by alternative employment, there may be a decrease to the standard of living and decreased ability to provide financially for the family. There may also be a decrease in the resources that workers and their families have available to them to help deal with stressors (e.g., TMAC's EFAP). However, based on 2017 community research, local businesses indicated that those individuals who want to work are working (Appendix V6-3B), and it is anticipated that many former employees of the Madrid-Boston Project will be able to transition other employment post-operations. **During Reclamation and Closure, changes to family stability are predicted to result in a negative residual effect on the VSEC Community Health and Well-being**.

Changes to Family Spending

The Madrid-Boston Project has implications for changes to individual and family spending. It is expected that increased income from Project employment will influence two broad types of spending, including productive spending (e.g., housing, education) and unproductive spending (e.g., gambling, alcohol and drugs).

While Kitikmeot residents have been employed by the Hope Bay Project at Doris and other projects in the region, the transition to a wage-based economy across the Kitikmeot region has been somewhat slower than in other regions. There are fewer Kitikmeot residents working or seeking employment (66%) in comparison to residents of the Kivalliq (68%) and Baffin (69%) regions. Similarly, average earnings in the Kitikmeot region ($41,406) were lower than the Kivalliq ($47,884) and Baffin ($55,997) regions in 2015 (Statistics Canada 2017d). This indicates the potential for the Madrid-Boston Project to shift workforce participation, and as such, result in changes to income levels and family spending in the Kitikmeot region. Changes to family spending may be realized as both a positive and adverse effect. Positive effects include the opportunity to spend income on a range of goods, including equipment to support land based activities and other investments. With respect to adverse effects, key indicators include the number of criminal violations, impaired driving violations, and drug violations, as well as gambling activity levels; these indicators are expected to reflect increases in unproductive spending as a result of the Madrid-Boston Project. It is of note that Doris Project Operation commenced in early 2017 and the Project employs a number of residents from the Kitikmeot region who are currently earning an income. Changes to family spending are typically expected to occur primarily during the period of transition to Project employment, followed by adjustment or stabilization as the new circumstances (employment and income) become the norm. Based on current information, there are no reports of unproductive spending specifically linked to employment at the Doris Project.

Throughout all phases of the Project, TMAC will provide all Kitikmeot residents, Inuit and non-Inuit, with transport from their home community to site if employed by the Project. Provision of direct transportation to and from the Project site eliminates opportunities for workers to spend money unproductively while in jurisdictions where they have access to drugs and alcohol (e.g., access to liquor stores in Yellowknife).

Characterization of Madrid-Boston Potential Effect

Construction

The Madrid-Boston Project is expected to affect individual and family spending during Construction. The effect will vary depending on individual and family circumstances prior to and during Madrid-Boston employment.

There is potential for employees to increase their unproductive spending as a result of increased income. However, such unproductive spending is not anticipated among the majority of Madrid-Boston Project employees, partly due to TMAC's 'zero tolerance' policy for alcohol and drug use (KIA & TMAC 2015). In cases where Madrid-Boston employees engage in unproductive spending, it is acknowledged that this type of spending may contribute to other indirect adverse effects such as crime, domestic violence, and drug and alcohol use. These social issues currently exist in the Kitikmeot region but have the potential to be indirectly exacerbated by the Madrid-Boston Project. Unproductive spending is anticipated to occur for a minority of Project employees. It is also of note that many of the existing reasons people consume alcohol (e.g., unemployment, poverty, hopelessness, inability to provide for one's family) may be lessened with the introduction of Project employment and associated income. Research regarding the "Community Experience of Mining in Baker Lake, Nunavut" indicated that while unproductive spending by some individuals is exacerbated due to the income associated with mining,, the majority of employees benefit from mining employment (Peterson 2012).

For employees, increased income also has the potential to change family spending related to housing and household item consumption. A change in employment status carries implications for income supports: those living in public housing will experience a gradual decrease in rental subsidy as their employment status changes and income level increases. This gradual transition is designed to support wealth accumulation and greater financial independence, and will not exceed what is defined as the manageable cost of housing by CMHC (e.g., one-third of income). For example, following the development of the Meadowbank Mine, reliance on income support decreased by 20% in Baker Lake (Scherkus 2011). This effect is positive as increased income and levels of responsibility for finances serve to establish greater overall self-reliance for individuals and families.

An additional positive effect to changes in family spending is that Madrid-Boston Project employees may use income to support traditional lifestyle activities such as harvesting. The cost of equipment can be a barrier to participation in traditional lifestyle activities, so there is potential for income to enable large equipment purchases (e.g. ATVs, snow machines, hunting rifles) (Appendix V6-3B).

Operation

Effects of the Madrid-Boston Project on community health and well-being due to changes to family spending during the Operation phase will be as described above for the Construction phase.

Characterization of Hope Bay Project Potential Effect

The assessment of the potential change to family spending does not appreciably change due to the Hope Bay Project because employment and income impacts within the Kitikmeot region are similar to those of the Madrid-Boston Project. The potential effects of the Operation phase of the Hope Bay Project on family spending are anticipated to begin in 2017 (start of operations) and will extend through the Madrid-Boston construction period (as the Hope Bay Project operations continue).

Residual Effect of Changes to Family Spending

As personal incomes increase due to Madrid-Boston Project employment, family spending is also expected to increase. A number of positive impacts are associated with productive spending in the

areas of education, housing, consumer goods, and investments in durable goods (e.g. harvesting equipment). However, there is also potential for an increase in unproductive spending among a minority of Madrid-Boston and Hope Bay Project employees and their family members. Unproductive spending includes gambling and alcohol and drug use. However, how income is spent is a personal choice and to a large extent, these individual choices define whether there is a positive or negative residual effect. Mitigation to address the negative effects of unproductive spending, including the EFAP and a 'zero tolerance' drug and alcohol policy, and TMAC Liaison role, will be in place during Construction and Operation phases. Experience of the Doris Project and projects elsewhere indicate that issues associated with unproductive spending are typically isolated to a relatively small number of individuals, with increases in income from employment exacerbating existing challenges that those individuals and their families face. In addition to the positive effects of changes to family spending, **during Construction and Operation a negative residual effect of changes to family spending on the VSEC Community Health and Well-being is predicted**.

Changes to Food Security and Cost of Living

The transition to the wage economy has been ongoing in Nunavut since the time of community settlement over 50 years ago. Reconciling subsistence economies with the wage economy is a continuing struggle, particularly as employment opportunities are scarce and the cost of living high.

For example, under the Consumer Price Index (CPI) Food Price Basket, the cost of a food basket in the Kitikmeot region was almost double that of Canada overall in March 2014. While the price of a food basket under the Revised Northern Food Basket (RNFB) program has decreased across Kitikmeot communities during the 2011 to 2014 period, the cost is still almost double that of the Canadian average (ERM 2015). Weekly food costs in the Kitikmeot[70] remain high ranging from $425 to $461 (in 2014). In 2015, the cost of food ranged from $436.86 in Cambridge Bay to $488.18 in Taloyoak. For Kitikmeot families (of four people) calculating a monthly food budget, this equates to cost of $1,747.44 in Cambridge Bay, $1,934.72 in Gjoa Haven, $1,777.44 in Kugluktuk, and $1,952.72 in Taloyoak. In contrast, a monthly food budget in southern Canada is, on average, approximately $880, or half of the cost of food in the Kitikmeot region (Nutrition North Canada 2016; Alini 2017). With the average annual income in the Kitikmeot region about $42,213 (in 2015) (Section 3.2.3.4) and average food costs of approximately $22,236.96, annually, food insecurity is an inevitable result. An 2010 survey undertaken in Nunavut indicated that 35.1% of homes were severely food insecure (defined as disrupted eating patterns and reduced food intake among adults and/or children), and another 35.1% of homes were moderately food insecure (Egeland 2010). Homes with children were more likely to be food insecure than homes without children. An important aspect of food security within the RSA communities is the continuance of traditional land use practices and harvesting country foods. For the majority of Nunavut residents (66%), at least half of the meat and fish they consume is obtained through traditional harvesting methods; an additional 38% report that more than half of the meat and fish consumed is obtain through harvesting activities (as compared to the amount that is purchased in stores) (Statistics Canada 2008). The 2006 survey also reported that approximately 57% of Nunavut children ages 6 to 14 ate wild meat, caribou, walrus, and/or muktuk three or more days per week (Inuit Qaujisarvingat Knowedge Centre n.d.).

[70] Data is unavailable for Kugaaruk.

Characterization of Madrid-Boston Potential Effect

Construction

As noted above, the cost of food in Nunavut is significantly higher than the Canadian average. This contributes to higher rates of moderate and severe food insecurity in Kitikmeot communities. Limited employment opportunities in the wage economy in Kitikmeot communities coupled with the high cost of equipment to enable subsistence harvesting leaves many households food insecure. There is potential for the Madrid-Boston Project to reduce food insecurity through increased employment and income.

Employees who choose to use their income productively (e.g., spending on nutritious foods, purchasing equipment to support harvesting) have the potential to positively impact food security not only in their own households but also amongst their extended family network, due to the Inuit cultural practice of sharing food (and country foods in particular).

There is also potential for employees to continue or increase their traditional harvesting activities due to the increases in personal income (affording an increase in ability to purchase fuel and equipment) and the extended period of time off work afforded by the fly-in/fly-out worker rotation schedule. A positive impact of Madrid-Boston Project employment may, therefore, be an overall increase in subsistence harvesting in Kitikmeot communities.

