

## 22 Social

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This chapter assesses the potential effects of the KSM Project (the Project) on social conditions in the Project area. This includes consideration of predicted effects on community demographics, infrastructure, and services; education, skills, and training; and community well-being (CWB). Social effects are predicted at both a regional level and at the level of local Aboriginal and non-Aboriginal communities.

### 22.1 Social Setting

This section provides a summary of the methods and results of social baseline information collected for the proposed Project. The information complements, and is to be used in conjunction with, the economic setting described in Chapter 20, Economics. For instance, the social context, including the nature and level of services, CWB, and infrastructure quality, is often predicated by the current and historical economic context for local and regional communities. As such, a changing local or regional economy will influence a number of social indicators within a given area. Social and economic studies were carried out between 2008 and 2012, using the same local study area (LSA) communities and regional study area (RSA). Detailed information on the methods and results for social studies is provided in the *KSM Project: 2012 Social Baseline Report* (Rescan 2013b; [Appendix 22-A](#)).

#### 22.1.1 Baseline Methodology Overview

##### 22.1.1.1 Study Areas

Two study areas were defined for the social baseline studies, an RSA and an LSA.

The RSA incorporates two administrative regions: the Regional District of Kitimat-Stikine (RDKS) and Electoral Area A of the Regional District of Bulkley-Nechako (RDBN; see Figure 22.1-1). A regional analysis is included because of the RSA's dependency on natural resources for economic opportunities and employment. A reliance on mining and forestry activities, in particular, distinguishes the RSA from other areas of the province. The Project is anticipated to rely largely on the RSA for human resources, supplies, services, and other requirements.

The RDKS provides local government services to rural and unincorporated settlements within an area of 100,000 km<sup>2</sup> in northwestern British Columbia (BC). The RDKS administers over 40 functions or services ranging from rural land use planning, to a community water system, to fire protection, to library services, to a public marina (RDKS 2012b). Its member municipalities include Kitimat, Terrace, Stewart, Hazelton, and New Hazelton. The RDKS Board of Directors comprises six municipal councillors or mayors, appointed annually from their respective municipal councils, and six directors, elected from their respective rural Electoral Areas for three-year terms (including Electoral Area F Dease Lake; RDKS 2012a).

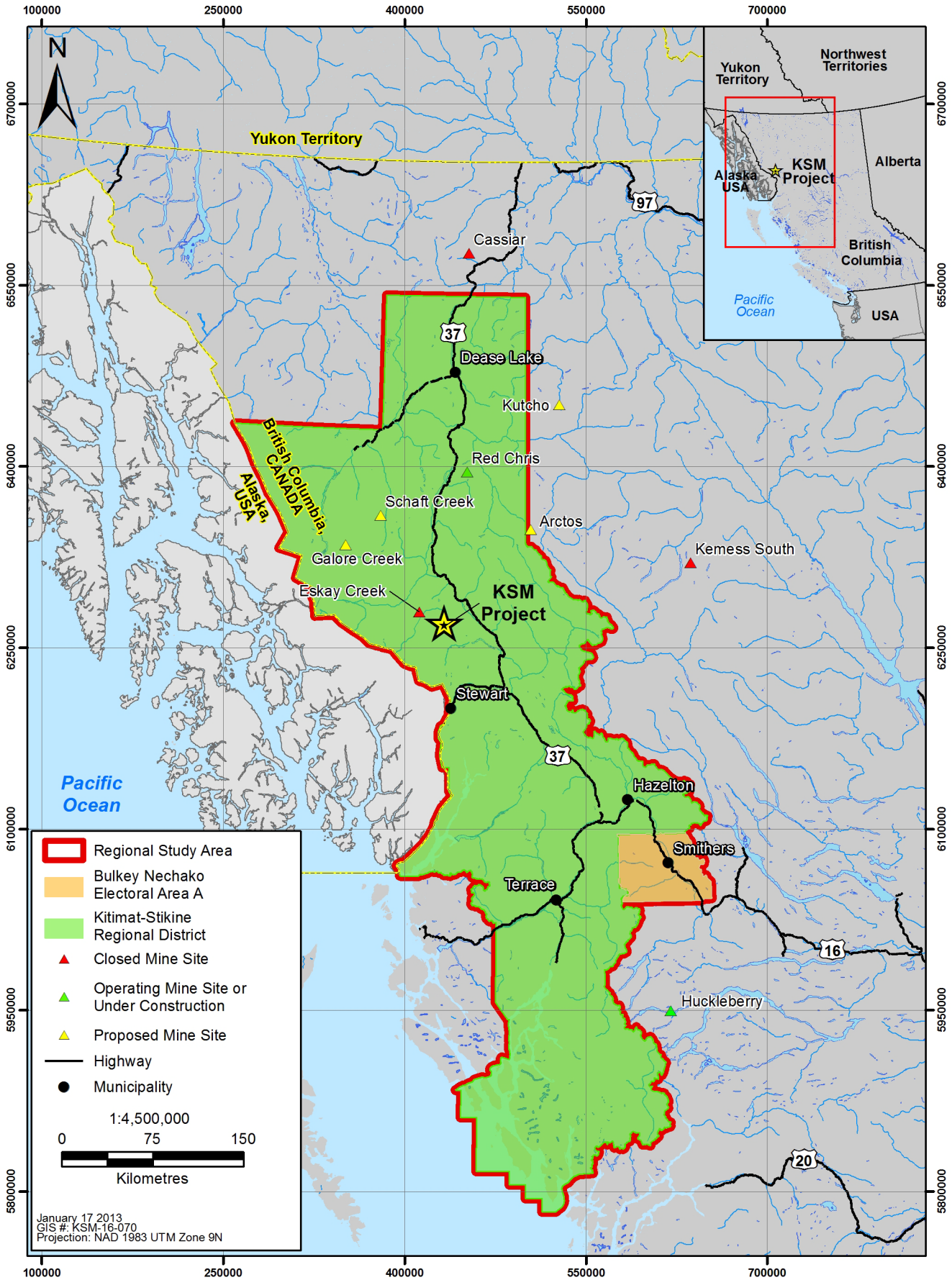


Figure 22.1-1

Electoral Area A of the RDBN comprises 3,688 km<sup>2</sup>, including the Town of Smithers and the rural areas surrounding the municipality (NDIT 2010). The RSA includes Nisga'a Lands as defined in the *Nisga'a Final Agreement* (NFA; NLG, Province of BC, and Government of Canada 1998), as well as Indian Reserves (IRs) for the Tahltan Nation, Gitksan Nation (including wilp Skii km Lax Ha), Gitanyow First Nation, Tsimshian First Nation, Haisla Nation, and Wet'suwet'en First Nation. The RSA and the proposed Project location, as well as the location of other industrial developments, are illustrated in Figure 22.1-1.

The LSA consists of select communities located within the RSA. It includes Aboriginal and non-Aboriginal communities that are expected to play a role in Project construction, operation, and closure (e.g., sources of labour, and businesses providing goods and services) due to their proximity to the Project and its transportation routes (Figure 22.1-2). Communities include municipalities (incorporated), unincorporated settlements, and IRs<sup>1</sup> (Table 22.1-1).

### **22.1.1.2 Methods**

Information and data for the *KSM Project: 2012 Social Baseline Study* (Rescan 2013b; [Appendix 22-A](#)) were derived from secondary sources (including publicly available reports, statistics, and published studies) and primary sources (including federal, provincial, and municipal government agencies; regional and community organizations; and individual community members).

Desk-based bibliographic research methods were used to collect and collate secondary data, including information from:

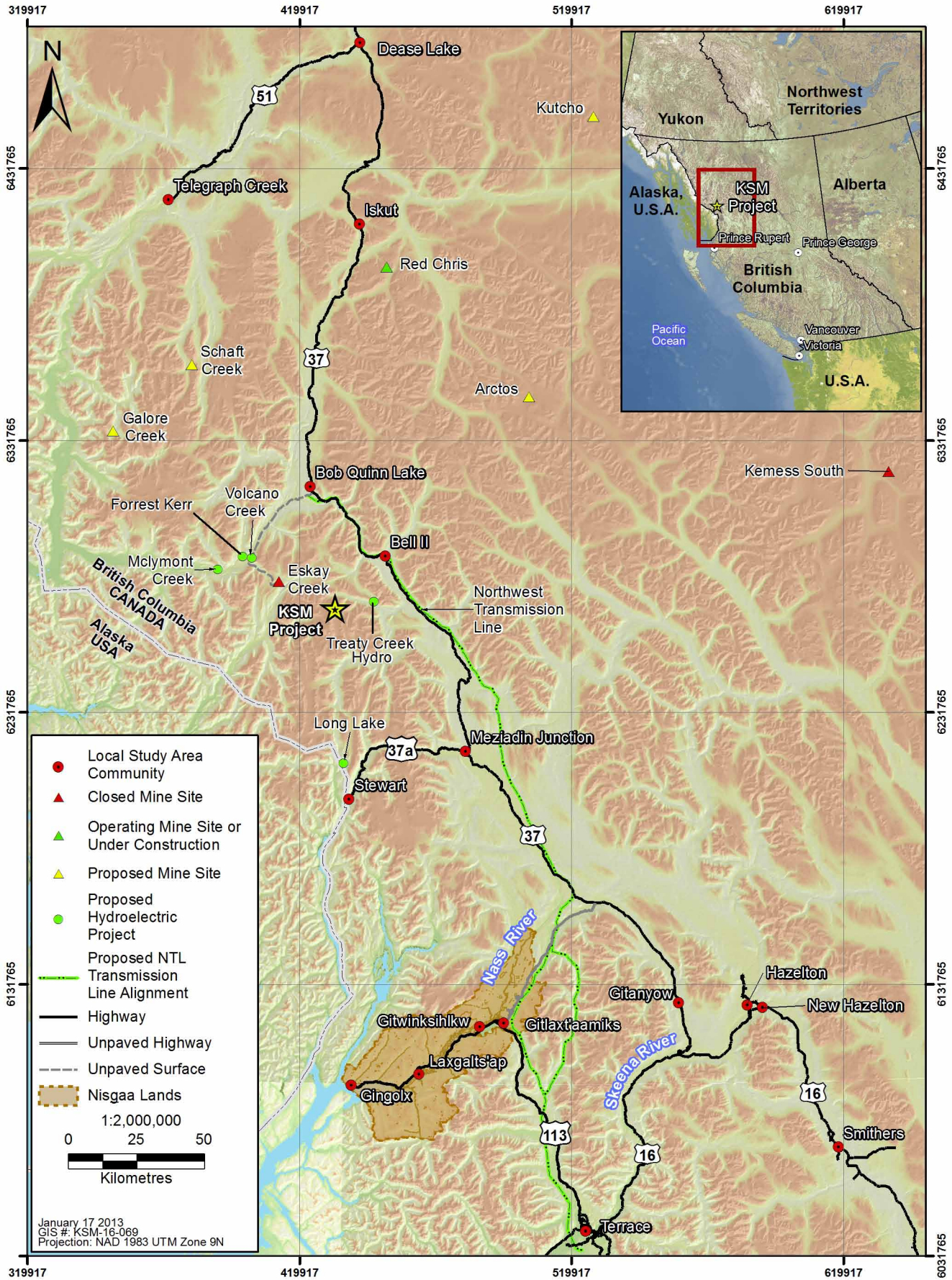
- Statistics Canada Census data;
- BC Stats;
- the Government of Canada, including Aboriginal Affairs and Northern Development Canada (AANDC); and
- the Province of British Columbia, including the ministries of Aboriginal Relations and Reconciliation; Health; Justice (Attorney General); Community, Sport, and Cultural Development (Local Government Department); Education; and Transportation and Infrastructure.

Qualitative methods, including interviews, were used to fill data gaps and collect primary data from sources including:

- local government-elected representatives and administrators (including representatives from Regional Districts, municipal districts, villages, towns, and cities potentially affected by the Project);

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<sup>1</sup> The selection of LSA communities was completed in conjunction with the *KSM Project: 2012 Economic Baseline Report* (Rescan 2013a) and relates to economic, social, and heritage considerations.



- Local Study Area Community
- ▲ Closed Mine Site
- ▲ Operating Mine Site or Under Construction
- ▲ Proposed Mine Site
- Proposed Hydroelectric Project
- Proposed NTL Transmission Line Alignment
- Highway
- Unpaved Highway
- - - Unpaved Surface
- Nisgaa Lands

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Kilometres

January 17 2013  
 GIS #: KSM-16-069  
 Projection: NAD 1983 UTM Zone 9N

### Social and Economic Local Study Area Communities

Figure 22.1-2

Table 22.1-1. Definition of Study Areas

Study Area	Rationale
<b>Regional Study Area</b>	
RDKS and Electoral Area A of the RDBN	The Project will rely on this area of northwestern BC for human resources, supplies, services, and other requirements. Employment, income, and GDP impacts from the Project are expected across this region.
<b>Local Study Area Communities</b>	
Nisga'a villages (Gitlaxt'aamiks, Gitwinksihlkw, Laxgalts'ap, and Gingolx)	Nisga'a Nation may provide labour, goods, and services to the Project. Certain Project components fall within the Nass Area as defined by the <i>Nisga'a Final Agreement</i> (NLG, Province of BC, and Government of Canada 1998).
Tahltan communities (Telegraph Creek 6 and Telegraph Creek 6A, Dease Lake 9 <sup>1</sup> , and Iskut 6)	The communities of Iskut 6, Dease Lake 9, and Telegraph Creek 6 and 6A (including Guhthe Tah 12) are where the majority of Tahltan Nation members reside, and are among the closest settlements to the Project. They are expected to be sources of labour, goods, and services for the Project (as they were for the recently closed Eskay Creek Mine). Certain Project components fall within the traditional territory of the Tahltan Nation.
District of Stewart	Concentrate from the KSM Project will be transported to the Port of Stewart by highways 37 and 37A, and then shipped overseas. Stewart may provide labour and services for the Project.
Gitanyow First Nation (Gitanyow 1)	The Gitanyow First Nation may provide labour and services for the Project. The proposed concentrate haul route along Highway 37A, as well as the transportation of construction and operation materials along Highway 37 from Gitwangak (Kitwanga), traverses Gitanyow territory.
Village of Hazelton and District of New Hazelton	These communities may provide labour, supplies, and services contracts for the Project. Most Skii km Lax Ha and Gitxsan Nation members reside in communities in the Hazelton area. Certain Project components fall within or adjacent to an area claimed by the Skii km Lax Ha. The Highway 37 haul route traverses Skii km Lax Ha traditional territory.
Town of Smithers and City of Terrace	Smithers and Terrace are the primary service centres for the region. As two of the largest communities in northwestern BC, these communities will likely provide some of the Project's labour, supplies, and service contracts. Smithers and Terrace will also serve as a transportation hub for the Project.
Unincorporated communities Dease Lake, Bell II, Meziadin Junction, and Bob Quinn Lake	These communities are expected to be a source of labour, goods, and services for the Project. Project traffic will pass by Meziadin Junction and Bell II. The Bob Quinn Lake airport may be used to transport materials and people during Project construction and operation.

<sup>1</sup> Dease Lake 9 and the unincorporated community of Dease Lake are both included in the LSA, and are discussed separately in this report.

- First Nations and Nisga'a Nations Chiefs and Councils, and employees;
- regional and local health authorities and administrators;
- school districts and colleges;
- economic development authorities; and
- transportation and other private industry organizations.

The first phase of the social baseline study was conducted in 2008 and was primarily desk-based. Field visits and interviews were initiated in 2009 and continued through to 2012, with desk-based research continuing throughout.

The approach to data collection followed Health Canada's guide to health impact assessments, which promotes a holistic approach to health and well-being. It recognises the interconnected relationships between communities and the physical environment (Health Canada 2004). The guide's determinants of health include employment and working conditions, income and social status, education, physical environment, healthy child development, biology and genetic endowment, health services, personal health practices and coping skills, and social support networks.

The social and economic aspects of this research have been separated to ensure consistency with the Application Information Requirements (AIR) for the proposed Project. However, this assessment adopts a holistic approach wherever possible due to the interconnectedness of human and CWB.

### **22.1.2 Results Overview**

The following sections include baseline study results for the RSA and LSA. Comprehensive data related to the RSA and LSA are provided in the *KSM Project: 2012 Social Baseline Study* (Rescan 2013b; [Appendix 22-A](#)). For clarity, LSA Aboriginal and non-Aboriginal communities are respectively grouped together.

#### **22.1.2.1 Regional Study Area**

The RSA, including the RDKS and Electoral Area A of the RDBN, is a remote area relative to most other regions within the province. Communities are typically dispersed, and are isolated from one another and from major populations and government centres. Distances between communities are long and it is common to travel two or more hours between communities. Isolation can also occur due to weather, as road closures can restrict access to and from communities. Smithers and Terrace provide services and supplies to much of the region.

##### **22.1.2.1.1 Population and Demographics**

The RSA's population in 2011 was approximately 42,752 (Statistics Canada 2012). The RSA's population has generally declined over the past decade or more, largely due to the loss of jobs (e.g., mine closures), particularly among non-Aboriginal communities ([Appendix 20-A](#)). This

decline is most evident in Stewart, which saw its population drop over 42% between 1996 and 2011 (see Section 22.1.2.3). The populations of Smithers and Terrace, the RSA's largest centres, have also been declining, albeit at lower rates of 3.9% and 10.1%, respectively.<sup>2</sup> Overall, the RSA experienced an average drop in population of approximately 13.1% between 1996 and 2011 (Statistics Canada 2002; 2012; [Appendix 22-A](#), Table 4.2-1). The number of males and females remains relatively balanced, and the median age ranges from 40.3 years to 42.3 years, which is on par with the provincial median of 41.9 years (Statistics Canada 2012).

### 22.1.2.1.2 *Aboriginal Population*

Nisga'a Nation and First Nations have a physical, cultural, and historical presence within the RSA. In 2006, approximately 29% of the RSA identified as Aboriginal, including 32% of the RDKS's population and 9% of RDBN's Electoral Area A (Table 22.1-2). Most of the smaller communities located along Highway 37 and near Highway 16 are predominantly Aboriginal ([Appendix 22-A](#)). Notably, a large proportion of the registered population from these Aboriginal peoples live off reserve (AANDC 2012).