TMAC provides country foods to Inuit employees through camp kitchens; country foods are obtained from a licensed processing facility (e.g. Kitikmeot Foods). It is not predicted that the Project will result in additional harvesting of country foods. Additionally, TMAC will continue to provide access to a Country Food Kitchen to allow personnel to store and consume personally harvested and owned country food. The Country Food Kitchen provides food storage and cooking space, and is available for workers to access while on site.

Operation

Effects of the Madrid-Boston Project on community health and well-being due to changes to food security and cost of living during the Operation phase will be as described above for the Construction phase.

Characterization of Hope Bay Project Potential Effect

Similarly, with consideration of the complete Hope Bay Project the effects due to changes in food security and cost of living do not change appreciably, and will be as described above for the Madrid-Boston Project.

Residual Effect of Changes to Food Security and Cost of Living

Increased incomes due to Madrid-Boston and Hope Bay Project employment are expected to have an overall positive impact on food security, enabling households to better manage the high cost of living in Kitikmeot communities. While not on site, employees may be able to increase country food consumption through the purchase of harvesting equipment and supplies, which is expected to enhance their ability to engage in hunting activities. This will be complemented by a number of mitigations to ensure access to country foods for employees while they are on-site, including providing a country food kitchen and serving country foods. **No negative residual effect of changes to food security and cost of living on the VSEC Community Health and Well-being is predicted**.

3.5.6 Characterization of Residual Effects

3.5.6.1 Definitions for Characterization of Residual Effects

In order to determine the significance of a residual effect, each potential negative residual effect is characterized by a number of attributes consistent with those defined in of the EIS Guidelines (Section 7.14, Significance Determination for the Hope Bay Project; (NIRB 2012a). A definition for each attribute and the contribution that it has on significance determination is provided in Table 3.5-12. Residual effects that have been assessed as positive, as evaluated above (Section 3.5.5), are not further assessed for significance.

Table 3.5-12. Attributes to Evaluate Significance of Potential Residual Effects

Attribute	Definition and Rationale	Impact on Significance Determination
Direction	The ultimate long-term trend of a potential residual effect - positive, neutral, or negative.	Positive, neutral, and negative potential effects on VSECs are assessed, but only negative residual effects are characterized and assessed for significance.
Magnitude	The degree of change in a measurable parameter or variable relative to existing conditions. This attribute may also consider complexity - the number of interactions (Project phases and activities) contributing to a specific effect.	The higher the magnitude, the higher the potential significance.
Equity	The dispersal of potential residual effects across different social groups or segments of society.	A high degree of equity indicates a relatively even dispersal of the residual effect. The lower the equity, the higher the potential significance.
Duration	The length of time over which the residual effect occurs.	The longer the length of time of an interaction, the higher the potential significance.
Frequency	The number of times during the Project or a Project phase that an interaction or socio-economic effect can be expected to occur.	Greater the number times of occurrence (higher the frequency), the higher the potential significance.
Geographic Extent	The geographic area over which the interaction will occur.	The larger the geographical area, the higher the potential significance.
Reversibility	The likelihood an effect will be reversed once the Project activity or component is ceased or has been removed. This includes active management for recovery or restoration.	The lower the likelihood a residual effect will be reversed, the higher the potential significance.

For the determination of significance, each attribute is characterized. The characterizations and criteria for the characterizations are provided in Table 3.5-13. Each of the criteria contributes to the determination of significance.

Table 3.5-13. Criteria for Residual Effects for Socio-Economic Attributes

Attribute	Characterization	Criteria[1]
Direction	Positive	Beneficial
	Variable	Both beneficial and undesirable
	Negative	Undesirable
Magnitude	Negligible	No change on the exposed indicator/VSEC
	Low	Differing from the average value for the existing socio-economic conditions to a small degree, and well below the range of historical variation

Attribute	Characterization	Criteria[1]
	Moderate	Differing from the average value for the existing socio-economic conditions and approaching the limits of historical variation
	High	Differing from the existing socio-economic conditions so that there will be a detectable change beyond the range of historical variation (i.e., change of system state from the existing conditions)
Equity	Equitable	Even distribution of potential residual effects across different social groups or segments of society
	Neutral	Potential residual effects are unevenly distributed but do not pertain to any particular social group or segment of society
	Inequitable	Uneven distribution of potential residual effects occurring to particular social groups or segments of society, including vulnerable groups
Duration	Short	Up to 4 years (Construction phase)
	Medium	Greater than 4 years and up to 22 years (4 years Construction phase, 10 years Operation phase, 3 years Reclamation and Closure phase)
	Long	Beyond the life of the Project
Frequency	Infrequent	Occurring only occasionally
	Intermittent	Occurring during specific points or under specific conditions during the Project
	Continuous	Continuously occurring throughout the Project life
Geographic Extent (socio-economic)	LSA communities	Communities of Cambridge Bay and Kugluktuk
	RSA communities	Communities of Cambridge Bay, Kugluktuk, Gjoa Haven, Taloyoak, and Kugaaruk
	Beyond Kitikmeot Region	Beyond the RSA communities
Reversibility	Reversible	Effect reverses within an acceptable time frame with no intervention
	Reversible with effort	Active intervention (effort) is required to bring the effect to an acceptable level
	Irreversible	Effect will not be reversed

3.5.6.2 Determining the Significance of Residual Effects

Section 7.4 of the EIS Guidelines (NIRB) provided guidance, attributes, and criteria for the determination of significance for residual effects. Also, the Canadian Environmental Assessment Agency's *Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects* (CEA Agency 1992) also guided the evaluation of significance for identified residual effects. The significance of residual effects is based on comparing the predicted state of the environment with and without the Project, including a judgment as to the importance of the changes identified.

Probability of Occurrence or Certainty

Prior to the determination of the significance for negative residual effects, the probability of the occurrence or certainty of the effect is evaluated. For each negative residual effect, the probability of occurrence is categorized as unlikely, moderate or likely. Table 3.5-14 presents the definitions applied to these categories.

Table 3.5-14. Definition of Probability of Occurrence and Confidence for Assessment of Residual Effects

Attribute	Characterization	Criteria
Probability of occurrence or certainty	Unlikely	Some potential exists for the effect to occur; however, current conditions and knowledge of socio-economic trends indicate the effect is unlikely to occur.
	Moderate	Current conditions and socio-economic trends indicate there is a moderate probability for the effect to occur.
	Likely	Current conditions and socio-economic trends indicate the effect is likely to occur
Confidence	High	Baseline data are comprehensive; predictions are based on well-established and understood socio-economic conditions and trends; effect relationships are well understood.
	Medium	Baseline data are comprehensive; predictions are based on socio-economic trends that are currently developing or changing; effect relationships are generally understood, with some assumptions made based on other socio-economic trends and conditions.
	Low	Baseline data are limited; predictions are based on socio-economic trends and conditions that vary across communities and regions; effect relationships may be variable or poorly understood.

Determination of Significance

As defined in the EIS Guidelines (NIRB), effect significance "is based on comparing the predicted state of the environment with and without the Project and expressing a judgment as to the importance of the changes identified."

The overall significance of an effect is derived from the experience and professional judgment of the environmental practitioners who prepare the assessment, considering the rankings of the contributing attributes of significance. While substantially based on professional judgment, the following are general rules of thumb applied in determining significance:

- If the magnitude of the negative effect is low, then the predicted effect is "not significant". If effects on measurable components meet applicable performance criteria, standards or guidelines, then the magnitude of the effect is negligible to moderate and, therefore, the prediction will be that an effect that is "not significant."
- If the geographic extent of the effect is confined to the LSA, then the predicted effect is likely to be "not significant."
- If the extent of a negative socio-economic effect is limited to individuals who also receive a corresponding positive benefit, then the predicted effect is likely to be "not significant."
- If the effect has a moderate to high reversibility, the predicted effect is likely to be "not significant."
- If the duration of the effect is short term (e.g., Construction phase only) then the effect prediction is also likely to be "not significant."

Confidence

The knowledge or analysis that supports the prediction of a potential residual effect—in particular with respect to limitations in overall understanding of the socio-economic environment and/or the ability to foresee future events or conditions—determines the confidence in the determination of significance. In general, the lower the confidence, the more conservative the approach to prediction of significance must be. The level of confidence in the prediction of a significant or non-significant potential residual effect considers the quality of the data and analysis, and their extrapolation to the predicted residual effects. "Low" is assigned where there is a low degree of confidence in the inputs, "medium" when there is moderate confidence and "high" when there is a high degree of confidence in the inputs. Where rigorous baseline data were collected and scientific analysis performed, the degree of confidence will generally be high. Table 3.5-14 provides descriptions of the confidence criteria.

Residual effects identified in the Project-related effects assessment are carried forward to assess the potential for cumulative interactions with the residual effects of other projects or human activities (addressed in Section 3.6 Cumulative Effects Assessment Methodology) and to assess the potential for transboundary impacts should the effects linked directly to the activities of the Madrid-Boston Project inside the Nunavut Settlement Area (NSA), which occurs across provincial, territorial, international boundaries or may occur outside of the NSA (addressed in Section 3. 7).

3.5.6.3 Characterization of Residual Effects for Employment

The provision of employment is expected to produce substantial benefits in the Kitikmeot region. These employment opportunities may result in competition for labour locally as a result of the demand for skilled labour and the higher than average incomes often associated with mine employment. This negative residual effect on the VSEC Employment is anticipated during Madrid-Boston Project Construction and Operation. Further, at Reclamation and Closure and Temporary Closure, the removal of employment opportunities is expected to have a negative residual effect on the VSEC Employment due to the loss of employment opportunities and income compared with Operation.

This section characterizes the expected negative residual effects of the Madrid-Boston and Hope Bay Project on the VSEC Employment. A summary of the characterization of each negative residual effect and the determination of significance is provided in Table 3.5-15 for Madrid-Boston and Table 3.5-16 for the complete Hope Bay Project. Positive residual effects are not further evaluated.

Change to Employment Opportunities and Income

Change to employment opportunities and income is expected to be negative in direction and moderate in magnitude. The magnitude of the effect will depend on the number of Madrid-Boston Project workers that are able to continue employment during Reclamation and Closure or Temporary Closure, and able to find alternative employment elsewhere at the time. The duration is anticipated to be short term. It is expected that the skills and experience gained by workers on the Project will increase their ability to find employment elsewhere. The equity of this effect is determined to be neutral. The frequency is expected to be intermittent as the effect will occur at specific points in time when labour force reductions are made. The geographic extent is expected to be limited to the RSA, with most impacts taking place in the LSA. The effect is reversible as it is expected that those who lose Madrid-Boston Project-related jobs during Reclamation and Closure or Temporary Closure will obtain employment elsewhere.

Table 3.5-15. Summary of Residual Effects and Overall Significance Rating for Socio-economics – Madrid-Boston

Description of Residual Effect	Attribute Characteristic							Overall Significance Rating		
	Direction (*positive, variable, negative*)	**Magnitude** (*negligible, low, moderate, high*)	**Equity** (*equitable, neutral, inequitable*)	**Duration** (*short, medium, long*)	**Frequency** (*infrequent, intermittent, continuous*)	**Geographic Extent** (*LSA communities, RSA communities, beyond Kitikmeot Region*)	**Reversibility** (*reversible, reversible with effort, irreversible*)	**Probability** (*unlikely, moderate, likely*)	**Significance** (*not significant, significant*)	**Confidence** (*low, medium, high*)
Employment										
Changes to employment opportunities and income	Negative	Moderate	Neutral	Short	Intermittent	RSA Communities	Reversible	Likely	Not Significant	High
Competition for local labour	Negative	Moderate	Neutral	Medium	Intermittent	RSA Communities	Reversible	Likely	Not Significant	Medium
Community Health and Well-being										
Changes to family stability	Variable	Low	Neutral	Medium	Continuous	RSA communities	Reversible	Moderate	Not Significant	Medium
Changes to family spending	Variable	Low	Neutral	Medium	Continuous	RSA communities	Reversible	Moderate	Not Significant	Medium

Table 3.5-16. Summary of Residual Effects and Overall Significance Rating for Socio-economics – Hope Bay Project

Description of Residual Effect	Attribute Characteristic							Overall Significance Rating		
	Direction (*positive, variable, negative*)	**Magnitude** (*negligible, low, moderate, high*)	**Equity** (*equitable, neutral, inequitable*)	**Duration** (*short, medium, long*)	**Frequency** (*infrequent, intermittent, continuous*)	**Geographic Extent** (*LSA communities, RSA communities, beyond Kitikmeot Region*)	**Reversibility** (*reversible, reversible with effort, irreversible*)	**Probability** (*unlikely, moderate, likely*)	**Significance** (*not significant, significant*)	**Confidence** (*low, medium, high*)
Employment										
Changes to employment opportunities and income	Negative	Moderate	Neutral	Short	Intermittent	RSA Communities	Reversible	Likely	Not Significant	High
Competition for local labour	Negative	Moderate	Neutral	Medium	Intermittent	RSA Communities	Reversible	Likely	Not Significant	Medium
Community Health and Well-being										
Changes to family stability	Variable	Low	Neutral	Medium	Continuous	RSA communities	Reversible	Moderate	Not Significant	Medium
Changes to family spending	Variable	Low	Neutral	Medium	Continuous	RSA communities	Reversible	Moderate	Not Significant	Medium

The probability is rated as likely as the effect will occur given the planned closure of the Madrid-Boston Project. Confidence is rated as medium as there is uncertainty with respect to the actual number of local and regional workers hired for the Project. As a result, the effect 'changes to employment opportunities and income' at Project Reclamation and Closure is determined to be **Not Significant**. This significance rating is based on the short duration, limited geographic extent and the reversible nature of the effect. Because Madrid-Boston Reclamation and Closure occurs at the end of the planned Hope Bay Project activities (i.e., Doris development and exploration activities will occur prior), there is no change to the assessment conclusions for the Hope Bay Project.

Change to Competition for Local Labour

Change in competition for local labour is expected to be negative in direction and moderate in magnitude. The magnitude is assessed as moderate because the expected competition for labour has the potential to affect some local and regional operations/businesses given the transferability of skills required for Madrid-Boston and the Hope Bay Project. During the construction of Madrid-Boston, the effect is expected to be minimal, as the short-term duration of employment opportunities and the specialized skillset required, is anticipated to affect a small number of operations/businesses in the Kitikmeot that have workers with these skills and are willing to shift employment during the Construction phase. However, with Hope Bay Project (i.e., Doris) the demand for workers will be similar during both the Construction and Operation phases of Madrid-Boston. However, the duration is still anticipated to be medium term. The equity of this effect is determined to be neutral. The frequency is expected to be intermittent as the effect is expected to occur when hiring takes place. The geographic extent is expected to be limited to the RSA, with most impacts taking place in the LSA. The effect is reversible and exists only as an indirect effect of employment.

There is a moderate probability that this effect will occur and a medium level of confidence is provided based on past experience. As a result, the effect 'competition for local labour' is determined to be **Not Significant**. This significance rating is based on the moderate magnitude, limited geographic extent, and the reversible nature of the effect.

3.5.6.4 Characterization of Residual Effects for Community Health and Well-being

Madrid-Boston and the Hope Bay Project are predicted to result in residual effects on the VSEC Community Health and Well-being due to change to family spending and change to family stability, associated with the influence of increased household incomes and adjustments to family roles and relationships. These effects are predicted to be both positive and negative. Mitigation has been identified to enhance the positive and reduce the negative aspects of these two effects; however, in keeping with a precautionary approach, the negative residual effects are further assessed and evaluated for significance.

This section characterizes the expected negative residual effects of Madrid-Boston and Hope Bay Project on the VSEC Community Health and Well-being. A summary of the characterization of each negative residual effect and the determination of significance is provided in Table 3.5-15 for Madrid-Boston and Table 3.5-16 for all aspects of the Hope Bay Project. Positive residual effects are not further evaluated.

Changes to Family Stability

Changes to family stability are both negative and positive in direction. As a negative effect, it is assessed as being low in magnitude because it is expected to affect a relatively small number of households resulting in a change in the existing socio-economic conditions, but overall for the LSA and RSA communities, the change will be below the range of historic variation. The equity of this effect is

determined to be neutral in that it is not expected to affect one segment of society or group more than another. The duration is predicted to be medium-term and the frequency to be continuous as the residual effect is related to employment during Construction and Operation phases of Madrid-Boston, and operations of the Hope Bay Project. The geographic extent is expected to be limited to the RSA communities. The effect is reversible because it is a direct result of Project employment and income. The operations of the Hope Bay Project (starting in 2017) have potential to result in employment and income impacts within the Kitikmeot region that are similar to the Operation phase of the Madrid-Boston Project; operations for Hope Bay began in 2017 and will extend through the Madrid-Boston Construction period; the assessment of the potential changes to family stability does not appreciably change with the Hope Bay Project operations, compared with Madrid-Boston Project in isolation.

There is a moderate probability that this effect will occur and a medium level of confidence is provided based on past experience. As a result, the effect 'change to family stability' is determined to be **Not Significant**. This significance rating is based on the low magnitude and the reversible nature of the effect. The determination is further supported as the effect does not extend beyond the life of the Project and is only applicable for individuals and their families who receive the corresponding benefit of employment.

Changes to Family Spending

The effect 'changes to family spending' is both negative and positive in direction, with the realization of negative effects a result of the spending choices and behaviours of individual workers. As a negative effect, it is assessed as being low in magnitude because it is expected to affect a relatively small number of households resulting in a change in the existing socio-economic conditions, but overall, for the LSA and RSA communities, the change will be below the range of historic variation. The equity of this effect is determined to be neutral in that it is not expected to affect one segment of society or group more than another, although individuals with existing challenges associated with gambling and substance abuse are expected to be more vulnerable. The duration is predicted to be medium-term. The frequency is assessed to be continuous, as the residual effect is related to ongoing during employment associated with the Construction and Operation phases of Madrid-Boston and operations of the Hope Bay Project. The geographic extent is expected to be limited to the RSA communities. The effect is reversible because it is a direct result of Project employment and income. It is expected that the Hope Bay Project will result in employment and income impacts within the Kitikmeot region that are similar to the Operation phase of the Madrid-Boston Project; Hope Bay operations began in in 2017, and potential effects of the Hope Bay Project may extent through the Madrid-Boston Construction period. Notwithstanding, the assessment of the potential changes to family spending does not appreciably change for the Hope Bay Project, compared with Madrid-Boston in isolation.

There is a moderate probability that this effect will occur and a medium level of confidence is provided based on past experience. As a result, the effect 'changes to family spending' is determined to be **Not Significant**. This significance rating is based on the low magnitude and the reversible nature of the effect. The determination is further supported as the effect does not extend beyond the life of the Madrid-Boston Project and is only applicable for individuals and their families who receive the corresponding benefit of employment.

3.6 CUMULATIVE EFFECTS ASSESSMENT

3.6.1 Methodology Overview

The potential for cumulative effects arises when the potential residual effects of Madrid-Boston and the Hope Bay Project affect (i.e., overlap and interact with) the same VSEC that is affected by the

residual effects of other past, existing or reasonably foreseeable projects or activities. Interacting projects and activities may combine to create additive or synergistic effects. An additive effect increases the effect in a linear way. A synergistic effect may result in an effect greater than the sum of the two actions.