**Table 22.1-2. Regional Study Area Population and Demographics**

	1996	2001 (% change from previous census)	2006 (% change from previous census)	2011 (% change from previous census)	Aboriginal Identity, 2006 (% of population)
RDKS	43,618	40,876 (-6.3%)	38,476 (-7.0%)	37,361 (-2.9%)	12,275 (32%)
Electoral Area A (RDBN)	5,573	5,696 (+2.2%)	5,290 (-7.1%)	5,391 (+1.9%)	470 (9%)
Total Regional	49,191	46,572 (-5.4%)	43,766 (-6.1%)	42,752 (-2.4%)	12,745 (29.1%)
British Columbia	3,724,500	3,907,738 (+4.9%)	4,113,487 (+5.3%)	4,400,055 (+7.0%)	196,070 (4.8%)

Source: Statistics Canada (2002, 2007, 2012).

<sup>1</sup> Aboriginal identity in the 2006 census was determined through self-identification.

In contrast to the overall population decline within the RSA, populations in Aboriginal communities grew at a rate of 1.5% annually between 1994 and 2006 (Skeena Native Development Society 2007). Since 2006, however, Nisga'a Nation and Gitanyow First Nation populations have remained relatively stable, whereas Tahltan Nation and Gitksan Nation populations have experienced a decline (Statistics Canada 2012).

### 22.1.2.1.3 *Economy*

The RSA has been economically dependent upon timber and minerals for well over 100 years (Province of British Columbia 2011). A number of non-Aboriginal communities throughout the RSA were established due to natural resource activity, including mining activities near Cassiar, Stewart, and Smithers. Forestry has also played an important role for communities such as Hazelton, Terrace, and, to a lesser degree, Stewart. The economy today remains driven by the

<sup>2</sup> Both communities, however, saw slight increases in their population between 2006 and 2011, which could indicate a change in the trend. See Section 22.1.2.3 for more details.

natural resources found in the area. To date, the RSA’s economic and social diversity has been constrained by limited access, services, and infrastructure; lengthy distances between communities; remote and small communities providing some degree of labour or services; and long winters. Investment within the region has fluctuated based on the strength of forestry and mining industries, global commodity prices, and the value of the Canadian dollar. Chapter 20, Economics, discusses the regional economy in more detail.

**22.1.2.1.4 Available Services and Infrastructure**

Services vary considerably based on the size of the community, with smaller communities providing a more limited range. Smithers, Terrace, and, to a lesser extent, Stewart, provide a broad range of services and supplies, including accommodation and support services for mining and forestry activities. The number of recreation, health, social, and educational services within the communities has dropped in parallel with the population. Regional hospitals are located in Terrace, the Village of Hazelton, and Smithers, and there are well equipped health clinics in both Dease Lake and Stewart, although existing services are contingent upon stable populations. Primary and secondary education facilities exist in many communities, while educational facilities within certain Aboriginal communities do not extend beyond elementary school. Northwest Community College (NWCC) and Northern Lights College also offer facilities and programs for RSA residents. Table 22.1-3 highlights the existing post-secondary facilities within the RSA. Additional information relating to community services and infrastructure is provided within the LSA community profiles (see Sections 22.1.2.2 and 22.1.2.3).

**Table 22.1-3. Post-secondary Facilities in the Regional Study Area**

<b>Community</b>	<b>Post-secondary Schools</b>
Dease Lake	Northern Lights College, also offers some targeted NWCC trades courses on demand
Terrace	NWCC University of Northern British Columbia (UNBC; satellite campus)
Smithers	NWCC
Hazelton	NWCC
Stewart	None (NWCC campus closed in 2008)
Gitwinksihlkw	Wilp Wixo'xskwhl Nisga'a Institute (in partnership with UNBC)

Source: NLC (2008); Northwest Community College (2012).

Road infrastructure within the RSA consists of Highway 16, Highway 37, and Highway 37A as primary corridors. Highway 37 is the only road between Gitwanga (also known as Kitwanga, at the junction with Highway 16) and the Yukon Territory. Highways in the RSA are all paved, with the exception of small sections of Highway 37 north of Iskut and Highway 51 from Dease Lake to Telegraph Creek, and are in good condition. Terrace and Smithers have major airports capable of handling jets, while Stewart, Bob Quinn, Dease Lake, Iskut, and Telegraph Creek have smaller airstrips. The Canadian National Railway line connects the Port of Prince Rupert to the rest of North America at Prince George, running through the communities of Terrace, Hazelton, New Hazelton, and Smithers, adjacent to Highway 16.



### 22.1.2.1.5 Governance

There are five levels of governance in northwestern BC. The communities in the RSA include municipalities governed under the BC *Local Government Act* (1996a) as well as IRs governed under the federal *Indian Act* (1985). The Nisga'a Lands Regulatory jurisdiction and administration of Nisga'a Lisims Government (NLG), as defined in the *Nisga'a Final Agreement* (NLG, Province of BC, and Government of Canada 1998), and each of the four Nisga'a villages (Gitlaxt'aamiks, Gitwinksihlkw, Laxgalts'ap, and Gingolx) are also governed locally by their respective village government. Unincorporated communities, such as South Hazelton, are governed under regional authorities (e.g., RDKS).

### 22.1.2.2 Local Study Area – Aboriginal Communities

The LSA's Aboriginal communities include Nisga'a Nation, Tahltan Nation, and Gitanyow First Nation communities. The Skii km Lax Ha are included as part of the broader community profile for the Village of Hazelton and the District of New Hazelton, due to their distance from the Project and proximity to the Hazelton area for economic livelihoods and services. The following sections provide a summary of each LSA community. Tables 22.1-4 and 22.1-5 further summarize these results.

**Table 22.1-4. Nisga'a Governance and Responsibilities**

Jurisdiction	Parties	Responsibilities
Nisga'a Lands	NLG*	Administration of government operations. Regulatory jurisdiction and administration of government programs and services; financial, land and resource, and fisheries management.
	Gitlaxt'aamiks Village Government	Local governance, programs, and services.
	Gitwinksihlkw Village Government	Local governance, programs, and services.
	Laxgalts'ap Village Government	Local governance, programs, and services.
	Gingolx Village Government	Local governance, programs, and services.

\* As defined by the *Nisga'a Final Agreement* (NLG, Province of BC, and Government of Canada 1998)

#### 22.1.2.2.1 Nisga'a Nation

Nisga'a Nation communities include four villages located in the Nass Valley: Gitlaxt'aamiks (New Aiyansh), Gitwinksihlkw (Canyon City), Laxgalts'ap (Greenville), and Gingolx (Kincolith). Nisga'a members also live elsewhere in BC, such as in Vancouver, Terrace, and Prince Rupert (NLG 2012). NLG represents Nisga'a Nation, with community representation by Nisga'a village governments (Table 22.1-4).

According to AANDC (2012), there are approximately 5,900 Nisga'a citizens, of which over 2,000 currently live in one of the four Nisga'a villages. Gitlaxt'aamiks, which is the most populated community and the seat of NLG, has a population of 858 with 269 private household dwellings (Table 22.1-5). In decreasing order of total population, there are 566 people in Laxgalts'ap, 408 people in Gingolx, and 182 residents in Gitwinksihlkw. All communities reported a population decrease between 2006 and 2011, except Gingolx, where the population increased by almost 20% from 2006. The average median age across all communities was 35.6 years (Table 22.1-6).

**Table 22.1-5. Socio-economic Overview of Local Study Area Aboriginal Communities**

Community	Population (2012) <sup>1</sup>	Annual Median Earnings (2005)	Annual Full-time Median Earnings (2005)	Unemployment	Education Rate	Education Services	Health Services	Emergency Services	Housing Units	CWB Index (2006) <sup>2</sup>
<b><i>Nisga'a Nation</i></b>										
Gitlaxt'aamiks	858 within the village, 1,815 total registered membership	\$14,989	\$38,528	26%	35% no high school diploma	K-7 7-12	Clinic offers primary health care services	Fire services; RCMP; BC Ambulance Service	269 households	67
Gitwinksihlkw	182 within the village, 392 total registered membership	n/a	n/a	26%	31% no high school diploma	K-7	Clinic offers primary health care services	Limited; serviced by other communities; BC Ambulance Service	59 households	70
Laxgalts'ap	566 within the village, 1,731 total registered membership	n/a	n/a	n/a	n/a	K-7	Clinic offers primary health care services	Fire and Rescue; policing serviced by other communities; BC Ambulance Service	134 households	n/a
Gingolx	408 within the village, 1,966 total registered membership	\$8,721	\$39,040	47%	41% no high school diploma	K-7 Adult Learning Centre	Clinic offers primary health care services	Limited; serviced by other communities; BC Ambulance Service	143 households	58
<b><i>Tahltan Nation</i></b>										
Telegraph Creek (Guhthe Tah 12, Telegraph Creek 6 and 6A) <sup>†</sup>	162 on reserve, 2,487 total registered membership <sup>3</sup>	n/a	n/a	20%	61% no degree	K-12	Reliant on neighbouring communities for major services	Local RCMP and fire; ambulance serviced by Dease Lake (unincorporated)	70 households	67

(continued)

**Table 22.1-5. Socio-economic Overview of Local Study Area Aboriginal Communities  
(completed)**

Community	Population (2012) <sup>1</sup>	Annual Median Earnings (2005)	Annual Full-time Median Earnings (2005)	Unemployment	Education Rate	Education Services	Health Services	Emergency Services	Housing Units	CWB Index (2006) <sup>2</sup>
<b><i>Tahltan Nation (continued)</i></b>										
Dease Lake 9	58 on reserve	n/a	n/a	33%	67% no high school diploma	K-12	Reliant on neighbouring communities for major services	RCMP detachment; fire and ambulance serviced by Dease Lake (unincorporated)	17 households	61
Iskut 6	207 on reserve, 705 total registered membership <sup>4</sup> ‡	\$21,952	\$35,968	24%	53% no high school diploma	K-9	Clinic offers primary health care services	Limited to fire; ambulance serviced by Dease Lake (unincorporated)	82 households	63
<b><i>Gitanyow First Nation</i></b>										
Gitanyow 1	382 on reserve, 802 total registered membership	\$10,208	\$27,200	52%	55% no high school diploma	K-7	Limited; reliant on neighbouring communities for most services	Limited to fire; serviced by New Hazelton and the Village of Hazelton; BC Ambulance Service out of Kitwanga	112 households	54

Source: Statistics Canada (2007, 2012), AANDC (2011, 2012), BC MARR (2011).

<sup>1</sup> Total registered membership includes both on- and off-reserve community members.

<sup>2</sup> The Community Well-being Index, developed by Statistics Canada based on 2006 Census data, is used to produce scores for individual Canadian communities with populations of at least 65 people. Scores are based on four indicators: education, income, labour force activity, and housing, which are meant to measure the well-being of Aboriginal and non-Aboriginal communities. Scores are used to compare well-being across Canadian communities, with zero the lowest and 100 the highest.

<sup>3</sup> This total is representative of the Tahltan Indian Band as a whole and includes Dease Lake 9.

<sup>4</sup> As of December 2010.

‡The community of Telegraph Creek includes three populated reserves. As such, the population of Telegraph Creek includes Guhthe Tah 12, Telegraph Creek 6 and Telegraph Creek 6A. All other columns apply to Guhthe Tah 12 only, due to limited information.

‡ BC MARR (2010)

**Table 22.1-6. Local Study Area Aboriginal Community Population and Demographics**

Community	2011 Census Population (AANDC 2012 pop.)	% Change from 2006 to 2011	Median Age, years, 2011 (2006)	Population over 15 Years, 2011 (2006)	Gender Composition, 2011 (2006)	Aboriginal Identity, 2006
<b>Nisga'a Nation</b>						
Gitlaxt'aamiks	758 (858)	-5.9%	(32.3)	(75.2%)	(Male 53%) (Female 47%)	95.0%
Gitwinksihlkw	184 (182)	-8.4%	(34.5)	(77.5%)	(Male 47%) (Female 53%)	n/a
Laxgalts'ap	378 (566)	-20.2%	n/a	n/a	n/a	n/a
Gingolx	408 (408)	+19.6%	33.0	75.0%	Male 57% Female 43%	97.0%
<b>Tahltan Nation</b>						
Telegraph Creek (Guhthe Tah 12, Telegraph Creek 6 and 6A)	162	-35.4%	33.5*	73.9%*	Male 53%* Female 47%*	95.0%
Dease Lake 9	58	-14.7%	27.5	64.8%	Male 55% Female 45%	86.0%
Iskut 6	207	-38.2%	35.8	76.9%	Male 51% Female 49%	96.0%
<b>Gitanyow First Nation</b>						
Gitanyow 1	382 (383)	-1.0%	28.1	71.3%	Male 53% Female 47%	97.5%
British Columbia	4,400,057	+7.0%	41.9	84.6%	Male 49% Female 51%	4.8%

Source: Statistics Canada (2007), AANDC (2012).

Note: Data in parentheses are for alternate years, as indicated in column headings.

\*For these figures, only Guhthe Tah 12 had data available for 2011.

Education levels within the communities are generally low. High school incompleteness rates were estimated at 35% in Gitlaxt'aamiks, 31% in Gitwinksihlkw, and nearly 41% in Gingolx<sup>3</sup>, compared to almost 20% for the province (Statistics Canada 2007). However, the proportion of persons with trades accreditation in Gitlaxt'aamiks (12%), Gitwinksihlkw (16%), and Gingolx (14%) was higher compared to the provincial figure of 11%. College certificate or university degree holders were relatively few in most communities.

The Social, Economic, Resource Use, and Cultural (SERC) survey ([Appendix 29-A](#)) asked some general questions about educational attainment, which suggest things may have improved since the 2006 census, as only 22% of respondents reported less than a high school diploma—better than the

<sup>3</sup> Data were suppressed by Statistics Canada in 2006 for the village of Laxgalts'ap.

census data even with the plus or minus 5% margin of error taken into account. Rates of attainment of different forms of post-secondary training and/or education reported in the SERC survey vary from the census data. For example, apprenticeships were reported at a rate of 9.3% (somewhat below the rate reported in the 2006 census), versus college or university certificates or diplomas reported by 25.6% of respondents, and 15.2% for bachelor degrees or higher.

According to 2006 Statistics Canada census data, the unemployment rate ranged from 26.1% in Gitwinksihlkw to 46.7% in Gingolx<sup>4</sup>; all communities had substantially higher unemployment rates than the provincial unemployment rate at the time (6%; Statistics Canada 2007). For Gitlaxt'aamiks and Gingolx<sup>5</sup>, median earnings in 2005 were respectively reported at \$14,989 and \$8,721, which were significantly less than the provincial average of \$25,722. However, the full-time earnings in Nisga'a villages of Gitlaxt'aamiks and Gingolx were only slightly lower than for the province (\$42,230), having been estimated at \$38,528 and \$39,040 in 2005 (Statistics Canada 2007).

Nisga'a Valley Health Authority (NVHA) oversees health services within Nisga'a community. The NVHA operates a health centre in each Nisga'a village, which provides basic clinic health services. BC's Local Health Area (LHA) 92 includes Nisga'a Nation villages. Data for LHA 92 in 2011 indicate an Index of Health Problems<sup>6</sup> rating of 0.91, the fifth lowest in the province<sup>7</sup>. The Nass Valley Royal Canadian Mounted Police (RCMP), based out of Gitlaxt'aamiks, provides services to Nisga'a villages. Fire services are provided by the Gitlaxt'aamiks and Laxgalts'ap volunteer fire departments. Ambulance services are provided by BC Ambulance Service for the northern region, and the NVHA operates an emergency phone service (Rescan 2012).

The combined communities in 2006, excluding Laxgalts'ap, had an average CWB Index rating of 65<sup>8</sup> (Table 22.1-4; AANDC 2011). This was slightly above the average First Nations score of 62 for the province, though lower than the non-First Nations CWB average of 82<sup>9</sup>. This implies a lower than average level of well-being based on an aggregate of income, education, employment, and housing indicators in comparison to non-Aboriginal populations within the province.

#### **22.1.2.2 Tahltan Nation**

Members of the Tahltan Nation number about 5,000 individuals living in various places throughout BC and in the Yukon Territory. About one quarter of the Tahltan Nation live within the Project's socio-economic RSA. There are two bands that represent members of the Tahltan Nation. Members of the Iskut First Nation Band reside in the reserve community of Iskut 6.

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<sup>4</sup> Data were suppressed by Statistics Canada in 2006 for the village of Laxgalts'ap.

<sup>5</sup> Data on income were suppressed by Statistics Canada in 2006 for the villages of Gitwinksihlkw and Laxgalts'ap.

<sup>6</sup> The Index of Health Problems takes into account the following indicators: Life expectancy at birth; potential years of life lost (PYLL) due to natural causes, per thousand population (PTP); PYLL due to accidental causes, PTP; PYLL due to suicide/homicide, PTP; teen pregnancy rate, per 1,000 women age 15 to 19; and infant mortality rate, per 1,000 live births.

<sup>7</sup> -1.5 being the best and 1.5 being the worst.

<sup>8</sup> The 2001 CWB figure for Laxgalts'ap was 72. Data for 2006 were unavailable.

<sup>9</sup> The Community Well-being Index, developed by Statistics Canada based on 2006 Census data, is used to produce scores for individual Canadian communities with populations of at least 65 people. Scores are based on four indicators: education, income, labour force activity, and housing, which are meant to measure the well-being of Aboriginal and non-Aboriginal communities. Scores are used to compare well-being across Canadian communities, with zero the lowest and 100 the highest.

Members of the Tahltan Indian Band reside in the reserve communities of Dease Lake 9 and Telegraph Creek (comprised of three populated reserves: Guhthe Tah 12, Telegraph Creek 6, and Telegraph Creek 6A). Almost half of the residents of the unincorporated municipality of Dease Lake are also Tahltan Nation members living off reserve, mostly, but not exclusively, from the Tahltan Indian Band. Some band members may also live in other parts of the province. Data specific to Dease Lake in this section refer exclusively to the on-reserve population of Dease Lake 9. The non-reserve and unincorporated community of Dease Lake is a mix of mainly Tahltan Nation and non-Aboriginal residents and is discussed in Section 22.1.2.3.