3.6.1.1 Approach to Cumulative Effects Assessment

The general methodology for cumulative effects assessment (CEA) is described in Volume 2, Chapter 4, and focuses on the following activities:

1. Identify the potential for Madrid-Boston Project-related residual effects to interact with residual effects from the Existing and Approved Projects within the Hope Bay Greenstone Belt (i.e., the Doris Project, the Hope Bay Regional Exploration Project, the Madrid Advanced Exploration Program, and the Boston Advanced Exploration Project) and other human activities and projects within specified assessment boundaries. Key residual effects associated with past, existing, and reasonably foreseeable future projects were identified using publicly available information or, where data was unavailable, professional judgment was used (based on previous experience in similar geographical locations) to approximate expected environmental conditions.
2. Identify and predict potential cumulative effects that may occur and implement additional mitigation measures to minimize the potential for cumulative effects.
3. Identify cumulative residual effects after the implementation of mitigation measures.
4. Determine the significance of any cumulative residual effects. A key task in the CEA is to understand the contribution of the Madrid-Boston Project to the overall cumulative effect on VEC/VSEC; specifically, the amount of the cumulative residual effect can be apportioned to the Madrid-Boston Project as compared to the Doris Project, the Existing and Approved Exploration Projects within the Hope Bay Greenstone Belt, and other projects and activities.

The effects assessment methodology (Volume 2, Chapter 4) describes that the potential for a cumulative effect arises when a residual effects of the Hope Bay Project overlaps and interacts with the same VSEC that is affected by the residual effects of other past, existing or reasonably foreseeable projects or activities. In accordance with the methodology, potential cumulative effects were considered for all VSECs that identified potential residual effects. For Socio-economic VSECs, residual effects were identified for:

- Employment VSEC (changes in employment opportunities and income, and change in competition for local labour); and
- Community health and well-being VSEC (changes in family stability and change in family spending).

Other Socio-Economic VSECs were not included in the CEA because no residual effects were identified for Madrid-Boston or Hope Bay Project that could interact cumulatively with residual effects of other past, existing or reasonably foreseeable future projects of activities. As such, no potential cumulative effects were identified for:

- Economic Development VSEC;
- Business Opportunities VSEC;
- Employment VSEC (change in labour force capacity)

- Education and training (changes to demand for education and training; change in perceptions of education and employment);
- Migration, Housing, and Infrastructure and Services VSEC; and
- Community Health and Well-Being (changes to food security and cost of living).

3.6.1.2 Assessment Boundaries

The CEA considers the spatial and temporal extent of Madrid-Boston and Hope Bay Project-related residual effects on VSECs combined with the anticipated residual effects from other projects and activities to assist with analyzing the potential for a cumulative effect to occur.

Spatial Boundaries

The cumulative effects assessment considers past, existing, and reasonably foreseeable major projects with potential residual effects that occur within the outer geographical limit of possible interaction with the Hope Bay Project. For the purpose of this assessment, the spatial boundaries used for the CEA include past, existing, and reasonably foreseeable projects and human activities in Nunavut and the Northwest Territories considered to have potential effects within the socio-economic RSA that are relevant to current residents. The socio-economic RSA is as defined in Section 3.4.2 (Spatial Boundaries) and includes communities of Cambridge Bay, Kugluktuk, Gjoa Haven, Taloyoak, and Kugaaruk.

Temporal Boundaries

The temporal boundary used for the CEA includes those projects and human activities considered to have residual effects that may act on current residents of the socio-economic RSA also affected by the Madrid-Boston Project as defined by the phases of the Project (i.e., there is temporal overlap). Temporal boundaries for the Project effects assessment are defined in Section 3.4.3 (Temporal Boundaries); for the CEA a longer timeline must be considered to account for the timelines of the other projects and human activities that may have temporal overlap.

The following periods were identified and evaluated as part of the CEA.

- **Past:** These are historical, closed projects and activities occurring within the outer geographical limit of possible interaction with the Project. The year 2001[71] was selected as the past temporal boundary for the analysis, representing a time when rigorous baseline studies and activities first occurred in the CEA study area. Baseline studies captured the effects of past activities.
- **Existing:** These are projects and activities undergoing construction or operating concurrently with the Madrid-Boston Project and occurring within the outer geographical limit of possible interaction with the Project.
- **Reasonably Foreseeable Future:** These are projects formally accepted into a regulatory approvals process and occur within the outer geographical limit of possible interaction with the Madrid-Boston Project. The boundaries are VSEC-specific and based on the predicted length of time it would take for the VSEC to recover to baseline conditions.

[71] Notwithstanding, Volume 2, Section 4.4.4 includes past and present projects that have active dates prior to 2001 (i.e., Lupin mine was active from 1982 to 2004; Ekati Diamond Mine has been active since 1998).

Past, existing and reasonably foreseeable future projects are described in the cumulative effects assessment methodology (Volume 2, Section 4.4.4). The temporal overlap of these projects in relation to the Madrid-Boston Project and the temporal overlap of these projects in relation to the Madrid-Boston Project is presented in Figure 4.4-3 of Volume 2, Chapter 4.

3.6.2 Potential Interactions of Residual Effects with Other Projects

The mining industry is the main source of industrial activity in Nunavut, which is being explored for uranium, diamonds, gold and precious metals, base metals, iron, coal, and gemstones. In addition to mining exploration and development, other land use activities are also present in the territory and, as required under Section 7.11 of the EIS Guideline (NIRB), were considered for potential interactions with the Hope Bay Project.

Table 3.6-1 identifies the mining and land used activities that may potentially interact with the residual effects of the Madrid-Boston Project. The nature of each activity is described in the CEA methodology (Volume 2, Section 4.4.4). Of note, Table 3.6-1 does not include:

- mineral exploration activities, as these are relatively small projects in scope and duration (e.g., small crews, limited land use areas, short-term [summer]).
- mines in other regions of Nunavut, as baseline information indicates that there are distinct labour markets in Nunavut, and that the interactions between the Kitikmeot region and the other regions of Nunavut are limited (i.e., mines in other regions do not rely on the labour and suppliers from the Kitikmeot).[72]

Table 3.6-1. Past, Existing, and Reasonably Foreseeable Future Projects with the Potential to Interact Cumulatively with Socio-economics

	Project	Location	Type	Proponent	Dates Active	Current Status
Past	Jericho	Nunavut	Diamond mine	Shear Diamonds Ltd.	2006 to 2012	Care and maintenance
	Lupin	Nunavut	Gold mine	Elgin Mining Inc.	1982 to 2004	Care and maintenance
	Snap Lake	Northwest Territories	Diamond mine	De Beers Canada Inc.	2008 to 2015	Care and maintenance
Present	Canadian High Arctic Research Station	Nunavut	Science station	Polar Knowledge Canada	2014 to 2017 (construction) Operation thereafter	Operating
	Diavik	Northwest Territories	Diamond mine	Rio Tinto and Dominion Diamonds	2003 to 2023	Operating
	Ekati	Northwest Territories	Diamond mine	Dominion Diamonds	1998 to 2033	Operating
	Gahcho Kué	Northwest Territories	Diamond mine	De Beers and Mountain Province	2015 to 2028	Operating

[72] TMAC recognizes that some communities, particularly Kugluktuk and Cambridge Bay, interact with mining projects in the NWT, such as Ekati and Diavik diamond mines through employment and business involvement in these mines.

	Project	Location	Type	Proponent	Dates Active	Current Status
Reasonably Foreseeable Future	Back River (George Lake and Goose Lake)	Nunavut	Gold mine	Sabina Gold and Silver Corp.	2019 to 2029	Approved
	Bathurst Inlet Port and Road	Nunavut	All-weather road	BIPR	20 years	Pre-application
	Courageous Lake	Northwest Territories	Gold mine	Seabridge Gold	15 years	Pre-application
	Grays Bay Road and Port Project	Nunavut	All-weather road	Nunavut Resources Corp. & GN	Unknown	Pre-application
	Hackett River	Nunavut	Base metal mine	Glencore Plc.	15 years	Pre-application
	Izok Corridor (High Lake and Izok Lake)	Nunavut	Copper, zinc, gold, silver mine	MMG Resources Inc.	14 years	Pre-application

With respect to socio-economic effects of the Madrid-Boston Project, the following VSECs were considered in the CEA:

- Employment
- Community Health and Well-being

This CEA focuses on the potential residual adverse (negative) effects of the Project, but it is important to recall that the majority of residual socio-economic effects assessed for the Madrid-Boston Project were deemed to be positive or beneficial in nature. None of these residual benefits are expected to become negative when combined with existing, past and future projects.

The following potential negative residual effects were identified for Madrid-Boston and the Hope Bay Project; combined with other projects and developments, these have the potential to lead to cumulative effects:

- Changes to employment opportunities and income;
- Changes to competition for local labour;
- Changes to family stability; and
- Changes to family spending.

3.6.3 Identification of Mitigation and Management Measures

Mitigation measures for cumulative effects involve taking further action, where possible, to avoid or minimize cumulative effects on VSECs. Because cumulative effects typically result from the combined effects of multiple developments, responsibility for their prevention and management is shared among the various developments that contribute to them. It is usually beyond the capability of any one party to entirely reduce or eliminate cumulative effects; therefore, measures often require collaborative efforts between projects or activities. Lack of control over operators of other projects or activities potentially confounds implementation of additional mitigation measures for cumulative effects. Proposed mitigation measures must take technical, environmental, and economical feasibility into consideration as well as the ability to influence the independent operators of other projects and activities.

Specific to socio-economic effects of the Project, the Kitikmeot Socio-economic Management Committee (Kit-SEMC) facilitates understanding of cumulative impacts in the RSA. The Kit-SEMC brings together territorial and federal governments (GN, INAC), industry proponents, Inuit organizations, hamlet representatives and other stakeholders to engage in discussions and information-sharing among all parties to understand social-economic changes in the region. Kit-SEMC's role is to provide input and participate in the socio-economic monitoring of major development projects. This includes, with respect to Project impacts, identifying whether a predicted change is taking place, determining if unpredicted adverse impacts are occurring, and participating in the development of mitigation and adaptive management measure to avoid or minimize any adverse effects.

An existing Socio-economic Monitoring Program (SEMP) for the Hope Bay Project accommodates this process by enabling early detection of adverse effects on VSECs, and includes annual reporting of impacts and benefits for the Project. The annual SEMP report is developed with the Hope Bay Socio-economic Working Group and also presented to the Kit-SEMC at annual meetings held where, in collaboration with stakeholders, impacts and benefits of the Project are reviewed. Similarly, other major resource development projects in the Kitikmeot region—such as the Back River Project and Grays Bay Road and Port Project—participate in Kit-SEMC meetings to share progress updates and monitoring results (Nunavut SEMC 2017). Collectively, these actions aid in consistent and effective monitoring of cumulative impacts in the RSA.

TMAC will continue to participate in regional socio-economic monitoring efforts, specifically the Kit-SEMC. TMAC recognizes the Kit-SEMC as the appropriate mechanism for monitoring and managing cumulative effects of industry, as this committee aims "to ensure that major development projects comply with their permits by meeting their socio-economic monitoring requirements during the environmental assessment, approval, and monitoring processes as required by NIRB and the NLCA." The Kit-SEMC is an appropriate channel for communication regarding Project-specific effects and monitoring/management programs.

3.6.3.1 Mitigation and Management Measures for Employment

Residual adverse effects on employment relate to potential competition for labour during the Construction and Operation phases; and the loss of employment opportunities and income at after mine closure (i.e., during the Reclamation and Closure phase). Mitigation measures proposed to reduce or eliminate these adverse effects are described in Section 3.5.5 (Employment). No additional mitigation measures are proposed other than those already implemented by present projects and developments, and those to be implemented by reasonably foreseeable projects and developments.

3.6.3.2 Mitigation and Management Measures for Community Health and Well-being

Residual effects on community health and well-being include potential negative changes in family stability and family spending related to employment and income during the Construction and Operation phases. Mitigation measures proposed to reduce or eliminate these negative effects are described in Section 3.5.5 (Community Health and Well-being). No additional mitigation measures are proposed other than those already implemented by present projects and developments, and those to be implemented by reasonably foreseeable projects and developments.

3.6.4 Characterization of Potential Cumulative Effects

This section describes and characterizes the potential cumulative effects on the Employment VSEC and Community Health and Well-being VSEC. If the identified mitigation measures are not sufficient to eliminate a cumulative effect, a potential cumulative residual effect is identified and described and

the specific projects and activities contributing to the cumulative residual effect are discussed. Cumulative residual effects are carried forward for significance determination (Section 3.6.4).

3.6.4.1 Employment

Changes to Employment Opportunities and Income

The reduction in direct employment and other economic opportunities at the Reclamation and Closure phase of the Madrid-Boston Project has the potential to result in a negative cumulative residual effect on employment opportunities and income if there are other projects and developments that have coinciding closure dates with that of Madrid-Boston.

Based on publicly available information about project schedules, none of the present projects or developments listed in Table 3.6-1 have coinciding closure dates with that of the Madrid-Boston Project. However, closure of the Back River Project (expected to close around year 2029) may correspond with the Madrid-Boston Project (Reclamation and Closure phase is expected to begin in 2032). Although with low confidence, it is possible for one or more of the reasonably foreseeable projects to have closure dates that coincide with those of Madrid-Boston. In such a case, there would be cumulative interaction related to the decrease in employment opportunities and personal income that would be considered as an adverse cumulative effect. However, there is a large degree of uncertainty with respect to potential cumulative interactions and an adverse cumulative residual effect.

To be conservative, there is predicted to be a **residual negative cumulative effect of changes to employment opportunities and income** during Madrid-Boston Reclamation and Closure.

Changes to Competition for Local Labour

The Hope Bay Project, including Madrid-Boston, has the potential to result in a negative cumulative residual effect in the form of increased competition for local labour a result of its demand and the demand of other projects and developments for labour in the Kitikmeot region. This effect is expected as a result of direct, indirect and induced employment opportunities throughout the Construction and Operation phases of the Madrid-Boston Project, in combination with the Doris Project, which may coincide with activities of other projects and developments that are also expected to demand workers from the Kitikmeot region. The potential projects that may cumulatively interact with Madrid-Boston and the Hope Bay Project include, in particular, CHARS and the Back River Project, as well as other reasonably foreseeable projects and developments listed in Table 3.6-1.

The Back River Project is particularly relevant in this context. This project will require many of the same skillsets and draw from the same communities within the Kitikmeot region. In total, the Back River Project is expected to require an average of about 400 workers during a 4-year Construction phase and 700 workers during a 10-year Operation phase. Overall, the Back River Project involves a smaller number workers and a shorter duration of employment. The Back River Project has recently received environmental assessment approval. Should its development correspond with the Hope Bay Project, residual effects of competition for local labour could be exacerbated. A **residual negative cumulative effect of competition for labour** on the VSEC Employment is predicted**.**

3.6.4.2 Community Health and Well-being

Changes to Family Stability

A residual adverse effect of changes to family stability is predicted for the Hope Bay Project, primarily due to the fly-in/fly-out worker rotation schedule and the social stressors that this can add to the

family with the separation and periodic re-introduction of the family member upon return from a work rotation. A negative cumulative effect may occur because other mine developments in the region operate using a similar model and the timing of the Hope Bay Project may coincide with activities of other projects and developments that are also expected to demand workers from the Kitikmeot region. The potential projects that can cumulatively interact with Madrid-Boston and the Hope Bay Project include the currently operating diamond mines in the Northwest Territories and the Back River Project, as well as other reasonably foreseeable projects and developments listed in Table 3.6-1. The potential effects are as described in the Project effects assessment and include increased tension in marital and parental relationships, increased potential for negative behaviours (e.g., gambling, alcohol and drug use) due to poor coping mechanisms, increased stressors on mental health, and increased potential for family violence and break-up. C**hanges to family stability is predicted to result in a negative residual cumulative effect** on the VSEC Community Health and Well-being**.**

Changes to Family Spending

As described in the Project effects assessment, a number of positive impacts are associated with employment and the income it provides, including productive spending in the areas of education, housing, and consumer goods and services. However, there is also potential for an increase in unproductive spending among some workers and their family members, including spending on gambling and alcohol and drug use. Additional employment and income in the RSA communities can exacerbate these adverse effects. The potential projects that can cumulatively interact with Madrid-Boston and the Hope Bay Project include, in particular, CHARS and the Back River Project, as well as other reasonably foreseeable projects and developments listed in Table 3.6-1. **Changes to family spending is predicted to result in a residual negative cumulative effect** on the VSEC Community Health and Well-being.

3.6.5 Characterization of Cumulative Residual Effects

Negative cumulative residual effects are characterized using the same criteria applied in the Project-related effect assessment methodology (Section 3.5.6): direction, magnitude, duration, equity, frequency, geographic extent, reversibility, probability of occurrence, and confidence in the analyses and conclusions. The negative cumulative residual effect is similarly characterized as either significant or not significant. A summary of the characterization of each negative cumulative residual effect and the determination of significance is provided in Table 3.6-6. Positive cumulative residual effects are not characterized.

3.6.5.1 Employment

Changes to Employment Opportunities and Income

The potential adverse cumulative effect of decrease in employment opportunities and income during the Reclamation and Closure phase of the Madrid-Boston Project, coinciding with other projects and developments, is expected to be negative in direction and moderate in magnitude. The magnitude will depend on the number and scale of other projects with coinciding closure dates with those of Madrid-Boston. The duration is anticipated to be short-term as workforce reductions will occur over a limited timeframe. The equity of this effect is determined to be neutral. The frequency is expected to be intermittent as the effect is expected to occur with decreasing production activities. The geographic extent is expected to be limited to the RSA. The effect is reversible as those who lose jobs are expected to obtain employment elsewhere, although this may be dependent on broader economic circumstances at the time of closure.

The probability is rated as unlikely as currently no other present or reasonably foreseeable projects or developments have coinciding closure dates with those of the Madrid-Boston Project. Confidence is

rated as medium as there is uncertainty with respect to the actual number of projects and developments having overlapping closure dates; this is particularly true with respect to the certainty and timing of the Back River Project.

Considering the above, the cumulative effect 'changes to employment opportunities and income' is determined to be **Not Significant**. This significance rating is based on the moderate magnitude, short duration, limited geographic extent and the reversible nature of the effect. The contributions of projects and activities to the cumulative residual effect of changes to employment opportunities and income are summarized in Table 3.6-2.