The Tahltan Central Council unites the two bands through a centralized governance system (Table 22.1-7) with a combined on- and off-reserve membership of approximately 2,487<sup>10</sup> (Table 22.1-5). Statistic Canada (2012) reports on-reserve populations of 162 for Telegraph Creek<sup>11</sup>, 58 at Dease Lake, and 207 in Iskut.

**Table 22.1-7. Tahltan Nation Governance and Responsibilities**

Jurisdiction	Bands	Responsibilities
Indian Reserves	Tahltan Indian Band	Local governance (Telegraph Creek 6 and 6A, Guhthe Tah 12, and Dease Lake 9). Band governance and services.
	Iskut First Nation	Local governance (Iskut 6). Band governance and services.
Tahltan Central Council		Registered under the <i>Society Act</i> (1996b), the Central Council represents the Tahltan Indian Band and Iskut First Nation on issues of joint concern (e.g., Aboriginal rights and title, land use planning).

According to Statistics Canada, the population in each Tahltan Nation community has decreased since 1996, with the most significant decrease occurring between 2006 and 2011 in all communities ([Appendix 22-A](#), Table 4.3-7). Notably, the 2011 Census reports a total population of 427 persons residing on reserve compared to 654 residents in 2006, a decline of almost 30%. This result is difficult to explain given the level of economic activity and mineral exploration in the Tahltan Nation traditional territory over the last few years (Rescan 2013a; [Appendix 20-A](#))

On-reserve levels of education are lower than the province for all Tahltan Nation communities. Education levels in Telegraph Creek, for instance, are significantly below the provincial average, with 61% of adults not having earned a high school diploma. Similarly, 53% of Iskut residents over 15 years of age had not completed high school as of 2006, more than double the provincial average of 20%. In Dease Lake 9, most residents (67%) had achieved less than a high school diploma (Statistics Canada 2007). The Tahltan Census indicates that approximately 5% of members have trades training, and around 10% have some level of college or university education (GMG Consulting 2009).

<sup>10</sup> Membership of Iskut First Nation (705 registered members) is as of December 2010, at which point they discontinued the provision of information to AANDC.

<sup>11</sup> Population of Telegraph Creek includes Telegraph Creek 6 and Telegraph Creek 6A, and Guhthe Tah 12.

The unemployment rate in Tahltan Nation communities is difficult to define because 2011 census data did not examine labour force characteristics, and 2006 data were reported from several sources with varying conclusions. For instance, Telegraph Creek reported a 2006 unemployment rate of 28% (Skeena Native Development Society 2007). Comparatively, Statistics Canada reported a 2006 unemployment rate of 20% for the community, down from 33% in 2001 (Statistics Canada 2002, 2007). An estimated 10 residents of Dease Lake 9 were unemployed in 2006, indicating an unemployment rate of 33%. For Iskut, the Skeena Native Development Society reported a 2006 unemployment rate<sup>12</sup> of 13%, whereas Statistics Canada's estimate is nearly double this, at 24%. In contrast, the 2007 Tahltan Census reported an unemployment rate of 12% (GMG Consulting 2009). Finally, the local economy has likely changed since the collection of these data, due to the closure of the Eskay Creek Mine and ongoing construction of the Red Chris Mine. As such, there is some uncertainty regarding the current level of unemployment within the labour force.

Iskut residents 15 years of age and over were reported to have a median annual income level of approximately \$21,952 in 2005 (Table 22.1-5). This is lower than the provincial median of \$24,867. Full-time median earnings were \$35,968. No information is available regarding incomes and earnings in Dease Lake 9 or Telegraph Creek 6 and 6A.

Telegraph Creek has a nursing station. Nurses at the Telegraph Creek station are also responsible for providing health services to First Nations living in Dease Lake 9, though these residents usually use the Stikine Health Centre in Dease Lake. The nearest full-service hospital is approximately 700 km away in Terrace. A new health centre was opened in Iskut in March 2006, replacing the previous clinic. The facility includes an emergency holding room, a treatment room, and examination rooms. Publicly available information relating to health issues and trends in the communities was limited.

Local fire departments provide emergency fire protection in Telegraph Creek 6 and 6A, while Dease Lake 9 and Iskut 6 are supported by the Dease Lake Fire Department. The Dease Lake RCMP detachment also services Dease Lake 9 and Iskut 6 (83 km to the south), and has two constables stationed at Telegraph Creek. Ambulance service is provided from the Stikine Health Centre in Dease Lake.

Utilities are well established in each community. The 2006 CWB Index for the Tahltan Nation communities was 67 for Telegraph Creek 6 and 6A, 61 for Dease Lake 9, and 63 for Iskut 6 (AANDC 2011). This was slightly above the provincial average First Nations score of 62, though lower than the non-First Nations CWB average of 82. This implies a lower than average level of well-being based on an aggregate of income, education, employment, and housing indicators in comparison to non-Aboriginal populations within the province.

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<sup>12</sup> The Skeena Native Development Society defines unemployment as "not having gainful employment" (SNDS 2007), including both those who are seeking work, and those who are not. This definition differs from that of Statistics Canada and the majority of statistical institutions, which define unemployment as limited to those individuals who are jobless and seeking employment. For the purposes of this report, unemployment will follow the Statistics Canada definitions.

### 22.1.2.2.3 Gitanyow First Nation

The community of Gitanyow is based on Gitanyow 1, located along Highway 37 approximately 140 km northeast of Terrace. The Gitanyow First Nation are politically independent, although culturally affiliated with the Gitksan Nation. Similar to the Gitksan Nation, the wilp (hereditary house) is the primary unit of governance, land title, and decision-making (Table 22.1-8). The Gitanyow Hereditary Chiefs' Office (GHCO) act as the Gitanyow First Nation's governing body. The GHCO are composed of eight house leaders representing each of the Gitanyow huwilp. Wilp members have use of and responsibility for the land and resources in their particular house territory. The GHCO uphold Gitanyow law (*ayookxw*) and regulate access to the resources within each wilp's respective territory.

**Table 22.1-8. Gitanyow Governance and Responsibilities**

Jurisdiction	Parties	Responsibilities
Nation	GHCO	Gitanyow law ( <i>ayookxw</i> )
Land and resources	Gitanyow huwilp	Land title, resource management
Indian Reserve	Gitanyow Band Office	Band services, facilities, and infrastructure

The Gitanyow Band Office is responsible for providing services, facilities, and infrastructure for local residents, including housing, education, and health. The registered population of the Gitanyow First Nation is approximately 802 (AANDC 2012). Just under half of the population (48% or 382 people) live on Gitanyow reserves (Table 22.1-5).

In 2006, approximately 20% of the Gitanyow population aged 15 years and over had completed a high school certificate. High school completion rates were similar for males and females. The Gitanyow high school incompleteness rate (54%) was more than twice the provincial rate (20%). A higher proportion of the Gitanyow population obtained trades certificates (14%) than in the province overall (11%).

The unemployment rate for the community of Gitanyow was approximately 51.7% in 2006, up substantially from 34.8% in 2001 ([Appendix 20-A](#), Table 4.3-24). Annual full-time median earnings, representing income received as wage or salary, for Gitanyow were \$27,200 in 2005, much lower than the full-time median earnings for BC as a whole (\$42,230; Statistics Canada 2007).

The community currently comprises approximately 125 buildings, including 5 businesses, fully serviced with untreated water from a local reservoir, and sewer facilities (L. Martin, pers. comm.). Most buildings on the reserve are detached three-bedroom homes, half of which are owned and maintained by the Band Office. Some 98 families, both on and off reserve, are currently on the waiting list for new homes.

Available health services, managed through Gitanyow Human Services, include a visiting doctor once a week, a dentist one morning per week, and a registered nurse at the health clinic four days per week (L. Martin, pers. comm.). Health services are primarily procured in Terrace or Hazelton. Policing services are provided through the Hazeltons, and ambulance service is provided from the BC Ambulance station in Kitwanga. A local fire department provides



emergency fire protection. The 2006 CWB Index for Gitanyow was 54, significantly lower than the provincial average First Nations score of 62 (AANDC 2011).

### **22.1.2.3 Local Study Area – Municipalities**

The LSA municipal study communities include Dease Lake (non-reserve population), Stewart, Terrace, the Hazeltons, Smithers, and small settlements along Highway 37. The following sections provide a summary of each of the municipal study communities. Results are further summarized in Table 22.1-9.

#### **22.1.2.3.1 Dease Lake (Unincorporated)**

Dease Lake is located on Highway 37, approximately 488 km north of Highway 16. It is the largest settlement along the Highway 37 corridor, and acts as the primary service centre for the RDKS (of which it forms a part) and the Stikine Region<sup>13</sup>. It is also considered a staging area for wilderness-based recreation and tourism activities in the area. Highway maintenance crews and non-Aboriginal businesses were the driving force for development when the community was first settled. Dease Lake 9, part of the Tahltan Band of Telegraph Creek, is located north of the community on Highway 37.

In 2011, the community reported 303 residents, a 21% decrease since 2006 (Statistics Canada 2012). Education levels in the off-reserve Dease Lake community indicate that a relatively high proportion of the population has pursued some form of post-secondary education. Of the population above 15 years of age, only 17% have *not* achieved a high-school graduation certificate; 20% possess a trades certificate or diploma, and 24% have a college certificate or diploma (Statistics Canada 2012).

With an unemployment rate of approximately 5.5% in 2006, unemployment in Dease Lake was slightly lower than the provincial average of 6% (Statistics Canada 2007). The annual median income among full-time workers in the off-reserve Dease Lake community was \$46,798 in 2005 (BC Stats 2012a).

The Stikine Health Centre, located in Dease Lake, is the primary health centre for the region and provides basic primary care. The health centre's official service area includes Highway 37 communities from Bell II in the south to the Yukon border in the north. Police, fire, and ambulance services are locally provided. Existing utilities are well maintained but limited. The CWB index for Dease Lake was not available.

#### **22.1.2.3.2 Stewart**

Stewart, a port town which historically serviced mining and forestry industries, is located about 310 km northwest of Terrace at the end of Highway 37A and the Portland Canal, which provides direct access to the Pacific Ocean. Stewart's population was once near 2,000, but has steadily declined over the last 20 years to a current population of approximately 500 (Table 22.1-10).

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<sup>13</sup> The Stikine Region is one of 29 Regional Districts in British Columbia. The region has no regional government, and encompasses an area of northwestern BC north of Dease Lake to the Yukon Border. It comprises the communities of Good Hope Lake, Lower Post, and Atlin.

**Table 22.1-9. Socio-economic Overview of Local Study Area Municipal Study Communities**

Community	Approximate Population (2011)	Annual Median Earnings (2005)	Annual Full-time Median Earnings (2005)	Unemployment	Education Rate	Health Services	Emergency Services	Utilities	Housing	CWB (2006)
Dease Lake (excluding Dease Lake 9)	303	\$36,035	\$46,798	5.5%	Varies across education levels; generally high; 17% with no high school diploma	Basic primary care	RCMP and emergency services	Reservoir and wells	160 existing homes, no availability	n/a
Stewart	494	\$26,223	\$38,190	8.2%	Varies across education levels; intermediate; 23% with no high school diploma	Basic clinic, emergency, and trauma services	RCMP and emergency services	Well developed, operating under capacity	379 existing homes, available lots, few houses	83
Terrace	11,486	\$25,771	\$45,957	9.3%	Varies across education levels; lower than provincial figures; 25% with no high school diploma	Well developed; regional service provider	RCMP and emergency services	Well developed, operating under capacity	4,861 existing homes, low availability	80
Hazelton	270	\$21,029	\$48,787	5.1%	Varies across education levels; lower than provincial figures; 32% with no high school diploma	Well developed; regional service provider	Emergency services area service provider; RCMP in New Hazelton	Well developed, operating under capacity	135 existing homes, low availability	74
New Hazelton	666	\$21,712	\$60,271	19.4%	Varies across education levels; lower than provincial figures; 34% with no high school diploma	See Hazelton	RCMP area service provider; emergency services in Hazelton	Well developed, recent upgrades	313 existing homes, low availability	75
Smithers	5,404	\$25,005	\$42,207	8.5%	Varies across education levels; lower than provincial figures; 25% with no high school diploma	Well developed; regional service provider	RCMP and emergency services; regional service provider	Well developed, operating under capacity	Over 2,000 existing homes, lots available	81

Source: Statistics Canada (2007), AANDC (2011).

Note: Education services are not included in this table, as all communities have K to 12 educational institutions.

**Table 22.1-10. Municipal Community Population and Demographics**

Community	2011 Population	Change from 2006	Median Age (years, 2011)	Population over 15 Years (2011)	Gender Composition, 2011	Aboriginal Composition (2006)
Dease Lake	303	-21.1%	34.6	77.3%	Male 53.0% Female 48.0%	37.0%
Hazelton	270	-7.8%	47.0	81.1%	Male 44.0% Female 54.0%	57.0%
New Hazelton	666	+6.2%	41.4	80.8%	Male 51.0% Female 49.0%	37.0%
Stewart	494	-0.4%	43.0	80.8%	Male 52.5% Female 47.5%	11.0%
Smithers	5,404	+3.6%	37.2	79.3%	Male 48.6% Female 51.4%	15.0%
Terrace	11,486	+1.5%	38.8	80.0%	Male 49.0% Female 51.0%	23.6%
British Columbia	4,400,057	+7.0%	41.9	84.6%	Male 49.0% Female 51.0%	4.8%

Source: Statistics Canada (2007, 2012).

Aging infrastructure is one of the key issues confronting Stewart. Much of the existing infrastructure was installed in the 1960s and is beginning to degrade. Stewart's housing stock, constructed mostly in the 1960s and 1970s, is considered to be in fair condition, although few houses are available for sale.

The level of educational achievement within the community varies considerably with age and gender. Nearly a quarter of residents (23%) had not completed high school in 2006 (Statistics Canada 2007). Trades certificates were held by about 11% of the population, and 31% of residents held university or college degrees, compared with 41% provincially.

In 2006, Stewart's unemployment rate was approximately 8%, significantly below the 2001 unemployment rate of 24%, but slightly higher than the provincial average of 6% (Statistics Canada 2007). In contrast, the regional district unemployment rate was 14% (BC Stats 2009). Median earnings among full-time employees in the community were estimated at \$38,190, below the full-time median of \$42,230 reported for the province. Median earnings of Stewart's labour force were \$26,223, which was above the provincial median of \$25,722 (Statistics Canada 2007).

The decline in the population has led to the hospital being downgraded to a health centre, as well as downsizing of the local school. The health centre currently provides clinic, emergency, and trauma services on an outpatient basis. Emergency services are available, including ambulance, fire, and RCMP. In spite of the challenges the community has faced with declining populations, Stewart had a CWB score of 83 in 2006 (AANDC 2011).

### **22.1.2.3.3 Terrace**

Incorporated in 1927, Terrace lies along the freight corridor for northwestern BC at the junction of highways 16 and 37. Terrace is a regional service centre and has the capacity to play a key service role for the proposed Project. The RDKS offices are also located in Terrace.

In 2011, Terrace's population was reported at 11,486, an increase of 1.5% from 11,320 in 2006 (Statistics Canada 2007, 2012). Additional demographic information is included in Table 22.1-10.

The Terrace LHA ranked in the bottom third of the province in terms of CWB (BC Stats 2012b). Terrace residents are more likely to have an incomplete high school education than the provincial average, and are less likely to hold college or university certifications. However, the community does exhibit a similar prevalence of trade certifications and diplomas (i.e., approximately 10% of the population) relative to the province—a field which is clearly dominated by the male population. Women, on the other hand, generally show higher levels of education in other areas, including university and college programs.

The 2006 unemployment rate for Terrace was 9%, which was higher than the provincial rate of 6%. Median earnings from all employment were reported at \$25,771, which was almost identical to the provincial average (\$25,772). Median earnings for those who worked full-time all year were \$45,957, which is over \$3,500 greater than the provincial average (Statistics Canada 2007).

Municipal infrastructure, including housing and services, is well established. The Mills Memorial Hospital is a significant regional health service provider. Further, the city and surrounding area have the largest concentration of medical professionals in northwestern BC. Emergency services are well resourced and available for both the city and surrounding area. In 2006, Terrace scored 80 on the CWB index, which is on par with the provincial average score for non-Aboriginal communities (AANDC 2011).

### **22.1.2.3.4 Village of Hazelton and District of New Hazelton**

The Village of Hazelton and the District of New Hazelton are located approximately 140 km northeast of Terrace and 60 km northwest of Smithers on Highway 16 where the Skeena and Bulkley rivers meet. The Hazelton area comprises two municipalities (the Village of Hazelton and District of New Hazelton), three unincorporated settlements (South Hazelton, Two Mile, and the Kispiox Valley), three Gitksan Nation villages (Gitanmaax, Glen Vowell, and Kispiox), and the Wet'suwet'en community of Hagwilget. Information pertaining to South Hazelton is aggregated within the RDKS, whereas the First Nations communities are discussed broadly within this section as they rely on the Hazelton area for both economic opportunities and community services.

The populations of the two municipalities of Hazelton and New Hazelton have declined by 20% since 1996 (Statistics Canada 2002, 2007, 2012), but have rebounded slightly as of late. In 2011, the populations of New Hazelton and Hazelton collectively increased from 920 in 2006 to 936 in 2011 (an increase of 1.7%).

Levels of academic achievement in the Hazelton communities are lower than the average for the province. In 2006, high school incompleteness rates in New Hazelton and Hazelton were estimated at 34 and 32%, respectively (Statistics Canada 2007). Residents aged 15 years and above from

the Hazelton communities held fewer apprenticeships and trade certificates than is typical in BC. Holders of college certificates from an institution below university level were relatively few in number in the Hazelton communities, yet comparatively more prevalent among the population of Hazelton than the population of BC. College certificates were obtained by 20% of the population versus 17% of the provincial population.

Unemployment in Hazelton was reported at approximately 5% in 2006 (Statistics Canada 2007). New Hazelton reported 65 unemployed persons in 2006, bringing the unemployment rate to 19.4%. Annual median earnings in New Hazelton and Hazelton were estimated at \$21,712 and \$21,029, less than the provincial median of \$25,722 in 2005. In contrast to earnings for all categories of work, full-time annual earnings were reported to be relatively high in New Hazelton and Hazelton, respectively reported at \$60,271 and \$48,787.

Wrinch Memorial Hospital, located in Hazelton, provides acute, complex, and palliative care; psychiatric services; obstetrics and paediatrics; and medical imaging. The hospital serves an area with a population of 7,000, stretching west to Gitanyow, east to Moricetown, and through the Kispiox Valley. A 16-member RCMP detachment located in New Hazelton provides emergency services, whereas highway patrol is provided by the detachment based in Terrace. The communities are very well serviced for emergency fire and ambulance needs. Utilities are well established and maintained in both communities. Housing availability is currently low, although the communities could accommodate a growing population. Retail and business services are limited. CWB scores for New Hazelton and Hazelton were 75 and 74, respectively (AANDC 2011).

Members of the Gitxsan Nation and Skii km Lax Ha reside in and adjacent to the municipalities of Hazelton and New Hazelton. Their characteristics are important to consider because they rely upon services provided by the municipalities of Hazelton and New Hazelton.

The five Gitxsan bands (Gitwangak, Gitsegukla, Gitanmaax, Glen Vowell, and Kispiox) have a collective registered membership of approximately 6,460, of whom approximately 2,300 live on reserve (AANDC 2012). A significant proportion of Gitxsan Nation members based in BC reside in or near the Hazeltons, approximately 140 km northeast of Terrace along Highway 16. The Gitxsan Nation communities rely primarily on Hazelton, Smithers, and, to a lesser extent, Terrace, for the provision of facilities and services. The wilp (hereditary house) is the central unit for Gitxsan Nation governance and decision-making.

Information collected to date on the wilp Skii km Lax Ha is based on secondary and desk-based research. A discussion of the Skii km Lax Ha remains a challenge because there are reportedly only 25 members currently residing in Canada ([Appendix 22-A](#)), and the group also lacks distinct reserve lands or other geographical areas. The majority of Skii km Lax Ha members reside in the communities of Gitanmaax and Hazelton.

Of the approximately 19 Skii km Lax Ha over the age of 20 years, 6 have not completed high school (Rescan 2009), and 12 have completed further post-secondary education, including accounting, law school, nursing, and various trades.

The Skii km Lax Ha had a labour force of approximately 12 people in 2009; the remainder are in school, disabled, or retired. Only one of the 12 Skii km Lax Ha members in the labour force

was unemployed (Rescan 2009). Tsetsaut Ventures Ltd. is the economic branch of the Skii km Lax Ha and provides contract employment opportunities for Skii km Lax Ha, Gitxsan Nation, and other residents in the Hazelton area.

#### **22.1.2.3.5 Smithers**

The town of Smithers is considered the regional service centre for the Bulkley Valley, given its strategic location along the routes of Highway 16 and the Canadian National Railway, approximately halfway between the cities of Prince Rupert and Prince George. Its regional airport has become a hub for a range of activities across northwestern BC. The airport's runway was recently expanded in order to better service mining and exploration. The 2011 population was estimated to be 5,404 (Statistics Canada 2012).

Levels of academic achievement in Smithers were notably lower than those of the province. Almost 25% of Smithers' population (aged 15 years and over) has less than a Grade 12 education, slightly higher than the provincial rate of 20%. Trades, college, and/or university education was attained by approximately 40% of the population, compared to 52% provincially (Statistics Canada 2007).

The unemployment rate in Smithers (9%, or approximately 240 people) is higher than that of the province (6%), and marks no major change since 2001. Smithers was reported to have a median income level of \$25,005 for all residents over 15 years of age in 2005, which was slightly lower than the median provincial income of \$25,722. Average earnings for those who worked full-time year-round were approximately \$42,207 (Statistics Canada 2007).

Smithers and the surrounding area are serviced by the Bulkley Valley District Hospital, which has a full range of available health care facilities and services, and a number of specialists. Local police, fire, and ambulance services are available to residents and neighbouring communities. Water, sewer, and other utilities are well maintained and can accommodate a population of up to 7,500. The CWB score for Smithers in 2006 was 81 (AANDC 2011).

#### **22.1.2.3.6 Highways 37 and 37A Unincorporated Settlements**

The Project proposes to use highways 37 and 37A as a transportation route north from the Project site to Stewart during operation. Settlements along the highways include Bob Quinn Lake, Meziadin Junction, and Bell II. The latter two settlements are generally classified as tourist destinations and facilities, and are significantly smaller than the communities previously discussed. Most businesses in these settlements are based on seasonal outdoor activities, including fishing, hiking, heli-skiing, snowmobiling, and hunting, though Bell II and Bob Quinn Lake also both support local mining exploration activities. All services at Meziadin Junction have been decommissioned.

## **22.2 Historical Activities**

The RSA's socio-economic profile reflects the natural resources found in the area, as well as the historically high proportion of Aboriginal residents. Forestry and mining have historically been the major employers in the region, leading to the development of a number of non-Aboriginal communities and related infrastructure, but these sectors are susceptible both to changes in

commodity prices and the value of the Canadian dollar. As the strength of these industries has fluctuated based on the global economy, so has the status of many communities in the northwest, many of which have experienced “boom and bust” cycles typical of natural resource-based communities. Attempts at diversifying the socio-economic profile over time, both regionally and locally, have faced additional challenges stemming from the limited status of infrastructure throughout the region (both in terms of transport and services), restricted access, long distances, small communities located far away from each other (with no critical mass of labour or services), and extreme winter weather conditions.

The mining and forestry industries have provided significant employment for residents of the area (Province of British Columbia 2011). Forestry sector employment remains important, although recent years have seen increased hardship associated with the closure of mills and processing operations throughout the region, including the 2010 closure of the Eurocan paper mill in Kitimat. Highways 16, 37, and 37A experienced high levels of logging truck traffic in the 1980s and 1990s.

In the mining sector, two major mines within the RSA (Eskay Creek and Kemess South) have closed. Only one mine (Huckleberry) is still in operation. Until recently, the remoteness of the region and the existing commodity prices limited any new exploration and development. Communities throughout the region have experienced important population declines over the last several decades, with the 2008/2009 global economic downturn further exacerbating the decline in employment (particularly related to forestry) and population throughout the region. As a result of declining populations, communities such as Stewart, Terrace, and Dease Lake have experienced a reduction in both services and facilities, including health, education, and government services. However, employment and contracting opportunities still exist to support ongoing mineral exploration activities in the area, and the Galore Creek and Red Chris mining projects have received environmental assessment certificates.

## **22.3 Land Use Planning Objectives**

The Cassiar Iskut-Stikine Land and Resource Management Plan (CIS LRMP; BC ILMB 2000), which overlaps with the western portion of the LSA, defines specific land and resource management objectives. The LRMP framework aims to balance environmental, economic, and social objectives by facilitating local development for greater economic diversity while maintaining lifestyle opportunities. Specific social- and economic-related goals and objectives as they relate to sustainable development and healthy and sustainable communities, which form part of the CIS LRMP, are listed in Table 22.3-1. In addition to these goals and objectives, general management directions have been defined for a number of area-specific Resource Management Zones. These goals and objectives speak to the management of mineral and energy resources, hunting, trapping, guide outfitting, fishing, recreation and tourism, and timber resources, among others.

The CIS LRMP aims to enhance certainty for industry and promote investment to create local employment and business opportunities (BC ILMB 2000). Exploration and development of mineral deposits are permitted activities throughout the majority of the plan area, providing that they occur in concordance with all relevant acts, and in consideration of social, economic, and environmental interests.

**Table 22.3-1. Cassiar Iskut-Stikine Land and Resource Management Plan: Social- and Economic-related Goals and Objectives**

Goals	Objectives
<i>Healthy and sustainable communities</i>	<ul style="list-style-type: none"> <li>Opportunities for skill development and job training.</li> <li>Jobs for local people.</li> <li>Entrepreneurial capacity.</li> <li>Adequate healthcare.</li> <li>A safe and secure environment.</li> <li>A wide range of recreation opportunities.</li> <li>Local benefits from resource development and extraction.</li> <li>Communication and cooperation between native and non-native communities.</li> </ul>
<i>Sustainable development</i>	<ul style="list-style-type: none"> <li>A diversified economic base.</li> <li>Job opportunities for local people.</li> <li>Healthy, sustainable, well balanced use of resources.</li> <li>Development that respects local cultures and lifestyles.</li> <li>Development that provides optimal returns to local communities and the province.</li> <li>Access to technology and capital.</li> <li>Infrastructure to support local economic potential.</li> <li>Minimum environmental footprints from all sectors.</li> <li>Generate local financial capacity to support ongoing development.</li> </ul>

The Nass South Sustainable Resource Management Plan (SRMP; BC MFLNRO 2012) also provides guidance on permitted land-use activity in areas that overlaps with the LSA. The Nass South SRMP's main function is to address sustainable management issues concerning land, water, and resources in the southern portion of the Nass Timber Supply Area. However, the plan also aims to facilitate a wide variety of economic opportunities while conserving high-value cultural and environmental resources. Resource use and permitted development activities include mineral resource activity, timber harvesting, commercial recreation and tourism, guide outfitting, hunting, fishing, trapping, and cultural land uses. Limited reference is made to mineral exploration and development in the Nass South SRMP, beyond stating that such activity, along with related road development, is permitted in all zones (except parks and protected areas), providing that necessary regulatory approval processes and conditions are satisfied.

Among the LSA communities, Official Community Plans (OCPs) have been developed for the Town of Smithers and the City of Terrace. Each community OCP contains goals and policies for improving quality of life and economic vitality based on current demographic and economic trends, which also speak to social aspects of development (Town of Smithers 2010; City of Terrace n.d.). For Smithers, the OCP policies that speak directly to social and community development include the following (Town of Smithers 2010):

#### Land Use

- Policy 5.3.2.1: The majority of new growth and development will be accommodated through sensitive infill and intensification (redevelopment) of existing built and serviced areas. These forms of development will be given priority over development proposals on previously undeveloped (greenfield) sites within the town boundaries.



- Policy 5.3.2.2: The majority of new residential growth should occur within the downtown and the adjacent mixed residential neighbourhoods.
- Policy 5.3.4.1: Support partnerships with the non-profit, building, and business community to leverage town-owned land for attracting commercial and development opportunities consistent with the community vision and goals. These projects and activities may include, but are not limited to, affordable housing, open space, and recreation facilities.

### Housing

- Policy 7.2.1: Give priority to multi-family residential proposals that allow people to remain in the community as they age, including various forms of supportive housing and multi-level care facilities.
- Policy 7.2.5: Housing types, sizes, and tenureship arrangements should be mixed wherever possible to encourage a social mix within individual neighbourhoods.
- Policy 7.2.2.1: Give priority to development proposals for small and compact forms of housing, such as small-lot single detached homes, town homes, and apartments.
- Policy 7.2.2.2: Encourage alternative housing tenures within residential areas such as cohousing, cooperative housing, and fee-simple town homes, especially where these meet an affordable housing need.
- Policy 7.2.2.3: Integrate seniors and special needs housing into the community where there is good access to public transit and basic support services.
- Policy 7.2.2.4: Support the creation of new, and the retention of existing, rental housing, and discourage the conversion of rental housing to strata ownership.
- Policy 7.2.2.9: Work with local housing providers to establish affordable housing strategies, such as participating in a housing organization.

### Recreation

- Policy 8.2.2.1: Place a high priority on developing the town's outdoor recreation facilities such as the development of multiple ball field/soccer field facility within town boundaries, affordable community sports and recreational facilities, and a multi-use, multi-purpose recreation centre for year-round use.

### Transportation

- Policy 10.2.3.3: Integrate, improve, and expand the existing trail network to provide additional, effective, and safe non-motorized off-street transportation options for residents and visitors.
- Policy 10.2.3.4: Support the operation and development of Smithers' Transit system.

### Infrastructure, Utilities, and Green Buildings

- Policy 11.2.2.4: Identify infrastructure investment priorities given current and projected needs.

- Policy 11.2.3.2: Implement sustainable wastewater management and treatment strategies, technologies, and infrastructure delivery models to ensure a stable supply over the long-term and reduce loadings on the sewer system.

### Heritage, Arts, Culture, and Education

- Policy 12.2.2.3: Support local efforts to preserve and promote historically significant features and knowledge of Smithers.
- Policy 12.2.2.6: Publicly celebrate the designation of heritage properties, keep the public apprised of heritage conservation and restoration projects, and involve and consult the public on heritage matters.
- Policy 12.2.3.3: Support community initiatives to provide and improve local arts and culture opportunities.
- Policy 12.2.4.1: Support community initiatives to provide additional educational opportunities and facilities.
- Policy 12.2.4.2: Support community initiatives that provide education opportunities and facilities that respond to the needs of students and employers and are linked to employment outcomes.

Terrace has adopted a set of objectives, under its recently revised OCP, focusing on economic development and diversification, social well-being, local culture, and reducing its environmental footprint (City of Terrace n.d.). Terrace OCP objectives that are relevant to social development include the following (City of Terrace n.d.):

### Housing

- Preserve and upgrade the housing stock in good condition.
- Provide housing that meets the needs of all residents with emphasis on housing for persons with disabilities, low income residents, and the homeless and under-housed.

### Culture, Heritage, and Arts

- Identify, protect, and enhance the city's heritage resources.
- Develop community festivals and events aimed at attracting visitors and strengthening Terrace as a regional centre for community celebrations.

### Water, Energy, Infrastructure, and Liquid Waste Management

- Protect and conserve the city water supply.
- Build roads and develop infrastructure to meet our current needs within our means.
- Take a long-term and holistic perspective on all infrastructure upgrades, including the consideration of lifecycle costs, sustainability, and regional benefits.

### Transportation

- Increase active modes of transportation for all ages.

## **22.4 Spatial and Temporal Boundaries**

### **22.4.1 Spatial Boundaries**

This Social Effects Assessment is based on the same two study areas used to describe the social setting for the Project (Section 22.1).

The RSA is included to assess effects on social components that are, in turn, related to economic and employment effects of the Project. The RSA boundaries were defined to incorporate two regions important to regional mining and forestry: the RDKS and Electoral Area A of the RDBN (Figure 22.1-1).

The LSA is included to assess effects on local Aboriginal communities and non-Aboriginal communities likely to experience direct Project-related effects. LSA communities were selected on the basis of their expected role in Project construction and operation, and their proximity to the Project and its related access and haul routes (Table 22.1-1). The LSA includes the four Nisga'a Nation communities, Telegraph Creek, Dease Lake, Iskut, the District of Stewart, Gitanyow, the Hazeltons, Smithers, Terrace, and unincorporated communities along Highway 37 (Figure 22.1-2). LSA communities associated with the Project are found within the RSA.

The selection of LSA communities and the RSA was completed in conjunction Chapter 20, Economics, due to the interrelated nature of these indicators.

### **22.4.2 Temporal Boundaries**

Some of the communities considered in the effects assessment may be affected at different times based on Project activities or specific Project phases due to proximity, existing labour force and economic base, community demographics, and education. The temporal boundaries of the social effects assessment include the following four phases:

- construction phase (5 years);
- operation phase (51.5 years);
- closure phase (3 years); and
- post-closure phase (250 years).

## **22.5 Valued Components**

Determination of social valued components (VCs) involved several steps, including:

- review of the AIR;
- review of issues identified from pre-application stage consultation and feedback;
- land use interviews;
- consultation with Aboriginal peoples;
- desk-based research and literature review; and

- application of professional judgement.

Each VC included in the assessment meets the following three criteria:

- There is a spatial and temporal overlap between the KSM Project and the VC such that interactions may occur.
- There is a suitable knowledge base and measurable parameters for the VC that can be used to characterize the Project interactions and serve as the basis for assessing the potential effects of the KSM Project.
- There is a perceived, reasonable likelihood (i.e., as assessed by stakeholders or discipline specialists) that the VC could be affected by the KSM Project.

### **22.5.1 Valued Components Included in Assessment**

The VCs selected to assess the potential effects on LSA and RSA social components include:

1. community demographics, infrastructure, and services;
2. education, skills development, and training; and
3. CWB.

Each VC is broken down into a number of elements. These elements were selected because they characterize the VCs and because information is available to support meaningful assessment. The elements are as follows:

#### Community Demographics, Infrastructure, and Services

- gender balance;
- ethnic diversity;
- median age;
- water and sewer delivery;
- roads;
- communications;
- utilities;
- housing and accommodation;
- local emergency response services (fire, medical, and police); and
- social and mental health support services (health care and social services).

#### Education, Skills Development, and Training

- educational profile of communities; and
- existing educational facilities within the study areas.

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### Community Well-being

- financial independence and access to goods and services;
- sense of individual and community worth;
- substance misuse;
- family stress;
- the quality of the natural environment; and
- traffic safety.

Community demographics, infrastructure, and services may be affected by the Project, as the Project will likely attract new individuals and families to LSA municipal communities. Both local municipal and Tahltan Nation communities have stated that a change in community demographics may affect community stability, the social fabric, and its sense of identity. Local government stakeholders have expressed that population influx would increase demand on community infrastructure and services, particularly with respect to Highway 37 tourist destinations and facilities. Local communities have also identified the potential need for housing as an issue for consideration. The AIR require the consideration of demographic characteristics and infrastructure.

Education, skills, and training in LSA communities may be affected by the Project, as the Project will require a diversity of technical skills from different trades and professions. Local municipal and Aboriginal communities and residents have expressed an interest in opportunities for education, skills enhancement, and training. Existing educational institutions have also expressed an interest in understanding the Project's staffing and skills-level needs in order to plan their program development accordingly.

Finally, CWB within LSA communities may be affected by the Project. CWB is a multi-dimensional concept that refers to individual and collective levels of health, satisfaction, quality of life, and standard of living (Kusel 1996; Costa and Scoble 2006; Sirgy et al. 2009; Murphy 2010). The Tahltan Nation, Gitxsan Nation, and Gitanyow First Nation, including wilp Wii'litsxw, have identified CWB as a culturally and socially important consideration. Further, the Tahltan have expressed concern that Project involvement may potentially result in socially damaging outcomes. Gitanyow wilp Wii'litsxw has expressed additional CWB concern with respect to Project-related traffic.

Table 22.5-1 lists VCs and provides a rationale for each VC's inclusion in the assessment.