Table 3.6-2. Contributions of Projects and Activities to Cumulative Residual Effect of Changes to Employment Opportunities and Income

Cumulative Residual Effect: The reduction in direct employment and other economic opportunities at the Reclamation and Closure phase of the Madrid-Boston Project has the potential to result in a negative cumulative residual effect on employment opportunities and income.	
Project or Activity	**Description of Contribution to Cumulative Residual Effect**
Madrid-Boston Project	There is potential for loss of an estimated 110 direct jobs in the Kitikmeot at the end of Operations, as well as reduction in spin-off employment opportunities. Madrid-Boston is predicted to be an important contributor to the cumulative effect, given the limited number of other projects (i.e., Back River) that could contribute to employment or loss of employment in the region..
Doris Project	The Doris Project operations will be completed approximately 10 years prior to closure of the Madrid-Boston Project. No contribution to the residual cumulative effect predicted, as the staged approach of closing Doris prior to the Madrid-Boston Project will result in a gradual decrease in employment opportunities, and the associated personal income. Additionally, it is expected that skilled employees from the Doris Project will identify employment opportunities following closure, in part based on contributions of TMAC's Human Resources Strategy and opportunities available at the Madrid-Boston Project.
Existing and Approved Exploration Projects within the Hope Bay Greenstone Belt	Exploration projects will be ongoing and employ a modest number of workers compared with Madrid-Boston operations; contribution to cumulative effect is predicted to be minor.
Other Past Projects or Activities	None.
Other Existing Projects or Activities	None.
Reasonably Foreseeable Future Projects or Activities	Closure of the Back River Project may occur at a time that aligns with the closure of the Madrid-Boston Project. Direct Kitikmeot employment for the Back River Project may be approximately equal to the Madrid-Boston Project; as such, at closure, there is potential for an equal contribution to the residual cumulative effect of loss of employment and income. It is possible for one or more of the other reasonably foreseeable projects to have closure dates that coincide with those of Madrid-Boston, although detailed closure information or schedules are not currently available.

Cumulative Residual Effect: The reduction in direct employment and other economic opportunities at the Reclamation and Closure phase of the Madrid-Boston Project has the potential to result in a negative cumulative residual effect on employment opportunities and income.	
Project or Activity	**Description of Contribution to Cumulative Residual Effect**
Description of Total Cumulative Residual Effect	Should other mine projects providing employment opportunities and income to Kitikmeot residents transition result in workforce reductions at the same time as the Madrid-Boston Project, there may be a negative cumulative resident effect to employment and income. Thus, an increased, but unknown, number of regional residents may become unemployed and be without income within a short period of time if there are other projects and developments that have coinciding closure dates with that of Madrid-Boston.

Changes in Competition for Local Labour

The potential a negative cumulative effect of competition for local labour is assessed as being negative in direction and moderate in magnitude. The magnitude of competition for labour from within the RSA communities will depend on the schedule of other projects, in particular the Back River Project. However, competition for local labour is expected to be focused on those individuals with the necessary mine-related skills and experience. There remains a large component of the RSA labour force that is available for employment, but lacks the necessary education, training and experience for skilled positions. The extent to which projects are successful in hiring from the Kitikmeot communities will depend on the success of training and education initiatives. The duration of the cumulative residual effect is anticipated to be medium term, and the equity is determined to be neutral. The frequency is expected to be intermittent as the effect is expected to occur when hiring takes place. The geographic extent is expected to be limited to the RSA. The effect is reversible and exists only as an indirect effect of employment.

There is a moderate probability that this effect will occur and a medium level of confidence is provided based on the lack of information of the potential overlapping activities of the Hope Bay Project and other projects and developments in the region.

Considering the above, the cumulative effect 'competition for local labour' is determined to be **Not Significant**. This significance rating is based on the moderate magnitude, regional geographic extent, and the reversible nature of the effect. The contributions of projects and activities to the cumulative residual effect of competition for local labour are summarized in Table 3.6-3.

3.6.5.2 Community Health and Well-being

Changes to Family Stability

The cumulative effect 'changes to family stability' may have both negative and positive aspects. Employment at the Madrid-Boston Project, and at other existing and reasonably foreseeable future projects is associated with an increase in income, which may have a positive effect on family stability (i.e., increased income brings the potential for an overall increase in standard of living and decrease challenges associated with providing financially for the family). However, workers will be employed on rotation at a remote location, and there may be shifts in household responsibilities and resources. As a negative effect, the change in family stability is assessed as being moderate in magnitude because, with the addition of other remote work projects requiring FIFO operations, such as the Back River Project, it is expected that changes in family stability will affect a larger number of households in the RSA communities. It is expected that other projects will implement mitigation similar to that identified for the Hope Bay Project (e.g., some form of an EFAP, communication facilities). The equity of this effect is determined to be neutral in that it is not expected to affect one segment of society or group more than

another. The duration is predicted to be medium-term and the frequency to be continuous as the residual effect is related to ongoing employment. The geographic extent is expected to be limited to the RSA communities. The effect is reversible because it is a direct result of employment and income.

There is a moderate probability that this effect will occur, depending on the realized timing of other project developments, and a medium level of confidence is provided based on past experience. Considering the above, the negative residual cumulative effect 'changes to family stability' is determined to be **Not Significant**. This significance rating is based on the moderate magnitude and the reversible nature of the effect. The determination is further supported as the effect is only applicable for individuals and their families who receive the corresponding benefits of employment from the projects considered, and will be largely variable depending on the individuals involved. The contributions of projects and activities to the cumulative residual effect of changes to family stability are summarized in Table 3.6-4.

Table 3.6-3. Contributions of Projects and Activities to Cumulative Residual Effect of Competition for Local Labour

Cumulative Residual Effect: There may be increased competition for local labour as a result of the Project's demand and the demand of other projects and developments for labour in the Kitikmeot region.	
Project or Activity	**Description of Contribution to Cumulative Residual Effect**
Madrid-Boston Project	There is potential for some currently employed skilled workers and residents of the Kitikmeot region to leave their employment for mine-related employment. During the Construction phase, employment with the Madrid-Boston Project is short-term and it is not expected that skilled workers with permanent employment will leave for temporary employment at the Project,. Notwithstanding, employment at the mine is expected to pay (including benefits), depending on the required skill level, position and experience, an estimated at $133,000 per year during construction. During the Operation phase, Project positions are estimated to have average annual earnings of $148,000, with ranges from $40,000 per year and up. Such earnings are higher than median/average salaries in the region, and could result in skilled workers leaving their employment for work at the mine, resulting in a competition for labour.
Doris Project	From 2017 to 2021, the Existing and Approved Projects (primarily Doris) are estimated to employ on average 36 workers (full-time equivalent) from the Kitikmeot region. The total demand for workers in the Kitikmeot region is expected to be approximately 108 (FTE) over this period (2017 to 2021). Average worker earnings are expected to be similar across the Hope Bay Project, differing according to the job position and requirements. The overlap between the Construction phase of the Madrid-Boston Project with operations at Doris Project that will interact cumulatively to increase competition for labour within Nunavut and, more specifically, the Kitikmeot region.
Existing and Approved Exploration Projects within the Hope Bay Greenstone Belt	From 2017 to 2021, the Existing and Approved Projects will employ workers from the Kitikmeot region (although the majority of full-time employment is attributed to the Doris Project). Average worker earnings are expected to be similar across the Hope Bay Project, differing according to the job position and requirements. The overlap between the Construction phase of the Madrid-Boston Project with other exploration activities that will interact cumulatively to increase competition for labour within Nunavut and, more specifically, the Kitikmeot region.
Other Past Projects or Activities	None.

Cumulative Residual Effect: There may be increased competition for local labour as a result of the Project's demand and the demand of other projects and developments for labour in the Kitikmeot region.	
Project or Activity	**Description of Contribution to Cumulative Residual Effect**
Other Existing Projects or Activities	The introduction of CHARS has created an additional demand for skilled labour in Cambridge Bay. However, CHARS construction was completed in 2017 and there will be limited ongoing maintenance opportunities (Appendix V6-3B), many of which will be managed by local contractors. Following the construction of CHARS, the Hamlet of Cambridge Bay has identified a renewed effort to develop local projects (e.g., vehicle storage building, power plant construction, development of housing). The development of these projects may interact cumulatively with competition for labour, particularly as skilled workers may be interested in working at projects that are closer to their homes and families. Development of these projects, particularly government projects requiring certified tradespersons, may limit the number of local opportunities. In the absence of local tradespersons, local construction contractors typically bring in skilled workers from outside the community.
Reasonably Foreseeable Future Projects or Activities	The Back River Project is the most likely to lead to cumulative interactions, as it will require many of the same skillsets and draw the labour supply from the same communities within the Kitikmeot region. Other reasonably foreseeable projects and developments listed in Table 3.6-1 may also interact with the Madrid-Boston Project should they have a demand for skilled labour within a similar timeframe.
Description of Total Cumulative Residual Effect	The Project may contribute cumulatively to competition for local labour as a result of its demand and the demand for skilled workers, who will also be in demand by other projects and developments in the Kitikmeot region. As reported in the 2017 community research (Appendix V6-3B), local businesses currently reported challenges hiring and retaining staff. This is due in part to a limited number of skilled workers in the Kitikmeot labour force, and because local businesses report that those residents who are motivated to work are currently working.

Table 3.6-4. Contributions of Projects and Activities to Cumulative Residual Effect of Changes to Family Stability

The fly-in/fly-out worker rotation may create stress within the family as a result of the separation and periodic re-introduction of a family member upon return from a work rotation	
Project or Activity	**Description of Contribution to Cumulative Residual Effect**
Madrid-Boston Project	Changes to family stability as a result of Madrid-Boston Project Construction and Operation may occur due to the FIFO worker rotation schedule and the social stressors that this can add to the family. Potential impacts will vary with the individual, and could include tension in marital and parental relationships, increased need for childcare services, increased potential for negative behaviours.
Doris Project	The Doris Project is currently operational and any contributions to cumulative effect would be realized upon commencement of the Madrid-Boston Project. Based on having a similar FIFO schedule, potential residual effects of the Doris Project are the same as those described for the Madrid-Boston Project. TMAC will continue to participate in regional socio-economic monitoring, specifically the Kit-SEMC, to further understand potential residual and cumulative effects of the approved, existing and proposed projects on the Hope Bay Greenstone Belt.