### **22.5.2 Valued Components Excluded from Further Assessment**

All identified VCs are included in the following assessment. Effects of Project-related traffic and traffic safety along highways 37 and 37A are assessed in the *Highways 37 and 37A Traffic Effects Assessment* ([Appendix 22-C](#)). Effects of Project-related traffic in Stewart are included in this Social Effects Assessment. Potential effects of the Project on land users (including air quality, noise, or other valued aspects of the natural environment) are assessed in Chapter 23, Land Use, while potential effects to human health are addressed in Chapter 25, Human Health.

**Table 22.5-1. Identification and Rationale for Social Valued Component Selection**

Valued Component	Identified by*				Rationale for Inclusion
	AG	G	P/ S	O	
Community demographics, infrastructure, and services	√	√	√	√	The AIR require consideration of demographic characteristics and infrastructure. New residents within the RSA and LSA seeking Project employment may change community populations and demographics and may increase the demand on existing infrastructure and services. Local and regional governments have expressed an interest in planning needs for any population change. Aboriginal peoples have interests in community stability, cohesion, and sense of identity.
Education, skills development, and training	√	√	√		The AIR require considering education and training characteristics and services. The Project is expected to require a large workforce with diverse education and training needs. Aboriginal peoples and local communities have expressed interest in new education, skills, and training. There is concern that existing education facilities and programs are at capacity.
CWB	√	√	√	√	The AIR require considering CWB characteristics. Federal policy is to consider impacts to individual and community health (Health Canada 2004). Aboriginal peoples have identified issues relating to the Project's potential effects on their CWB. Existing literature and professional practice suggest evaluating CWB.

\*AG = Aboriginal Group; G = Government; P/S = Public/Stakeholder; O = Other.

## 22.6 Scoping of Potential Effects

Project components are expected to interact with the social VCs by creating a number of social changes, including changes in:

- employment (direct, indirect, and induced);
- income;
- population;
- tax base (municipally and regionally); and
- traffic.

Tables 22.6-1 to 22.6-3 highlight how Project components interact with the social VCs. Table 22.6-4 provides a summary overview of these tables.

**Table 22.6-1. Potential Effects from the Project on Community Demographics, Infrastructure, and Services**

Project Region	Project Area	Change in Employment	Change in Income	Change in Population	Change in Tax Base	Change in Traffic
Mine Site	Camp 3: Eskay Staging Camp Camp 7: Unuk North Camp Camp 8: Unuk South Camp Coulter Creek Access Road Mitchell Operating Camp McTagg Rock Storage Facility McTagg Twinned Diversion Tunnels McTagg Power Plant Mitchell Rock Storage Facility Camp 4: Mitchell North Camp Mitchell Ore Preparation Complex Mine Site Avalanche Control Iron Cap Block Cave Mine Mitchell Pit Mitchell Block Cave Mine Mitchell Diversion Tunnels Camp 10: Mitchell Secondary Camp Water Treatment and Energy Recovery Area Sludge Management Facilities Sulphurets Laydown Area Camp 2: Ted Morris Camp Explosives Manufacturing Facility Temporary Frank Mackie Glacier Access Route Camp 1: Granduc Staging Camp					

(continued)

**Table 22.6-1. Potential Effects from the Project on Community Demographics, Infrastructure, and Services (completed)**

<b>Project Region</b>	<b>Project Area</b>	<b>Change in Employment</b>	<b>Change in Income</b>	<b>Change in Population</b>	<b>Change in Tax Base</b>	<b>Change in Traffic</b>
Processing and Tailing Management Area	Mitchell-Treaty Twinned Tunnels Construction Access Adit Mitchell-Treaty Saddle Area Camp 6: Treaty Saddle Camp Camp 5: Treaty Plant Camp Treaty Operating Camp Treaty Ore Preparation Complex Concentrate Storage and Loadout Area North Cell Tailing Management Facility East Catchment Diversion Centre Cell Tailing Management Facility South Cell Tailing Management Facility Treaty Creek Access Road Camp 11: Treaty Marshalling Yard Camp Camp 12: Highway 37 Construction Camp					
Off-site Transportation	Highway 37 and 37A					
Workforce and Procurement	Employment Procurement of Goods and Services			x	x	
				x	x	

**X = interaction between component and effect**



**Table 22.6-2. Potential Effects from the Project on Education, Skills Development, and Training**

Project Region	Project Area	Change in Employment	Change in Income	Change in Population	Change in Tax Base	Change in Traffic
Mine Site	Camp 3: Eskay Staging Camp Camp 7: Unuk North Camp Camp 8: Unuk South Camp Coulter Creek Access Road Mitchell operating camp McTagg Rock Storage Facility McTagg Twinned Diversion Tunnels McTagg Power Plant Mitchell Rock Storage Facility Camp 4: Mitchell North Camp Mitchell Ore Preparation Complex Mine Site Avalanche Control Iron Cap Block Cave Mine Mitchell Pit Mitchell Block Cave Mine Mitchell Diversion Tunnels Upper Sulphurets Power Plant Mitchell Truck Shop Water Storage Facility Camp 9: Mitchell Initial Camp Camp 10: Mitchell Secondary Camp Water Treatment and Energy Recovery Area Sludge Management Facilities Sulphurets Laydown Area Sulphurets-Mitchell Conveyor Tunnel Sulphurets Pit					

(continued)

**Table 22.6-2. Potential Effects from the Project on Education, Skills Development, and Training (completed)**

Project Region	Project Area	Change in Employment	Change in Income	Change in Population	Change in Tax Base	Change in Traffic
	Kerr Rope Conveyor Kerr Pit Camp 2: Ted Morris Camp Explosives Manufacturing Facility Temporary Frank Mackie Glacier Access Route Camp 1: Granduc Staging Camp					
Processing and Tailing Management Area	Mitchell-Treaty Twinned Tunnels Construction Access Adit Mitchell-Treaty Saddle Area Camp 6: Treaty Saddle Camp Camp 5: Treaty Plant Camp Treaty Operating Camp Treaty Ore Preparation Complex Concentrate Storage and Loadout Area North Cell Tailing Management Facility East Catchment Diversion Centre Cell Tailing Management Facility South Cell Tailing Management Facility Treaty Creek Access Road Camp 11: Treaty Marshalling Yard Camp Camp 12: Highway 37 Construction Camp					
Off-site Transportation	Highway 37 and 37A					
Workforce and Procurement	Employment	x		x	x	
	Procurement of Goods and Services	x		x	x	

**X = interaction between component and effect**

**Table 22.6-3. Potential Effects from the Project on Community Well-being**

Project Region	Project Area	Change in Employment	Change in Income	Change in Population	Change in Tax Base	Change in Traffic
Mine Site	Camp 3: Eskay Staging Camp Camp 7: Unuk North Camp Camp 8: Unuk South Camp Coulter Creek Access Road Mitchell Operating Camp McTagg Rock Storage Facility McTagg Twinned Diversion Tunnels McTagg Power Plant Mitchell Rock Storage Facility Camp 4: Mitchell North Camp Mitchell Ore Preparation Complex Mine Site Avalanche Control Iron Cap Block Cave Mine Mitchell Pit Mitchell Block Cave Mine Mitchell Diversion Tunnels Upper Sulphurets Power Plant Mitchell Truck Shop Water Storage Facility Camp 9: Mitchell Initial Camp Camp 10: Mitchell Secondary Camp Water Treatment and Energy Recovery Area Sludge Management Facilities Sulphurets-Mitchell Conveyor Tunnel Sulphurets Pit Kerr Rope Conveyor					

(continued)

**Table 22.6-3. Potential Effects from Project on Community Well-being (completed)**

Project Region	Project Area	Change in Employment	Change in Income	Change in Population	Change in Tax Base	Change in Traffic
Mine Site <i>(cont'd)</i>	Kerr Pit Camp 2: Ted Morris Camp Explosives Manufacturing Facility Temporary Frank Mackie Glacier Access Route Camp 1: Granduc Staging Camp					
Processing and Tailing Management Area	Mitchell-Treaty Twinned Tunnels Construction Access Adit Mitchell-Treaty Saddle Area Camp 6: Treaty Saddle Camp Camp 5: Treaty Plant Camp Treaty Operating Camp Treaty Ore Preparation Complex Concentrate Storage and Loadout Area North Cell Tailing Management Facility East Catchment Diversion Centre Cell Tailing Management Facility South Cell Tailing Management Facility Treaty Creek Access Road Camp 11: Treaty Marshalling Yard Camp Camp 12: Highway 37 Construction Camp					
Off-site Transportation	Highway 37 and 37A					x
Workforce and Procurement	Employment Procurement of Goods and Services	x x	x x	x x	x x	

**X = interaction between component and effect**

**Table 22.6-4. Potential Effects Overview Summary**

VC	Change in Employment		Change in Income		Change in Population	
	Project	Cumulative Influence	Project	Cumulative Influence	Project	Cumulative Influence
Community demographics, infrastructure, and services	-	-	-	-	X	X
Education, skills development, and training	X	X	-	-	X	X
CWB	X	X	X	X	X	X

VC	Change in Tax Base		Change in Traffic	
	Project	Cumulative Influence	Project	Cumulative Influence
Community demographics, infrastructure and services	X	X	-	-
Education, skills development, and training	X	X	-	-
CWB	X	X	X	X

As described in the Economic Effects Assessment (Section 20.7.1), the Project will require a considerable workforce as well as supplies and services. Experience with similar projects indicates that Project workforce and procurement needs will likely result in direct and spin-off (indirect and induced) economic impacts, including employment gains, increases in personal income, and increases in overall economic value-added (GDP), as well as increases in the local, regional, and provincial tax base. In addition, workforce and procurement needs are expected to alter local labour markets with respect to employee qualifications. Finally, the Project is anticipated to attract a number of new residents within the RSA and LSA communities who are seeking to access and/or secure new direct or indirect employment opportunities.

Community demographic composition may be altered due to population influxes into the LSA communities. Demand on existing infrastructure and services is also expected to increase due to an influx of new workers and their families.

The educational profile of the RSA and LSA communities may change as the Project both attracts employees with existing education and skill sets and offers new training and skills development for existing residents. Educational facilities will also need to adapt to new and potentially increasing demand for mining-related programs and resources.

CWB may also change within the LSA as individual community employment and income profiles potentially improve through access to Project-related employment opportunities. Employment will provide a source of financial independence and access to goods and services. New employment and income opportunities would likely also contribute to either a stabilization or reversal of the declining population trend that many LSA communities have experienced in recent years. CWB is also expected to benefit from the change in tax base through additional residents and income spending. However, employment demands and increased income may create potential changes in family stress and substance misuse, and may lead to other potential negative social behaviours. These impacts will potentially occur within the LSA and RSA.

In addition, transportation associated with the Project has the potential to adversely affect CWB by changing noise, air quality, and safety along local roads. More specifically, this is a concern with respect to trucking through the community of Stewart.

### **22.6.1 Construction**

Project expenditures during construction will occur over the five-year construction phase. Some of the goods and services required for the Project's development are expected to be procured within the region—for instance, in Terrace and Smithers—and elsewhere in the province. This may result in positive impacts to the municipal and regional tax base within the RSA and within certain LSA municipalities. An increased tax base, in turn, may affect community infrastructure and service capacity.

Construction will result in an estimated 1,497 person-years of employment (direct, indirect, and induced), or an average of about 272 jobs per year for residents in the RSA (Economic Effects Assessment, Section 20.7.2). Although workers will reside within dedicated construction camps, it is anticipated that a number of them will come from a variety of communities within the LSA, the RSA, and from across the province. The CWB within LSA communities may benefit as employment will provide a source of financial independence, access to goods and services, and a sense of community worth. Although some employees might move into LSA communities during construction, it is unlikely that community demographics, infrastructure, and services will be affected, due to the temporary and specialized nature of construction employment and because most Project workers will reside within camps.

The construction phase may also have indirect effects on education, skills, and training, as demand for mining-related programs and resources may increase within the LSA in anticipation of securing longer-term employment once operation commences.

### **22.6.2 Operation**

Project operation is predicted to last approximately 51.5 years, with total Project-related employment of an estimated 21,810 person-years, or an average of about 423 jobs each year in the RSA (Section 20.7.2). Workers will be housed within permanent camps on site and will be transported from LSA communities (including Terrace and Smithers). It is expected that a greater proportion of workers will come from LSA and RSA communities than during construction, maximizing local and regional benefits. Project operation will also result in an increase in truck and bus traffic associated with transporting materials, staff, and concentrate.

Community demographics may be affected by Project operation. Workforce needs associated with Project operation are likely to result in new individuals and families moving to the surrounding communities in order to minimize commute times and benefit from direct, indirect, and induced employment and business opportunities. Due to the small size of certain LSA communities, this influx may change community demographics in terms of median age, gender distribution, and ethnicity. In turn, this may affect the social fabric, sense of identity, community stability, and education profiles. However, most new residents are likely to settle in the larger communities of Terrace, Smithers, and Stewart, due to their services and amenities.

Community infrastructure may also be affected by Project operation. Increasing populations and incomes associated with Project operation could lead to a change in demand on housing, water, sewage, waste management, and road infrastructure. However, Project operation may also result in an increase in the overall government tax base, including corporate and personal income tax, sales tax, property tax, and mining tax payments. The increase in taxes would assist governments in the provision of the public infrastructure and services necessary to support the change in demand.

Communities' educational profiles and educational facilities may be affected by the operation of the Project, which will require a diversity of technical and professional skills from different trades and professions. A change in demand on local and regional educational facilities, programs, and resources is anticipated.

Project operation may affect CWB. New employment opportunities associated with Project operation could increase individual and community income profiles, allowing for improved financial independence and greater access to goods and services. However, the rotation schedules for staff residing in camps may adversely affect family and community dynamics and may contribute to stress. Access to additional income may also contribute to substance misuse or other negative social behaviours. An increase in Project operation-related traffic holds the potential for adverse effects on the level of service (depending on existing capacity), the quality of the natural environment, and road safety.

### **22.6.3 Closure**

Decommissioning activities during closure will provide employment and business opportunities, but these activities will be much more limited than during operation. LSA and RSA communities that have become economically and, to some degree, socially dependent on the Project during operation may experience adverse effects during closure.

There will be a loss of employment and income associated with the cessation of operation. Loss of employment and reduction in expenditures on suppliers could further result in indirect and induced employment and income loss. Such loss has the potential to contribute to a decline in population as residents leave their communities in search of new employment opportunities. As residents leave, community demographics and education profiles may be altered. Any decrease in demand on infrastructure and services may also reduce the service level for remaining residents within communities. CWB may be adversely affected as individual and community incomes are lost, potentially leading to a reduction in financial independence and access to goods and services.

## 22.6.4 Post-closure

Environmental monitoring and management activities during post-closure will provide employment and business opportunities, but these opportunities will be more limited than during operation and even more limited than during closure. LSA and RSA communities that experienced adverse effects during closure may continue to experience adverse effects during post-closure.

## 22.7 Potential for Residual Effects

The following sections describe the potential effects of Project-induced social changes on: (1) community demographics, infrastructure, and services; (2) education, skills development, and training; and (3) CWB. The potential effects of each anticipated social change—including changes in employment, income, population, tax base, and traffic—will be described in turn. Following the presentation of mitigation and enhancement measures for each potential effect, residual effects will be predicted. The assessment of the significance of each residual effect will be described in the final section.

### 22.7.1 Change in Employment

Economic impact modelling predicts that Project construction and operation will result in substantial direct and spin-off (indirect and induced) economic benefits (Economic Effects Assessment, Section 20.7.1). Table 22.7-1 provides a summary of the predicted Project-specific changes in employment in relation to the current size of the labour force.

**Table 22.7-1. Project-specific Employment Effects**

	Experienced Labour Force (persons, 2006)	Total Project-related Employment (person-years, FTE)	Annual Average Project-related Employment	
			Total (persons, FTE)	Proportion of 2006 Labour Force (%)
<b>Construction</b>				
RSA	22,530	1,497	272	1.21%
BC	2,193,115	31,094	5,653	0.26%
Canada	16,861,180	55,248	10,045	0.06%
<b>Operation</b>				
RSA	22,530	21,810	423	1.88%
BC	2,193,115	194,313	3,773	0.17%
Canada	16,861,180	345,868	6,716	0.04%

Sources: Active labour force statistics from Statistics Canada (2007). Other data are derived from estimates of the 2012 Economic Model Report ([Appendix 20-B](#)).

Notes: Project-related employment includes the sum of direct, indirect, and induced employment. Operation employment includes construction for underground mining. FTE = full-time equivalent.

During construction, the total number of annual jobs provided by the Project will constitute an estimated 0.26% of the active labour force in BC, and 1.2% of the active labour force within the RSA (Table 22.7-1). Once full production capacity is reached, the total number of jobs provided by the Project during operation will constitute 0.17% of the provincial labour force, and 1.88% of the RSA labour force.



Change in employment will likely create a positive effect for education, skills, and training. Employment positions requiring a range of skill levels will be available, particularly for operation. This change in employment is expected to create an incentive for LSA residents to pursue additional education, skills development, and training in order to obtain Project-related employment or advance to a higher position. Residents may begin to pursue educational advancement during construction in order to have the basic requirements for longer-term operation-related opportunities. Opportunities for on-the-job training are also expected for junior, intermediate, and senior positions.

However, the magnitude and spatial distribution of the impacts of employment needs on education, skills, and training is difficult to predict. The regional workforce has some degree of experience in mining, industrial, and forestry activities, thereby offering a potential body of workers with skill sets that are applicable or transferable to a variety of mining-related positions. However, education levels in most LSA communities are generally lower than the provincial average, creating a higher demand for employees from outside the region, while also suggesting that existing residents wishing to obtain Project-related employment will likely require skills upgrading. Educational institutions that offer programs, apprenticeships, trades training, and other resources exist in LSA communities including Dease Lake, Smithers, Hazelton, and Terrace (Table 22.1-3). Due to the relatively small populations in many of the Aboriginal communities, even if only a handful of residents in each community were to pursue education and skills upgrading, there is the potential to notably affect the community's education profile. In addition to skills upgrading, it is likely that a number of already highly skilled persons will immigrate to the LSA as a result of the Project, thereby increasing the skills base of the local communities.

Changes in employment are likely to have a beneficial effect on CWB. Workforce hiring, training, and skills development will likely boost LSA residents' sense of self-worth and community pride and engagement. Employment also prevents boredom and may thereby minimize social problems associated with unemployment, such as crime and substance misuse (Farrington et al. 1986; Ritter 2006).

However, change in employment, particularly in a camp-based setting, may also adversely affect CWB. Working away from families for extended periods of time could potentially disrupt family dynamics, resulting in increased stress, separation, and breakdowns in familial relationships. Increased work-related stress, in turn, could result in a potential increase in substance misuse and other negative social behaviours (Gibson and Klinck 2005).

Loss of employment at closure may adversely affect CWB through a decrease in overall personal and community sense of worth and capacity. The extent of this effect in the LSA will depend on the level of Project-related employment to be lost and on the existence of alternative employment opportunities. The smaller and more isolated LSA communities are predicted to have poorer employment opportunities in comparison with the larger communities of Smithers and Terrace.

### **22.7.1.1 Mitigation and Enhancement for Change in Employment**

A combination of management practices, monitoring and adaptive management, and enhancement measures will be implemented during construction and operation to mitigate and enhance the potential Project effects on education, skills, and training, and CWB. Measures to enhance employment will be identified in a Labour Recruitment and Retention Strategy, a Procurement Strategy, and a Workforce Training Strategy. Prior to Project closure, a Workforce Transition Program will be implemented to mitigate any potential adverse effects attributed to loss of employment (Section 20.7.1.1).

The objectives of these mitigation and enhancement strategies are to:

- maximize employment benefits within the LSA communities, the RSA, and the province as a whole;
- encourage the involvement of local and regional businesses in the Project to maximize benefits within the RSA;
- maximize work experience, education, and skill levels of the regional workforce, as well as develop the workforce to meet the needs of the Project; and
- help workers secure suitable employment elsewhere at closure, and thus minimize adverse effects of employment loss upon closure.

As part of the Labour Recruitment and Retention Strategy, an Employee Assistance Program would provide support to Project employees experiencing stress or breakdowns in family relationships due to existing work schedules. For closure, potential adverse effects to CWB from a change in employment will be mitigated through a Workforce Transition Program.

The features of these and other mitigation strategies are discussed in detail in the Economic Effects Assessment, Section 20.7.2.1.

### **22.7.1.2 Potential for Residual Effects: Change in Employment**

Three potential residual effects have been identified due to change in employment (Table 22.7-2): (1) a beneficial residual effect during construction and operation as the change in employment will enhance the education, skills, and training of the local, regional, and provincial workforce; (2) a beneficial residual effect on CWB as communities are expected to benefit from increased individual esteem, community pride, and community involvement; and (3) an adverse residual effect on CWB because of the potential for an increase in stress on families and substance misuse.

### **22.7.1.3 Education, Skills, and Training: Potential Residual Effects due to Change in Employment**

The employment generated from the Project would directly increase the education levels and skills of the LSA's and RSA's workforce through training, ongoing work experience and skills development, and attraction of skilled employees. Indirectly, education, skills, and training are also anticipated to benefit, as demand for education and skills upgrading increases throughout the LSA and RSA in order to access the change in employment opportunities provided through the Project.

**Table 22.7-2. Potential Residual Effects on Social Valued Components due to Change in Employment**

<b>Valued Component</b>	<b>Timing Start</b>	<b>Project Area(s)</b>	<b>Component(s)</b>	<b>Description of Effect due to Component(s)</b>	<b>Type of Project Mitigation</b>	<b>Project Mitigation Description</b>	<b>Potential Residual Effect</b>	<b>Description of Residuals</b>
Education, Skills and Training	Construction and Operation	Workforce and Procurement	Employment, Procurement of Goods and Services	Project-related employment would increase workforce experience and capability through training, on-going work experience.	Management Practices, Monitoring and Adaptive Management, Enhancement	Recruitment and Retention Strategy; Procurement Strategy; Workforce Training Strategy	Yes	The educational profile of the local, regional and provincial workforce will increase due to employment-related training and work experience (beneficial)
Community Well-being	Construction and Operation	Workforce and Procurement	Employment, Procurement of Goods and Services	Increase in overall personal and community sense of worth and capacity through employment.	Management Practices, Enhancement	Recruitment and Retention Strategy; Workforce Training Strategy	Yes	Individual esteem and community pride will increase due to employment (beneficial)
	Construction and Operation	Workforce and Procurement	Employment, Procurement of Goods and Services	Potential disruption to families resulting in increased stress, separation, and breakdowns in familial relationships, and potential increase in substance misuse and other negative social behaviours through increased stress from employment.	Management Practices, Monitoring and Adaptive Management, Enhancement	Recruitment and Retention Strategy;	Yes	Family stress will increase due to employment rotation schedules (adverse), and substance misuse will increase due to employment-related stress (adverse)
	Closure	Workforce and Procurement	Employment, Procurement of Goods and Services	Decrease in overall personal and community sense of worth and capacity through loss of employment.	Management Practices	Workforce Transition Program	No	n/a

Project mitigation for the change in employment during construction and operation, including the implementation of a Labour Recruitment and Retention Strategy, a Procurement Strategy, a Labour Relations Strategy, and a Workforce Training Strategy (Economic Effects Assessment, Section 20.7.2.1), is focused on enhancing the benefits and maximizing Project-related employment and related education, skills, and training within LSA and RSA communities. This includes expected positive effects for non-Aboriginal and Aboriginal residents within the LSA. The Project is expected to result in positive residual effects on education, skills, and training within the LSA, the RSA, and across BC.

#### **22.7.1.4 Community Well-being: Potential Residual Effects due to Change in Employment**

There is the potential for both beneficial and adverse effects on CWB due to Project-related change in employment during construction and operation. For instance, an increase in overall personal and community sense of worth and capacity is predicted as local and regional residents gain employment in a sector with higher salaries, and develop additional skills. However, the work rotation schedule could potentially disrupt families, resulting in increased stress, separation, and breakdowns in familial relationships, as well as drug and alcohol misuse.

Project mitigation for the change in employment on CWB during construction and operation (Section 22.7.1.1) is focused on enhancing the benefits and maximizing Project-related employment and income within the LSA (including Aboriginal and non-Aboriginal communities), which in turn will lead to a beneficial residual effect through increased individual esteem, community pride, and community involvement. With respect to stress on families and communities, the Labour Recruitment and Retention Strategy will identify actions to help reduce potential effects by ensuring that employees are fully informed of potential stresses and issues. An Employee Assistance Program will also be available to provide support for employees and their families experiencing stress on relationships and any potential substance misuse. Nevertheless, a residual effect of increased stress on families and potential substance misuse is anticipated following mitigation.

The Worker Transition Strategy for closure will mitigate adverse effects on CWB associated with the loss of employment. The success of the strategy will depend upon economic conditions at the time, which are beyond the control of the Project. If new employment opportunities from other projects exist at closure, it is likely that employment will not fall below baseline conditions. Consequently, no adverse residual effects are predicted.

#### **22.7.2 Change in Income**

The Project is expected to increase income in the LSA study communities through the creation of direct, indirect, and induced employment (Economic Effects Assessment, Section 20.7.2). In particular, wages received from direct work with the Project are predicted to be high, given that employees in the mining industry tend to receive higher annual salaries and benefits than employees in many other industries. Community income levels could also increase through the arrival of additional in-migrants receiving Project-related salaries (directly or indirectly). Table 22.7-3 provides a summary of the estimated Project-specific change in income in relation to the current size of the labour force.

**Table 22.7-3. Project-specific Effects on Income**

	Median Full-time Earnings (2005)	Project-related Income	
		Average Worker Income	Proportion of 2005 Median Full-time Earnings
<b>Construction</b>			
RSA	\$46,775	\$99,132	2.12%
BC	\$42,230	\$79,115	1.87%
Canada	\$41,404	\$72,839	1.76%
<b>Operation</b>			
RSA	\$46,775	\$93,838	2.01%
BC	\$42,230	\$66,716	1.58%
Canada	\$41,404	\$63,661	1.54%

Sources: Median full-time earning (2005) statistics from Statistics Canada (2007). Current GDP (2011) for BC and Canada is as reported by BC Stats (BC Stats 2012a). Other data are derived from estimates of the economic impact modelling (Appendix 20-B).

Note: Average Project-related worker income estimated as total personal income divided by total employment (direct, indirect, and induced). GDP impacts exclude any direct Project operating profits. Current GDP statistics are not published at the sub-provincial level.

An increase in household income will likely have a beneficial effect on CWB, because it will help LSA residents boost their financial independence and their access to goods and services as disposable incomes increase through the acquisition of direct, indirect, and induced employment (Ritter 2006). Additional income can facilitate access and improvements to health, education, and overall standards of living. In addition, increased income serves to improve self-esteem, reduce poverty, and lower financial dependencies on social assistance. Conversely, change in income could adversely affect CWB, as increasing incomes could be used to fuel substance (i.e., drugs and alcohol) misuse or other negative social behaviours (e.g., gambling).

Potential income decreases could occur at closure as the Project, its suppliers, and providers of goods and services lay off staff, only if comparable income-earning and business opportunities are not available to offset these losses. Decreases in income are generally considered adverse in that they dampen household spending and economic growth. Additionally, a decrease in income can reduce CWB by intensifying financial dependencies, potentially limiting access to health and education services, and generally restricting the ability of individuals and families to buy the goods and services they require (HRSDC 2008).

### 22.7.2.1 Mitigation and Enhancement for Change in Income

Management practices, monitoring and adaptive management, and enhancement measures will be implemented to mitigate the potential Project effects on CWB during construction and operation. This includes a Labour Recruitment and Retention Strategy and a Procurement Strategy (Economic Effects Assessment, Section 20.7.2.1; Section 22.7.1.1). The Labour Recruitment and Retention Strategy will include financial management and general life skills development training programs to enhance the income benefits to LSA and RSA communities. Financial management training, in particular, may help individuals unfamiliar with a regular and scheduled income stream to manage and plan for the increase in income. Residents in Aboriginal

communities may have less experience with financial management arising from a regular income.

Mitigation for adverse effects to CWB (increased substance misuse) will include a zero tolerance drug and alcohol policy for Project employees and suppliers. The Employee Assistance Program will also provide support to workers to assist them in dealing with personal and family issues.

For Project closure, a Workforce Transition Program, as identified in Section 20.7.1.1, will be implemented to help mitigate any potential decrease in financial independence, purchasing power, and access to goods and services by helping workers to secure new employment.

### **22.7.2.2 Potential for Residual Effects**

Two potential residual effects have been identified due to change in income (Table 22.7-4): (1) a beneficial residual effect to CWB because the change in income will enhance individual and LSA community financial independence and access to goods and services during construction and operation; and (2) an adverse residual effect on CWB as a change in income may increase substance misuse.

### **22.7.2.3 Community Well-being: Potential Residual Effects due to Change in Income**

Existing and new community members throughout the LSA may experience a change in income during construction and operation through increased Project-related employment opportunities. Increasing household income serves to improve self-esteem, reduce poverty, lower financial dependencies on social assistance, and help individuals access more of the goods and services they require, translating into a beneficial effect on CWB within the LSA and across the RSA.

For construction and operation, the Project mitigation and enhancement for the change in income (Section 21.7.2.1) is focused on enhancing the benefits associated with employment and procurement of goods and services within RSA and LSA communities, as well as across the province. This includes expected positive effects on the household incomes of non-Aboriginal community members and members of Nisga'a Nation and First Nations within the LSA. Increased income is expected to result in a positive residual effect on CWB due to increased financial independence and access to goods and services within the LSA and RSA.

Social and community health research in the mining sector has found that labourers and shift-based workers in the natural resources industries are susceptible to substance misuse. As such, a Project-related change in income could also adversely affect CWB, as increasing incomes could be used to fuel substance misuse and/or other negative social behaviours. Project mitigation will serve to allay this effect by providing support through the Employee Assistance Program. Residual effects are anticipated, as research in the socio-economic area of mining speculates that participation in drug use outside of work hours, despite strict anti-drug and alcohol policies at most Canadian-based companies, can be quite common (LaPalme 2003).

**Table 22.7-4. Potential Residual Effects on Social Valued Components due to Change in Income**

Valued Component	Timing Start	Project Area(s)	Component(s)	Description of Effect due to Component(s)	Type of Project Mitigation	Project Mitigation Description	Potential Residual Effect	Description of Residuals
Community Well-being	Construction and Operation	Workforce and Procurement	Employment, Procurement of Goods and Services	Increased financial independence, purchasing power and access to goods and services through increased income.	Management Practices, Enhancement	Recruitment and Retention Strategy; Procurement Strategy; financial management and general life skills development training program	Yes	Financial independence and access to goods and services will increase due to increased income (beneficial)
	Construction and Operation	Workforce and Procurement	Employment, Procurement of Goods and Services	Potential increase in substance misuse and other negative social behaviours through increased income.	Management Practices, Monitoring and Adaptive Management	Employee Assistance Program; zero tolerance drug and alcohol policy	Yes	Substance misuse will increase due to increased income (adverse)
	Closure	Workforce and Procurement	Employment, Procurement of Goods and Services	Decreased financial independence, purchasing power, and access to goods and services through decreased income and economic development.	Management Practices	Workforce Transition Program	No	n/a

At Project closure, CWB could be adversely affected as Project-related employment and income opportunities are lost, and if comparable income-earning and business opportunities are not available to offset these losses. The Workforce Transition Program will help Project employees identify the transferable skills and training required to access alternative employment opportunities. Depending on economic conditions at closure, which are beyond the control of the Project, some income loss may occur even with the Workforce Transition Program. However, Project-related income loss alone is not expected to cause community income levels to fall below current baseline conditions. Consequently, no residual effect is anticipated.

### **22.7.3 Change in Population**

Local hiring for Project-related needs is preferable when possible, as it can lead to more targeted benefits for the local communities. However, due to the education and skills profile within the LSA study communities, as well as the need for specialized employment positions at the Project, it is expected that a large proportion of employees will need to be hired from elsewhere to fully satisfy labour requirements. These workers may opt to reside within LSA communities and bring their families with them, thereby further increasing LSA populations. In addition, business opportunities will increase as a result of the Project (Economic Effects Assessment, Section 20.7.4) thereby potentially attracting speculative job seekers, entrepreneurs, and their families to the area.

Accurate predictions of population change are difficult to forecast, particularly at the community level. However, using job estimates from the economic model (Economic Effects Assessment, Section 20.7.1), it is predicted that the total (direct, indirect, and induced) employment as a result of the Project will result in an average of about 272 jobs (full-time equivalent) in the RSA during each year of construction. Similarly, an average of about 423 people is estimated to be employed in the RSA during each year of operation. Notably, many more positions are likely to be created in BC and Canada in construction (5,653 and 10,045, respectively) and operation (3,772 and 6,716, respectively). To put this into context, as presented in Section 22.7.1, during construction the total number of annual jobs provided by the Project will constitute an estimated 1.2% of the active labour force within the RSA (Table 22.7-1). Similarly, the total number of jobs provided by the Project during operation represents about 1.88% of the RSA labour force.

The degree of population change realized will be contingent upon existing population dynamics; the amount of local hiring (including other RSA communities outside of the LSA); whether new employees to the area bring their families; the readiness of infrastructure (particularly housing), services, and amenities; other economic opportunities in the region; and personal perceptions about desirable community lifestyles.

Project-related population growth may affect community demographics, infrastructure, and services. Population growth will alter the gender, age, ethnic, and cultural profile of LSA communities. How community members perceive these changes may be positive or negative depending on the individual. Population growth will also affect demand on community infrastructure and services. Potentially affected community services include local emergency response services (fire, medical, and police), ongoing support services (health care and social services), and public education. Potentially affected community infrastructure includes sewage, water, utilities, waste management, roads, communications, and housing.



In the short term, smaller communities may experience adverse effects to community infrastructure as the potential population increase with migration, and hence demand, puts pressure on the individual communities' capacity. Of concern within the smaller LSA communities is the lack of existing housing supply. Larger communities (e.g., Terrace and Smithers) are less likely to be adversely affected, due to their relatively greater service and infrastructure capacity. This adverse effect is expected to be tempered by the relatively modest change in population expected within the RSA given the predicted change in Project-related employment relative to the current labour force and population.

In the long term, all communities are likely to experience beneficial effects to infrastructure and services, as growing populations create an incentive to improve on or create new infrastructure, facilities, and services. For instance, a change in population size, diversity, and demographics is expected to increase the demand for improved health and social infrastructure and services to meet the needs of this new community profile.

Education, skills, and training will likely be affected by population growth. In-migrating skilled workers increase communities' educational/skill profile. In addition, the capacity of existing educational and training facilities and programs is anticipated to be outpaced in small communities in the short term. However, increased demand may result in improved educational infrastructure and services, which, in turn, may improve the educational profile of local populations in the long term.

Population growth will likely affect CWB. Population growth can reverse population declines, thereby strengthening community pride. CWB may be adversely affected in small communities in the short term, if reductions in community support service and infrastructure result in lower levels of treatment of stress and substance misuse and/or increased public safety issues. However, in the long-term, increased demand may spur additional investment in enhanced community services and infrastructure.

At closure, loss of Project-related employment may lead to a decrease in population. Population declines would result in decreased demand on infrastructure and services, which may also lead to reduced service delivery within the broader community, although likely not below current levels. Loss of Project-related employees may decrease LSA and RSA workforce experience and capability as skilled employees leave in search of employment elsewhere. Finally, CWB may be adversely affected as overall community sense of worth and capacity decrease due to loss of community residents.

### **22.7.3.1 Mitigation and Enhancement for Change in Population**

Mitigation strategies, including management practices, monitoring, and adaptive management and enhancement will be developed and implemented to minimize the adverse effects of population change on community demographics, infrastructure, and services; education, skills and training; and CWB. This will be realized through the Labour Recruitment and Retention Strategy, the Workforce Training Strategy, and the Workforce Transition Program (Economic Effects Assessment, Section 20.7.1.1). The Labour Recruitment and Retention Strategy and the Workforce Training Strategy will enhance communities' educational/skill profile by recruiting skilled employees to the region and training new community members for Project employment.

The Workforce Training Strategy will help manage demand on educational facilities by facilitating resource planning and capacity-building as it relates to Project-specific educational and skills development. The Workforce Transition Program will be developed to mitigate any potential decrease in employment and population, thereby minimizing any potential decrease in demand on valued community services.