The fly-in/fly-out worker rotation may create stress within the family as a result of the separation and periodic re-introduction of a family member upon return from a work rotation	
Project or Activity	**Description of Contribution to Cumulative Residual Effect**
Existing and Approved Exploration Projects within the Hope Bay Greenstone Belt	Existing and Approved Exploration Projects are currently underway and any contributions to cumulative effects would be realized upon commencement of the Madrid-Boston Project. Based on having a similar FIFO schedule, potential residual effects are the same as those described for the Madrid-Boston Project. TMAC will continue to participate in regional socio-economic monitoring, specifically the Kit-SEMC, to further understand potential residual and cumulative effects of the approved, existing and proposed projects on the Hope Bay Greenstone Belt.
Other Past Projects or Activities	None.
Other Existing Projects or Activities	Diamond mines in the Northwest Territories currently employ some Kugluktuk residents. This employment and associated FIFO schedule may result in residual impacts of family stresses. With an increase in employment from the Madrid-Boston Project, there is potential for the number of families in Kugluktuk experiencing stress due to the FIFO schedules to increase..
Reasonably Foreseeable Future Projects or Activities	Reasonably foreseeable future projects, primarily the Back River Project, will require workers on a rotational schedule in a similar manner of the Madrid-Boston Project. Employment associated with the Back River Project, and associated family stresses, has potential to add to the residual effect of family stress resulting from the Madrid-Boston Project. Other reasonably foreseeable projects and developments may also interact with the Madrid-Boston Project, pending their location, workforce size and requirements, and schedules.
Description of Total Cumulative Residual Effect	The FIFO worker rotation schedule may create stress within a family as a result of the separation and periodic re-introduction of a family member upon return from a work rotation. Should other projects operate simultaneously with the Madrid-Boston Project, and also require workers on a FIFO schedule, there is potential for an increased number of families that may experience a range of stresses. Increase stress within a family may: affect marital and parental relationships, increase potential for negative behaviours (e.g., gambling, alcohol and drug use), increased stressors on mental health, and increased potential for family violence and break-up.

Changes to Family Spending

It is expected that increased income from Project employment will enable productive spending (e.g., housing, education, purchase of snowmachines and other equipment used for harvesting and other land based activities), but could also lead to unproductive spending (e.g., gambling, alcohol and drugs). As such, potential residual cumulative effects of 'changes to family spending' are predicted to be both negative and positive in direction. It is expected that negative effects to family spending will be a result of the spending choices and behaviours of individual workers. It will be deterred by TMAC's 'zero tolerance' policy for alcohol and drug use (KIA & TMAC 2015).

The negative effect it is assessed as being low in magnitude because it is expected that, despite existing and foreseeable future projects bringing additional employment opportunities and income to residents of the Kitikmeot communities, negative spending choices are still expected to affect a small number of households. As previously discussed, how income is spent is a personal choice made by individuals and will, to a large extent, determine whether there is a positive or negative residual

cumulative effect. It is further assumed that other projects will implement mitigation that is similar to TMAC's, such as offering an EFAP and enforcing a 'zero tolerance' drug and alcohol policy with workers. The equity of this effect is determined to be neutral in that it is not expected to affect one segment of society or group more than another, although individuals with pre-existing challenges associated with gambling and substance abuse are expected to be more vulnerable. The duration is predicted to be medium-term and the frequency to be continuous because the residual effect is associated with ongoing employment within a family. The geographic extent is expected to be limited to the RSA communities. The effect is reversible because it is a direct result of Project employment and income.

There is a moderate probability that this effect will occur, depending on the realized timing of other project developments, and a medium level of confidence is provided based on past experience. Considering the above, the negative cumulative effect 'changes to family spending' is determined to be **Not Significant**. This significance rating is based on the low magnitude and the reversible nature of the effect. The contributions of projects and activities to the cumulative residual effect of changes to family spending are summarized in Table 3.6-5.

Table 3.6-5. Contributions of Projects and Activities to Cumulative Residual Effect of Changes to Family Spending

Cumulative Residual Effect: Employment and income may result in an increase in unproductive spending among some workers and their family members, including increases in gambling and alcohol and drug use.	
Project or Activity	**Description of Contribution to Cumulative Residual Effect**
Madrid-Boston Project	There is potential for employees to spend their income in an unproductive manner; however, such unproductive spending is not anticipated among the majority of Madrid-Boston Project employees. Notwithstanding, it is acknowledged that this type of spending may indirectly contribute to other adverse effects such as crime and, domestic violence. These negative issues currently exist in the Kitikmeot region and could be exacerbated by the Madrid-Boston Project. This is predicted for a minority of Project employees. Research has indicated that while these issues may be exacerbated for some workers and families, the majority of employees benefit from mining employment.
Doris Project	This Project is currently operational and is providing employment and income to Kitikmeot residents. Unproductive spending choices by current or future Doris Project employees has potential to add to any unproductive spending choices by individuals associated with the Madrid-Boston Project. Based on current monitoring information, there are no reports of unproductive spending linked to employment at the Doris Project.
Existing and Approved Exploration Projects within the Hope Bay Greenstone Belt	Existing and Approved Exploration is currently underway, and is providing employment and income to Kitikmeot residents. Unproductive spending choices by employees at the exploration projects have potential to add to any unproductive spending choices by individuals associated with the Madrid-Boston Project. Based on current monitoring information, there are no reports of unproductive spending linked to employment at existing exploration projects.

Cumulative Residual Effect: Employment and income may result in an increase in unproductive spending among some workers and their family members, including increases in gambling and alcohol and drug use.	
Project or Activity	**Description of Contribution to Cumulative Residual Effect**
Other Past Projects or Activities	Unproductive spending, including of the purchase and consumption of alcohol and drugs, and gambling, currently occurs in Kitikmeot communities. Reasons people consume alcohol are complex and varied, and may include poverty, unemployment, hopelessness, and an inability to provide for one's family; as such, current levels of unproductive spending are not linked to a particular past project or activity (although loss of employment may be a contributing factor).
Other Existing Projects or Activities	The Hamlet of Cambridge Bay undertook a socio-economic assessment to understand potential effects of CHARS in the community. CHARS has provided employment and income for individuals in Cambridge Bay, and income associated with this employment has potential to add to the residual effect of unproductive spending from the Madrid-Boston Project. However, CHARS construction completed in 2017 and the community is looking forward to positive trickle-down effects from CHARS operations (e.g., resident scientists and their families requiring services such as restaurants, and personal services). As such, while there is potential for income from CHARS to result in unproductive spending and interact negatively with the residual effect from Madrid-Boston, the contribution from CHARS to this cumulative effect is expected to be minimal.
Reasonably Foreseeable Future Projects or Activities	Reasonably foreseeable future projects, primarily the Back River Project, will result in an increased number of residents with employment and available income. As such, there is potential for more individuals to spend productively or unproductively. Similar to the Madrid-Boston Project, unproductive spending is not anticipated among the majority of employees. Other reasonably foreseeable projects and developments may also interact with the Madrid-Boston Project, pending their location, workforce size and requirements, and schedules.
Description of Total Cumulative Residual Effect	Employment and income may result in an increase in unproductive spending among some workers and their family members; unproductive spending includes gambling and alcohol and drug use. Should the Back River project or other reasonably foreseeable projects provide employment and disposable income, it is possible that a larger proportion of community members and their families may participate in unproductive spending.

A summary of the characterization of each negative cumulative residual effect and the determination of significance is provided in Table 3.6-6. Positive cumulative residual effects are not characterized.

Table 3.6-6. Summary of Cumulative Residual Effects and Overall Significance Rating for Socio-economics

Description of Residual Effect	Attribute Characteristic							Overall Significance Rating		
	Direction (*positive, variable, negative*)	**Magnitude** (*negligible, low, moderate, high*)	**Equity** (*equitable, neutral, inequitable*)	**Duration** (*short, medium, long*)	**Frequency** (*infrequent, intermittent, continuous*)	**Geographic Extent** (*LSA communities, RSA communities, beyond Kitikmeot Region*)	**Reversibility** (*reversible, reversible with effort, irreversible*)	**Probability** (*unlikely, moderate, likely*)	**Significance** (*not significant, significant*)	**Confidence** (*low, medium, high*)
Employment										
Changes to employment opportunities and income	Negative	Moderate	Neutral	Short	Intermittent	RSA Communities	Reversible	Unlikely	Not Significant	Medium
Competition for local labour	Negative	Moderate	Neutral	Medium	Intermittent	RSA Communities	Reversible	Moderate	Not Significant	Medium
Community Health and Well-being										
Changes to family stability	Variable	Moderate	Neutral	Medium	Continuous	RSA communities	Reversible	Moderate	Not Significant	Medium
Changes to family spending	Variable	Low	Neutral	Medium	Continuous	RSA communities	Reversible	Moderate	Not Significant	Medium

3.7 TRANSBOUNDARY EFFECTS

The EIS Guidelines (NIRB) define transboundary effects as those effects linked directly to the activities of the Project inside the NSA, which occur across provincial, territorial, international boundaries or may occur outside of the NSA (NIRB 2012a). Transboundary effects of the Project have the potential to act cumulatively with other projects and activities outside the NSA.