Mitigation of the potential effect change in population also includes a community communications plan and an Employee Assistance Program.

The community communications plan will be used to clearly and regularly communicate with, and receive feedback from, all stakeholders and residents in the RSA, as well as the broader public. An important part of communications will be to provide regular and timely updates on the schedule and activities of the Project. This will facilitate planning by governments and service providers, including health, social, and emergency services. Planning by local municipal governments and appropriate community investments by all levels of government will be important to address community needs and to manage change.

The details of the community communications plan are to be developed prior to the start of construction. As the plan is developed, the following points will be considered:

- Scope and content of communications: The appropriate level (amount and frequency) of information sharing and the content will be determined for each phase of the Project in order to be relevant to targeted audiences.
- Communication methods: A variety of methods (e.g., print, online, radio, and in-person) will be used as needed to convey relevant information to community officials, other stakeholders, and the public.
- Community liaison: A company contact and contact information will be identified and openly communicated to community officials, other stakeholders, and the public.

Worker health and safety policies and employee support and counselling provided through the Employee Assistance Program will minimize demand on local services and will mitigate potential effects on CWB.

In addition, the use of on-site worker accommodations during construction and operation is expected to mitigate potential increases in population and demand for housing within the LSA. That is, with on-site accommodations and rotational shift schedules, there will be no particular residential location advantage for Project workers, meaning that workers may choose to continue to live within the RSA or elsewhere in the province.

### **22.7.3.2 Potential for Residual Effects**

Six potential residual effects have been identified due to change in population (Table 22.7-5). During construction and operation, residual effects are predicted for all three VCs: community demographics, infrastructure, and services; education, skills development, and training; and CWB.

**Table 22.7-5. Potential Residual Effects on Social Valued Components due to Change in Population**

<b>Valued Component</b>	<b>Timing Start</b>	<b>Project Area(s)</b>	<b>Component(s)</b>	<b>Description of Effect due to Component(s)</b>	<b>Type of Project Mitigation</b>	<b>Project Mitigation Description</b>	<b>Potential Residual Effect</b>	<b>Description of Residuals</b>
Community Demographics, Infrastructure, and Services	Construction and Operation	Workforce and Procurement	Employment, Procurement of Goods and Services	Project-related employment and procurement would attract new residents to local communities, altering the gender, age, ethnic, and cultural profile.	Management Practices, Monitoring and Adaptive Management; Enhancement	community communications plan	Yes	Altering of community demographics due to population growth (beneficial and/or adverse, depending on personal opinion)
	Construction and Operation	Workforce and Procurement	Employment, Procurement of Goods and Services	An increase in population and change in demographics would increase demands on community infrastructure and services (health, social, recreation, etc.) in the short term, but could increase their capacity over the long term.	Management Practices, Enhancement	community communications plan; Employee Assistance Program	Yes	Demand on community services and infrastructure may outpace small LSA communities' capacity in the short term due to population growth (adverse)
	Closure	Workforce and Procurement	Employment, Procurement of Goods and Services	Loss of Project-related employment may lead to a decrease in population, reducing use and demands on community infrastructure (including housing) and services.	Management Practices	Workforce Transition Program; community communications plan	No	n/a
Education, Skills Development, and Training	Construction and Operation	Workforce and Procurement	Employment, Procurement of Goods and Services	Project-related employment would attract skilled employees to the LSA and RSA.	Management Practices, Enhancement	Recruitment and Retention Strategy; Workforce Training Strategy	Yes	Improvement in the educational profile of LSA and RSA communities due to immigration of skilled workers (beneficial)
	Construction and Operation	Workforce and Procurement	Employment, Procurement of Goods and Services	An increase in population would put additional strain on LSA and RSA educational programs, facilities, and resources in the short term, but increase the capacity of educational institutions over the long term.	Management Practices, Enhancement	Workforce Training Strategy; community communications plan	Yes	Improvement in the capacity of educational institutions due to population-fueled demand (beneficial)

(continued)

**Table 22.7-5. Potential Residual Effects on Social Valued Components due to Change in Population (completed)**

<b>Valued Component</b>	<b>Timing Start</b>	<b>Project Area(s)</b>	<b>Component(s)</b>	<b>Description of Effect due to Component(s)</b>	<b>Type of Project Mitigation</b>	<b>Project Mitigation Description</b>	<b>Potential Residual Effect</b>	<b>Description of Residuals</b>
Education, Skills Development, and Training <i>(cont'd)</i>	Closure	Workforce and Procurement	Employment, Procurement of Goods and Services	Loss of Project-related employment may decrease LSA and RSA workforce experience and capability as skilled employees leave in search of employment elsewhere.	Management Practices	Workforce Transition Program	No	n/a
	Closure	Workforce and Procurement	Employment, Procurement of Goods and Services	Potential decrease in employment and population may reduce demand on LSA and RSA educational programs, facilities, and resources, resulting in reduced service delivery.	Management Practices	Workforce Transition Program; community communications plan	No	n/a
Community Well-being	Construction and Operation	Workforce and Procurement	Employment, Procurement of Goods and Services	Increase in overall community sense of worth through reversal of population decline.	Management Practices; Enhancement	Recruitment and Retention Strategy	Yes	Increase in community pride due to reversal in population decline (beneficial)
	Construction and Operation	Workforce and Procurement	Employment, Procurement of Goods and Services	Increased social, mental health, and community safety issues with increased demand on community support services.	Management Practices	community communications plan; Employee Assistance Program	Yes	Increase in social, mental health, and community safety issues in the short term as community support capacity is outpaced due to population change (adverse)
	Closure	Workforce and Procurement	Employment, Procurement of Goods and Services	Decrease in overall community sense of worth and capacity through potential loss of employment and population.	Management Practices	Workforce Transition Program	No	n/a
	Closure	Workforce and Procurement	Employment, Procurement of Goods and Services	Decreasing populations and demand for services may lead to reduced service delivery within the broader community.	Management Practices	Workforce Transition Program; community communications plan	No	n/a

### **22.7.3.3 Community Demographics, Infrastructure, and Services: Identification of Potential Residual Effects due to Change in Population**

Project-related employment and procurement may attract new residents to LSA communities, thereby increasing populations, potentially altering the gender, age, ethnic, and cultural profile. How these changes are perceived may be positive or negative depending on personal opinion. Project mitigation strategies implemented during construction and operation will help communities plan for potential population influx. The provision of on-site accommodation for workers and the rotational shift schedule will also minimize Project-related population increases within the LSA. However, a residual effect is anticipated following mitigation because negative and positive perceptions of demographic change, where present, are likely to remain.

A growing population and changing demographic is likely to increase demands on community infrastructure and services (health, social, emergency, recreation, etc.). Terrace and Smithers are likely able to accommodate potential increases in demand. However, the smaller and more remote communities may not have the capacity to adequately address increased demand, particularly for health and social services. This effect is anticipated to be more acute in the initial years of operation, as facilities, programs, and services will expand over time and be improved.

A potential residual adverse effect to community infrastructure and services is anticipated following mitigation. Due to the population size and associated tax base within many of the smaller LSA communities, demands on community housing, municipal infrastructure, community services, and community facilities may outpace LSA communities' capacity to meet demands. However, their capacity and infrastructure would expand over the long-term and be improved.

Loss of Project-related employment at closure and resulting out-migration of workers may result in decreased demand on community infrastructure, facilities, and services, potentially resulting in reduced service delivery. The Workforce Transition Program and the community communications plan will help mitigate loss of employment and related out-migration by facilitating skills and employment transfer should alternative employment opportunities be regionally available. Early communications of employment and contract changes will also help municipalities and service providers plan accordingly. Given that service delivery will return toward baseline conditions upon closure, residual effects are not anticipated.

### **22.7.3.4 Education, Skills Development, and Training: Potential Residual Effects due to Change in Population**

Project-related employment would attract skilled employees to the LSA and RSA, thereby contributing to an enhanced workforce. Project-related mitigation will be used to further enhance this outcome. Consequently, a beneficial residual effect is predicted as the educational profile of LSA and RSA communities will be improved.

An increase in population may put additional strain on LSA and RSA educational programs, facilities, and resources, but could increase the capacity of educational institutions over the long-term. Project-related mitigation, including a Labour Recruitment and Retention Strategy, a Labour Relations Strategy, a Workforce Training Strategy, and a community communications

plan, will be used to facilitate educational facilities' planning, resourcing, and capacity development.

No adverse residual effect is expected on education, skills, and training in the short term as the Workforce Training Strategy will add additional capacity. In the long term, a beneficial residual effect is anticipated as expanded and improved educational facilities will enhance the educational profile of local, regional, and provincial workforce.

Loss of Project-related employment at closure may decrease LSA and RSA workforce experience and capability as skilled employees leave in search of employment elsewhere. The Workforce Transition Program will be used to mitigate any loss of employment and population. As educational profiles would return toward baseline conditions upon the loss of skilled residents, no residual effect is anticipated.

Loss of employment and potential population decrease at closure may also reduce demand on LSA and RSA educational programs, facilities, and resources, resulting in reduced service delivery. The Workforce Transition Program and the community communications plan will be used to mitigate any loss of employment, population, and related demand on educational programs and facilities. As the capacity of educational facilities would return toward baseline conditions upon population loss, no residual effect is anticipated.

#### **22.7.3.5 Community Well-being: Potential Residual Effects due to Change in Population**

Project-related change in population within the LSA during construction and operation could increase overall community sense of worth and capacity through induced economic effects, and by potentially reversing the population decline experienced recently within the RSA. Mitigation strategies, including a Labour Recruitment and Retention Strategy and a Procurement Strategy, will further enhance this beneficial effect. An overall increase in community pride and participation is anticipated as a residual effect.

Population growth would increase the demand for social and mental health services within the LSA communities. Service, program, and infrastructure demands may outpace LSA communities' capacity to meet demands in the short-term. Mitigation strategies include an Employee Assistance Program, worker health and safety policies, and a community communications plan.

Due to the population size and associated tax base within LSA communities, a residual effect is anticipated for CWB over the short term as demand for health and mental and social health services may exceed the local capacity to respond to these demands. Over the long term, community support capacity is expected to expand to meet demand.

A decrease in overall community sense of worth and capacity could occur at closure through potential loss of population. A Workforce Transition Program will be implemented to facilitate skills and employment transfer both locally and regionally. As population reduction would return toward baseline conditions, no residual effect is anticipated.

Potential loss of employment and decreasing populations at closure could also lower demand for services and could lead to reduced service delivery within the broader community. A Workforce Transition Program and a community communications plan will be implemented to facilitate skills and employment transfer, both locally and regionally, and to encourage adequate planning. As reduction in service delivery would return toward baseline conditions, no residual effect is anticipated.

#### 22.7.4 Change in Tax Base

The Project is expected to increase the tax base of the RSA and LSA municipal communities during construction and operation. The predicted government tax revenues (personal income tax, corporate profit tax other than that of the Project, and sales tax) generated as a result of the economic activity are substantial (Table 22.7-6; Economic Effects Assessment, Section 20.7.3). During construction, this consists of total tax revenue of approximately \$183 million to the Government of BC, and \$732 million to the Government of Canada, with approximately \$162 million combined going to the other provinces. During operation, this consists of total revenue of approximately \$1.27 billion to the Government of BC and \$5.37 billion to the Government of Canada, with approximately \$1.38 billion combined going to the other provinces.

**Table 22.7-6. Government Tax Revenue Effects of the Project**

	Canadian Government Tax Revenue (million \$)	Provincial Tax Revenue (million \$)	Total Government Tax Revenue (million \$)
<b>Construction</b>			
BC	\$408.4	\$182.8	\$591.3
Canada	\$731.6	\$344.5	\$1,076.0
<b>Operation</b>			
BC	\$2,808.0	\$1,265.2	\$4,073.2
Canada	\$5,368.4	\$2,641.1	\$8,009.6

Source: 2012 Economic Model Report (Appendix 20-B).

In addition to these tax revenues, during operation the Proponent is estimated to pay:

- the BC mineral tax (based on net current Project proceeds and net revenues) of an average of approximately \$39.2 million/year for a total of approximately \$2.35 billion over the life of the mine to the Government of British Columbia; and
- rural property tax of an average of approximately \$1.55 million/year for a total of approximately \$85.0 million over the life of the mine.

An increase in the tax base is predicted to create beneficial effects on community demographics, infrastructure, and services because the tax base from Project-related activities would increase government revenues available to fund community infrastructure and services. Beneficial effects for education, skills development, and training, and CWB are expected indirectly, as a result of enhanced community infrastructure and services. However, it is recognized that with the development of any new project, higher government tax revenues typically do not occur until operation.

At closure, tax revenue contributions will decrease in the LSA, RSA, province, and country. This reduction is associated with the end of the Project-related contributions made to personal income tax, corporate profit tax, sales tax, and resource revenues. However, it is difficult to predict specific effects of the decrease due to the long timeline for Project operation.

#### **22.7.4.1 Mitigation for Change in Tax Base**

Changes in the tax base are predetermined by existing municipal, regional, and provincial regulatory frameworks; as such, no specific mitigation is proposed. However, the Workforce Transition Program (Section 20.7.1.1) will assist in the transition of Project employees into new positions, helping to maintain the tax base due to income and consumer spending. Additionally, the regional economy is anticipated to develop and diversify over the life of the Project, thereby providing a broader tax base within the RSA (see also Economic Effects Assessment, Section 20.7.5).

#### **22.7.4.2 Potential for Residual Effects**

A positive residual effect to community demographics, infrastructure, and services is expected due to a change in the tax base (Table 22.7-7). No residual effects are anticipated for education, skills development, and training, or for CWB.

#### **22.7.4.3 Community Demographics, Infrastructure, and Services: Potential Residual Effects due to Change in Tax Base**

Increased government revenues available to fund infrastructure and services are predicted during construction and operation. As a result, the potential residual effect from increased revenues is anticipated to be beneficial provincially, regionally, and throughout the LSA.

Upon closure, government revenues may be reduced, depending on economic conditions at the time (which are beyond the control of the Project) and the employment and business opportunities available from other projects. Since a reduction in government revenues from the tax base would return toward baseline conditions, no residual adverse effect is predicted.

#### **22.7.5 Change in Traffic**

The transportation of materials and personnel to and from the Project site, and concentrate hauling to the Port of Stewart during construction and operation may adversely affect CWB. Potential effects due to Project-related traffic along highways 37 and 37A are assessed in the *Highways 37 and 37A Traffic Effects Assessment* ([Appendix 22-C](#)) and, thus, are not addressed further.

During the initial years of construction, there will be an average of approximately 1,760 one-way trips (5 one-way trips per day) travelling through Hyder to deliver equipment and materials to a staging area at Granduc. Materials and equipment will be moved from the Granduc staging area to the Project site using the Temporary Frank Mackie Glacier access route during the winter. The potential effects on Hyder residents will be mitigated by spreading out traffic through Hyder over the year. Thus, this potential effect is also not assessed further.



**Table 22.7-7. Potential Residual Effects on Social Valued Components due to Change in Tax Base**

<b>Valued Component</b>	<b>Timing Start</b>	<b>Project Area(s)</b>	<b>Component(s)</b>	<b>Description of Effect due to Component(s)</b>	<b>Type of Project Mitigation</b>	<b>Project Mitigation Description</b>	<b>Potential Residual Effect</b>	<b>Description of Residuals</b>
Community Demographics, Infrastructure, and Services	Construction and Operation	Workforce and Procurement	Employment, Procurement of Goods and Services	Tax base from Project-related employment will increase government revenues available to fund infrastructure and services.	None	None	Yes	Increase in government revenues to fund infrastructure and services due to increased tax base (beneficial)
	Closure	Workforce and Procurement	Employment, Procurement of Goods and Services	Loss of employment and resulting tax base may decrease government revenues used to fund infrastructure and services.	None	None	No	n/a

The potential for an adverse effect on CWB due to a change in traffic is assessed here specifically with respect to traffic through Stewart. During construction, it is estimated that there will be an annual average of approximately 880 truck trips through Stewart (an average of 3 trips per day). During operation, there will be an annual average of 13,200 truck trips through Stewart (an average of 36 trips per day). The actual volume of trucks on a given day is expected to vary depending on the needs of the Project.

Increased road traffic through Stewart may create adverse effects for CWB with respect to road safety and environmental quality due to nuisance from noise and emissions for residents and visitors. Increased traffic volume may increase the probability of vehicle-related accidents, although changes to collision rates are complex and difficult to predict because they are affected by a number of factors, including driver behaviour, intersection configurations and treatments, road conditions, and weather, among others. The Project-related change in vehicle traffic is predicted to be an increase in noise and vehicle emissions, potentially resulting in an adverse effect on CWB.

#### **22.7.5.1 Mitigation for Change in Traffic**

To ensure vehicle and employee safety, transport haulage load and dimensions will conform to prescribed limits and to bulletins on seasonal axle weight restrictions. Appropriate traffic control and vehicle maintenance measures will be implemented according to BC's Occupational Health and Safety Regulation (BC Reg. 296/97) for the protection of workers and the public. Mitigation of adverse effects associated with Project-related changes in traffic is described in more detail in the Highways 37 and 37A Traffic Effects Assessment ([Appendix 22-C](#)). As defined in this appendix, a Company Safety Management System will be implemented, and appropriate signage used.

In addition, the Proponent will develop and implement a community communications plan (Section 22.7.3.1) for the Project. Implementation of the plan will provide for regular communications with Stewart so that the municipal government and residents are provided with information on transportation volumes and schedules, including early notification when major traffic changes are anticipated.

Project vehicles will also be required to appropriately manage and conduct their activities in accordance with the Traffic and Access Management Plan (Chapter 26.25), which defines specific management traffic actions to avoid adverse worker and public health and safety effects, and minimizes adverse social and environmental effects.

To mitigate impacts to the quality of the natural environment, concentrate-hauling vehicles will be equipped with high-quality filters to reduce air emissions and to comply with the BC Air Action Plan (Province of British Columbia 2013).

#### **22.7.5.2 Potential for Residual Effects**

Two residual adverse effects are predicted for CWB due to a change in traffic (Table 22.7-8). No residual effects are anticipated on the VC community demographics, infrastructure, and services, or education, skills development, and training.