3.7.1 Methodology Overview

The following systematic process was used to determine which VSECs would be included in the transboundary effects assessment:

- Identify any potential residual adverse effects of the Project (Madrid-Boston and the complete Hope Bay Project) on a VSEC, after mitigation measures are applied, that may result in transboundary effects.
- Determine whether the residual effects of the Project may operate cumulatively in a transboundary context with the environmental effects of projects or activities located in other jurisdictions. Assess whether the Project will interact cumulatively in a meaningful way (i.e., is "likely" to heighten effects).
- Describe mitigation measures, where feasible, that may be applied where measurable effects are described.

3.7.2 Potential Transboundary Effects

Madrid-Boston and the Hope Bay Project are assessed as having non-significant residual effects on the VSECs Employment, and community Health and Well-being. Specifically, the residual effects are:

- Employment
  - Changes to employment opportunities and income
  - Changes to competition for local labour
- Community Health and Well-being
  - Changes to family stability
  - Changes to family spending

3.7.2.1 Employment

Changes to Employment Opportunities and Income

The negative effect of changes to employment opportunities and income at Reclamation and Closure is assessed as being primarily limited to the Kitikmeot region. The employment of workers from the Northwest Territories with Madrid-Boston and the Hope Bay Project is predicted to be relatively modest (see Appendix V6-3C) and workers from other areas of Canada are expected to come from a diversity of areas including larger population centres where there are more work opportunities. In addition, with remote fly-in/fly-out mine operations, the workers are typically experienced with and expect to transition to work on other projects based on the opportunities available across Canada. A potential residual transboundary adverse effect of the Project (Madrid-Boston and the Hope Bay Project) on the Employment VSEC associated with changes to employment opportunities and income is not predicted.

Changes to Competition for Local Labour

As assessed, the negative residual effect of changes to competition for local labour due to Madrid-Boston and the Hope Bay Project is predicted to be limited to the Kitikmeot region. This effect is not expected to reach into Yellowknife (NWT), in particular, because of the relatively modest number of workers expected to come from that community. A potential residual transboundary adverse effect of the Project (Madrid-Boston and the Hope Bay Project) on the Employment VSEC associated with changes to competition for local labour is not predicted.

3.7.2.2 Community Health and Well-being

Changes to Family Stability

A residual adverse effect of changes to family stability is predicted for the Project, primarily due to the fly-in/fly-out worker rotation schedule and the social stressors that this can add to the family. The effect is expected to be primarily limited to the Kitikmeot communities because of the focus on hiring in the region and the current socio-economic conditions and challenges. A potential residual transboundary adverse effect of the Project (Madrid-Boston and the Hope Bay Project) on the Community Health and Well-being VSEC associated with changes to family stability is not predicted.

Changes to Family Spending

The residual Project effect of changes to family spending results in both positive and negative outcomes, and is highly dependent on the spending choices made by individuals and the success of mitigation. The effect is expected to be primarily limited to the Kitikmeot communities because of the focus on hiring in the region and the current socio-economic conditions and challenges. A potential residual transboundary adverse effect of the Project (Madrid-Boston and the Hope Bay Project) on the Community Health and Well-being VSEC associated with changes to family spending is not predicted.

In summary, no potential transboundary effects on socio-economics due to Madrid-Boston and the Hope Bay Project are predicted.

3.8 IMPACT STATEMENT

The Madrid-Boston Project has the potential to have both positive and adverse effects on socio-economic conditions in the Kitikmeot communities. The interactions with socio-economics are due to the employment of a labour force and the procurement of goods and services for the Project, which in turn may result in changes to households and communities.

VSECs have been selected to represent the interests of Kitikmeot residents in relation to the Project. Regional interests were identified in public and community meetings held in the Kitikmeot communities. The scoping analysis identified the following VSECs and potential effects for inclusion in the assessment:

- Economic Development
  - Changes to economic growth (Project contributions to territorial GDP and tax revenues, royalties and other payments to the federal and territorial governments, NTI and the KIA).
- Business Opportunities
  - Changes to local business growth (the opportunities for Inuit and northern businesses as a result of Project procurement and as enhanced by implementation of the IIBA).

- Employment
  - Changes to employment opportunities and income (the direct result of Project employment and procurement).
  - Changes to labour force capacity (the potential for changes to the skills and experience of the regional labour force as a result of the requirements of Project employment).
  - Competition for local labour (the potential for currently employed residents of the Kitikmeot region to leave their employment for mine-related employment).
- Education and Training
  - Changes to the demand for education and training programs (considering the capacity of the regional education system to accommodate the potential increased demand for local education and training programs).
  - Changes in perceptions of education and employment (considering the integration of traditional and western education values that has occurred to date and the motives of youth and their participation in education).
- Migration, Housing, and Infrastructure and Services
  - In-migration to the Kitikmeot region (the potential for the Project to result in spin-off employment wherein non-local individual may relocate to the region to obtain employment that has been created locally due to economic growth associated with the Project).
  - Changes to the demand for housing (the potential for Project-related in-migration or changes in employment and income status of individuals to result in effects on housing demand).
  - Changes to the demand for local services (the potential for Project-related in-migration to increase the demand for local services).
- Community Health and Well-being
  - Changes to family stability (the ability of local families and others to adapt to the lifestyle of fly-in/fly-out rotation work associated with Project employment).
  - Changes to family spending (implication for increased incomes on individual and family spending patterns as a result of mine-related employment).
  - Changes to food security and cost of living (the potential for changes to traditional harvesting activities and local food costs and the contribution of traditional livelihoods to community and individual well-being).

A key mitigation to be implemented for Madrid-Boston is the Hope bay Project IIBA, which sets out principles and methods to, among other purposes, maximize Inuit training, employment and business opportunities arising from the Operation of the Project, and provide a mechanism through which effective communication and cooperation can take place. Key features of the IIBA include provisions for, among others: 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, under certain conditions, of a Business Development Fund.

In addition, the Hope Bay Project has an existing Socio-economic Monitoring Program (SEMP) that will accommodate the activities that are the subject of this assessment. The SEMP allows for both early detection of adverse effects on VSECs and reporting of impact and benefit objectives for the Project.

As part of the SEMP, TMAC works in collaboration with other stakeholders including the GN, INAC, the KIA, and the communities of the Kitikmeot region through the Kitikmeot Socio-economic Monitoring Committee.

The effects assessment concluded that most potential effects would be positive and beneficial. However, four negative residual effects were identified for the VSEC Employment and the VSEC Community Health and Well-being.

Approaching the end of the Operation phase and throughout the Reclamation and Closure phase of the Madrid-Boston Project, there will be a decrease in employment opportunities, and the associated personal income, that could temporarily increase local and/or regional unemployment levels compared with the levels achieved during Operation. Mitigation will be in place to assist workers in the transition, including a Workforce Transition Strategy. The effect 'changes to employment opportunities and income' at Project Reclamation and Closure is determined to be **Not Significant.**

Throughout the Construction and Operation phases, the Madrid-Boston Project has the potential to increase competition for local labour with specific skills (e.g., truck drivers and heavy equipment operators currently residing in Kugluktuk and Cambridge Bay). Construction will overlap with the additional worker demand from production at the Doris Project. Competition for workers with higher, more specialized skill levels can also occur due to the lower availability of such workers. While Project employment may be perceived as presenting a viable opportunity for those presently employed, this effect is not expected to be widespread. Some competition for local employment may also be expected from the replacement of workers who leave current positions to work at the mine or from the demand for workers for indirect employment opportunities. The effect 'competition for local labour' is determined to be **Not Significant**.

Changes to family stability are anticipated during Madrid-Boston Project Construction and Operation, and during the operation of the Hope Bay Project, primarily due to the fly-in/fly-out worker rotation schedule and the social stressors that this can add to the family with the separation and periodic re-introduction of the family member upon return from a work rotation. Potential impacts are wide-ranging and include, but are not limited to, increased tension in marital and parental relationships, increased potential for negative behaviours (e.g., gambling, alcohol and drug use) as a coping mechanism, increased stressors on mental health, and increased potential for family violence and break-up. Positive effects of changes to family stability during Construction and Operation will also occur as a result of the Project, primarily due to increases in household income and the resulting increase in standard of living and ability to provide financially for the family. The negative effect 'changes to family stability' is determined to be **Not Significant**.

The effect 'changes to family spending' is both negative and positive. A number of positive impacts are associated with productive spending in the areas of education, housing, consumer goods, and investments in durable goods. However, there is also potential for an increase in unproductive spending among some Madrid-Boston and Hope Bay Project employees and their family members, including increases in gambling and alcohol and drug use. However, how income is spent is a personal choice made by individuals and will, to a large extent, determine whether there is a positive or negative residual effect. Issues associated with unproductive spending are typically isolated to a relatively small number of individuals, with increases in income from employment exacerbating existing challenges that those individuals and their families face. As a result, the effect 'changes to family spending' is determined to be **Not Significant**.

The potential cumulative effects of Madrid-Boston and the Hope Bay Project were reviewed and assessed as **Not Significant**. The CEA considered the effects of past, present, and future projects on

VSECs for which the primary assessment resulted in residual effects, specifically, on the VSEC Employment and the VSEC Health and Community Well-being. The CEA noted that should other projects be approved and developed, the adoption of similar mitigation and management measures to reduce or eliminate potential negative outcomes is expected. No potential transboundary effects of Madrid-Boston and the Hope Bay Project were identified.

In sum, the socio-economic effects of the Hope Bay Project will continue to provide significant benefits to the residents of the Kitikmeot region, as well as Nunavut and Canada as a whole, with the development of Madrid-Boston. Where negative residual effects are anticipated, mitigation and management measures have been established to reduce or eliminate these effects. The socio-economic benefits represent a unique opportunity for further development of the Kitikmeot region.

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