**Table 22.7-8. Potential Residual Effects on Social Valued Components due to Change in Traffic**

Valued Component	Timing Start	Project Area(s)	Component(s)	Description of Effect due to Component(s)	Type of Project Mitigation	Project Mitigation Description	Potential Residual Effect	Description of Residuals
Community Well-being	Construction	Off-site transportation (Stewart)	Highway 37 and 37A	Increased risk of vehicle accidents and decreased public safety	Management Practices	Compliance with BC's Occupational Health and Safety Regulation (BC Reg. 296/97); Company Safety Management System; community communications plan; Traffic and Access Management Plan	No	n/a
	Operation	Off-site transportation (Stewart)	Highway 37 and 37A	Increased risk of vehicle accidents and decreased public safety	Management Practices	Compliance with BC's Occupational Health and Safety Regulation (BC Reg. 296/97); Company Safety Management System; community communications plan; Traffic and Access Management Plan	Yes	Increase in vehicle accidents due to increased traffic volume in Stewart (adverse)
	Construction	Off-site transportation (Stewart)	Highway 37 and 37A	Reduced quality of the environment due to increased vehicle emissions (noise, exhaust)	Management Practices	Compliance with BC's Occupational Health and Safety Regulation (BC Reg. 296/97) and the BC Air Action Plan (Province of British Columbia 2013); Company Safety Management System; community communications plan; Traffic and Access Management Plan	No	n/a
	Operation	Off-site transportation (Stewart)	Highway 37 and 37A	Reduced quality of the environment due to increased vehicle emissions (noise, exhaust)	Management Practices	Compliance with BC's Occupational Health and Safety Regulation (BC Reg. 296/97) and the BC Air Action Plan (Province of British Columbia 2013); Company Safety Management System; community communications plan; Traffic and Access Management Plan	Yes	Increase in emissions (noise, exhaust) due to increased traffic volume in Stewart (adverse)

### **22.7.5.3 Community Well-being: Potential Residual Effects due to Change in Traffic**

Following mitigation, a residual adverse effect to CWB is predicted due to increased noise and emissions from truck traffic through Stewart, and the potential for an increased risk of vehicle accidents. Effects related specifically to human health are discussed in Chapter 25. The potential residual effect is predicted for the operation phase only, due to the expected Project-related traffic volumes. During construction, truck traffic is relatively modest through Stewart (an average of approximately three trips per day); thus, with mitigation, no residual adverse effect on CWB is predicted during this phase.

## **22.8 Significance of Residual Effects**

Residual effects are predicted on all three social VCs—community demographics, infrastructure, and services; education, skills development, and training; and CWB. In total, 14 residual effects were identified, associated with the effects of change in employment, change in income, change in population, change in tax base, and change in traffic.

### **22.8.1 Residual Effect Descriptors**

Residual effect descriptors and definitions for social VCs are provided in Table 22.8-1. Key descriptors for the assessment of potential effects on social VCs are:

- magnitude: the anticipated size of the effect relative to typical or usual historic socio-economic changes (negligible, low, medium, high);
- geographic extent: the spatial scale to which the effect is anticipated to apply (individuals/households, community [including Aboriginal and non-Aboriginal communities], regional, beyond regional);
- duration: the anticipated length of the effect (short-term is 1 year or less, medium-term is 1 to 11 years, long-term is 12 to 70 years, far-future is more than 70 years); and
- frequency: how often the effect is anticipated to occur (once, sporadic, regular, continuous).

Reversibility and context also play a role in the determination of significance, although are less key for the identified social effects.

### **22.8.2 Residual Effects Assessment for Community Demographics, Infrastructure, and Services**

As summarized in Table 22.8-2, the Project is predicted to have three residual effects on community demographics, infrastructure and services due to the effects of change in population and change in tax base.

#### **22.8.2.1 Residual Effect of Change in Population on Community Demographics**

The Project is predicted to have a residual effect on community demographic profiles throughout LSA communities during operation (Table 22.8-2). This is expected due to the Project's potential to attract new residents to LSA communities. Demographic change would be experienced primarily at the level (or extent) of the community.

**Table 22.8-1. Definitions of Significance Criteria for Social Residual Effects**

Timing (What phase of the Project is the effect associated with?)	Magnitude (negligible, low, medium, high)	Geographic Extent (local, landscape, regional, beyond regional)	Duration (short term, medium term, long term, far future)	Frequency (once, sporadic, regular, continuous)	Reversibility (reversible short term, reversible long term, or irreversible)	Context (resilience and/or unique attributes) (low, neutral, high)	Probability (low, medium, high)	Confidence (low, medium, high)	Significance (Not Significant: minor, moderate; Significant: major)	Follow-up Monitoring (Not required, required)
<b>Construction</b>	<b>Negligible.</b> There is no detectable change from baseline conditions.	<b>Individual/Household.</b> The effect is limited to individuals, families, and/or households.	<b>Short term.</b> The effect lasts approximately 1 year or less.	<b>Once.</b> The effect occurs once during any phase of the Project.	<b>Reversible short term:</b> An effect that can be reversed relatively quickly.	<b>Low.</b> The valued component is considered to have little to no unique attributes and/or there is high resilience to imposed stresses.	<b>Low.</b> An effect is unlikely but could occur.	<b>Low (&lt; 50% confidence).</b> The cause-effect relationship between the Project and its interaction with the environment is poorly understood; data for the Project area may be incomplete; uncertainty associated with synergistic and/or additive interactions between environmental effects may exist. High degree of uncertainty.	<b>Not Significant (minor).</b> Residual effects have no or low magnitude, individual/household geographical extent, short- or medium-term duration, and occur intermittently, if at all. There is a high level of confidence in the conclusions. The effects on the VC are indistinguishable from background conditions (i.e., occur within the range of historic variation). Land-use management objectives will be met. Follow-up monitoring is optional.	<b>Not required</b>
<b>Operation</b>	<b>Low.</b> The magnitude of effect differs from the average value for baseline conditions, but is within the range of historic variation.	<b>Community.</b> An effect extends to the Local Study Area community level.	<b>Medium term.</b> The effect lasts from 1 to 11 years.	<b>Sporadic.</b> The effect occurs at sporadic or intermittent intervals during any phase of the Project.	<b>Reversible long term:</b> An effect that can be reversed after many years.	<b>Neutral.</b> The valued component is considered to have some unique attributes, and/or there is neutral (moderate) resilience to imposed stresses.	<b>Medium.</b> An effect is likely but may not occur.	<b>Medium. (50 – 80% confidence):</b> The cause-effect relationship between the Project and its interaction with the environment is not fully understood, or data for the Project area are incomplete. Moderate degree of uncertainty.	<b>Not Significant (moderate).</b> Residual effects have medium magnitude, individual/household, community or regional geographic extent, are short term to chronic (i.e., may persist into the far future), and occur at all frequencies. Residual effects on VCs are distinguishable at the population and/or community level. Ability of meeting land-use management objectives may be impaired. Confidence in the conclusions is medium or low. The probability of the effect occurring is low or medium. Follow-up monitoring of these effects may be required.	<b>Required</b>
<b>Closure</b>	<b>Medium.</b> The magnitude of effect differs from the average value for baseline conditions and approaches the limits of historic variation.	<b>Regional.</b> The effect extends across the Regional Study Area.	<b>Long term.</b> The effect lasts between 12 and 70 years.	<b>Regular.</b> The effect occurs on a regular basis during any phase of the Project.	<b>Irreversible.</b> The effect cannot be reversed.	<b>High.</b> The valued component is considered to be unique, and/or there is low resilience to imposed stresses.	<b>High.</b> An effect is highly likely to occur.	<b>High.</b> There is greater than 80% confidence in understanding the cause-effect relationship between the Project and its interaction with the environment, and all necessary data are available for the Project area. Low degree of uncertainty.	<b>Significant (Major).</b> Residual effects have high magnitude, regional or beyond regional geographic extent, are chronic (i.e., persist into the far future), and occur at all frequencies. Residual effects on VCs are consequential (i.e., structural and functional changes in populations and communities are predicted). Ability to meet land-use management objectives is impaired. Probability of the effect occurring is medium or high. Confidence in the conclusions can be high, medium, or low. Follow-up monitoring is required.	
<b>Post-closure</b>	<b>High.</b> The magnitude of effect is predicted to differ from baseline conditions so that there will be a detectable change beyond the range of historic variation (i.e., change of state from baseline conditions).	<b>Beyond Regional:</b> The effect extends possibly across or beyond the province.	<b>Far Future:</b> The effect lasts more than 70 years.	<b>Continuous.</b> An effect occurs constantly during any phase of the Project.						

**Table 22.8-2. Summary of Residual Effects on Demographics, Infrastructure, and Services**

Description of Residual Effect	Project Component(s)	Timing of Effect	Magnitude	Extent	Duration	Frequency	Reversibility	Context	Likelihood of Effects		Significance Determination	Follow-up Monitoring
									Probability	Confidence Level		
Altering of community demographics due to population growth (beneficial and/or adverse, depending on personal opinion)	Employment; Procurement of goods and services	Operation	Low	Community	Long	Continuous	Reversible long term	Low	High	Medium	Not Significant (minor)	Not Required
Demand on community infrastructure and services may outpace small LSA communities' capacity in the short term due to population growth (adverse)	Employment; Procurement of goods and services	Operation	Low	Regional	Medium	Continuous	Reversible short term	Low	High	High	Not Significant (minor)	Not Required
Increase in government revenues to fund infrastructure and services due to increased tax base (beneficial)	Employment; Procurement of goods and services	Operation	Low	Regional	Long	Continuous	Reversible long term	Neutral	High	High	Not Significant (minor)	Not Required
Overall Residual Effect	Employment; Procurement of goods and services	Operation	Low	Regional	Long	Continuous	Reversible short term	Low	High	High	Not Significant (minor)	Not Required

The magnitude of the effect will vary depending on the size of the community: smaller communities may experience greater relative demographic change than larger communities. However, given the relatively small number of people moving to the area (a fraction of the 423 annual average employees required during operation), and the fact that new residents will be spread across LSA communities (with immigrants more likely to settle in the larger communities), the magnitude of the effect is likely to be low, even in smaller communities.

The effect is expected to be continuous throughout the period, and to be reversible only upon closure. However, LSA communities have experienced population and demographic changes in the past (related to being a resource-based economy), and persisted. Consequently, they have the capacity to incorporate demographic change and maintain their unique attributes. There is a high probability that the effect will occur. However, it is difficult to predict the number of new residents in each community, resulting in a medium level of confidence. Overall, the effect of the Project on community population and demographics is predicted to be **not significant (minor)**.

### **22.8.2.2 Residual Effect of Change in Population on Community Infrastructure and Services**

The change in population due to Project-related employment opportunities is expected to increase demand on community infrastructure and services during operation (Table 22.8-2). In the short-term, increased demand may outpace or stress the communities' infrastructure and services capacity.

This effect will be experienced at the community level, with the magnitude varying across communities depending on their size and current infrastructure. Overall, the magnitude of the effect is expected to be low, as most new residents will likely settle in the larger communities, which have greater infrastructure and service capacity. The effect is expected to be continuous, but medium in duration and reversible in the short-term, as community infrastructure and services are anticipated to improve and expand over time to meet increased demand. The effect is assessed as regional in extent because some services are procured through the Regional Districts. Communities' resilience to the effect is also expected to be high (thus, context rated as low), as communities are able to adapt their infrastructure and services to changing populations over time. Thus, while the probability of a low magnitude increase in infrastructure and services demand is high, with a high level of confidence, the overall effect of population change on community infrastructure and services is predicted to be **not significant (minor)**.

### **22.8.2.3 Residual Effect of Change in Tax Base on Community Infrastructure and Services**

Project-related employment, expenditures, and mineral production are expected to increase the government tax base. Further, residents in all municipal LSA communities will contribute to tax revenue as they pay income tax and property tax and purchase goods and services. LSA-based businesses benefitting from Project-generated economic activity will also pay corporate and other taxes associated with their activities. Cumulatively, these contributions are expected to allow government-funded infrastructure and service improvements within the RSA and LSA communities.

As taxes will be paid throughout the duration of operation (duration is long), government revenues will be continuously available to fund infrastructure and service upgrades throughout the phase. The effect will only be reversible upon closure. However, the effect is expected to be low in magnitude, as the revenue raised will be spread among a number of communities and will not be specifically dedicated to upgrading community infrastructure and services; instead, it will go into general government revenues. The probability that government funds will be raised and available to fund infrastructure and services is high, as is confidence in the assessment. However, whether the funds will be so used is difficult to predict. Given the low magnitude of the effect and uncertainty regarding the intended use of government revenue raised through the Project, the effect of government revenues on community infrastructure and services is predicted to be **not significant (minor)**.

#### **22.8.2.4 Overall Residual Effect on Community Demographics, Infrastructure, and Services**

Potential residual effects of the Project on community demographics, infrastructure, and services include increased population and altered demographic structure; population growth outpacing infrastructure and service capacity in the short-term; and an increase in government revenue available to fund infrastructure and services in the long-term. However, none of these effects are expected to be significant. Overall, the effects of the Project on community demographics, infrastructure, and services are expected to be low in magnitude, community-level in extent, long in duration, continuous in frequency, reversible in the short-term, and low in context (Table 22.8-2). The likelihood of the overall residual effect is expected to be high in probability with a high level of confidence, with the overall residual effect rated as **not significant (minor)**.

#### **22.8.3 Residual Effects Assessment for Education, Skills Development, and Training**

As summarized in Table 22.8-3, the Project is predicted to have three residual effects on education, skills development, and training due to the effects of change in employment and change in population.

##### **22.8.3.1 Residual Effect of Change in Employment on Education, Skills Development, and Training**

The Project is predicted to have a beneficial effect on the local, regional, and provincial workforce during construction and operation (Table 22.8-3). This is expected to include educational and skills upgrading for Aboriginal and non-Aboriginal peoples.

For both construction and operation, the effect is expected to take place at the regional level, as the local and regional workforce will be enhanced through Project-related education and training. While employees from outside of the region will also receive training, many workers are predicted to reside in the RSA and LSA communities. While some training and education opportunities will be offered at particular times, on-the-job training will be continuous. The skills and education obtained are expected to be long lasting. However, the magnitude of the effect is expected to be low, due to the relatively small proportion of community, regional, and BC citizens receiving training, education, and skills upgrading. Thus, while the likelihood of an effect on education, skills development, and training is high, the overall effect is predicted to be **not significant (minor)**.



**Table 22.8-3. Summary of Residual Effects on Education, Skills Development, and Training**

Description of Residual Effect	Project Component(s)	Timing of Effect	Magnitude	Extent	Duration	Frequency	Reversibility	Context	Likelihood of Effects		Significance Determination	Follow-up Monitoring
									Probability	Confidence Level		
Increase in the educational profile of the local, regional, and provincial workforce due to employment-related training and work experience (beneficial)	Employment; Procurement of goods and services	Construction and Operation	Low	Regional	Long	Continuous	Reversible short term	Neutral	High	High	Not Significant (minor)	Not Required
Improvement in the educational profile of LSA and RSA communities due to in-migration of skilled workers (beneficial)	Employment; Procurement of goods and services	Operation	Low	Community	Long	Continuous	Reversible long term	Neutral	High	High	Not Significant (minor)	Not Required
Improvement in the capacity of educational institutions due to population-fueled demand (beneficial)	Employment; Procurement of goods and services	Operation	Low	Regional	Long	Continuous	Reversible long term	Neutral	Medium	Low	Not Significant (minor)	Not Required
Overall Residual Effect	Employment; Procurement of goods and services	Construction and Operation	Low	Regional	Long	Continuous	Reversible long term	Neutral	High	High	Not Significant (minor)	Not Required

### **22.8.3.2 Residual Effect of Change in Population on Education, Skills Development, and Training**

Project hiring is expected to attract skilled workers to the LSA communities. Consequently, the educational profile of the LSA communities is expected to improve (Table 22.8-3).

This effect will largely be felt at the community level. The duration of the effect will last as long as operation, will be continuous throughout the phase, and will be reversible should workers not find other opportunities in the region and choose to emigrate upon closure. While the effect will vary across communities on the basis of their size and existing educational profile, overall the effect is expected to be low in magnitude, given the relatively small numbers of expected in-migrating workers. Thus, while there is a high likelihood that LSA communities' educational profiles will be affected by in-migrating skilled workers, the effect is predicted to be not significant (minor).

A second predicted residual effect of population increase on education, skills, and training is a beneficial effect on the capacity of local and regional educational facilities as their services grow over time with increasing populations and demand for educational programs and services (Table 22.8-3). This residual effect is also predicted to occur primarily during operation. Increased capacity is expected to further result in improved educational and skills profiles of LSA communities.

This effect would largely be experienced at the regional level, as educational facilities serve a regional clientele. The effect of expanded educational facilities and services would extend long into the future and would be continuous. The magnitude of the effect is assessed as being low, as population increase is not expected to increase demand to a very large extent and because demand for educational services would be expected to be mainly focused to a specific sector (natural resources) and associated spin-off businesses. The probability of the effect is assessed as medium because economic conditions may make the expansion of facilities challenging. In addition, the confidence level of the assessment is low, as it is difficult to predict whether resources would indeed be directed toward expanding facilities and programs. Consequently, the effect of improved capacity of educational facilities due to increased population on education, skills development, and training is predicted to be not significant (minor).

### **22.8.3.3 Overall Effect on Education, Skills Development, and Training**

Potential residual effects of the Project on education, skills development, and training include enhancement of the local, regional, and provincial workforce through Project-related training and in-migration of skilled workers, and expansion and improvement of educational facilities. Overall, the effects of the Project on education, skills development, and training are expected to be low in magnitude, regional in extent, long in duration, continuous in frequency, reversible in the long-term, and neutral in context. The likelihood of the overall residual effect is expected to be high in probability with a high level of confidence. Thus, the overall effect is expected to be **not significant (minor)**.

### **22.8.4 Residual Effects Assessment for Community Well-being**

As summarized in Table 22.8-4, the Project is predicted to have eight residual effects on CWB due to the effects of change in employment, change in income, change in population, and change in traffic.

#### **22.8.4.1 Residual Effect of Change in Employment on Community Well-being**

Project-related change in employment is predicted to result in two residual effects on CWB.

Project-related employment is predicted to have a beneficial effect on individual esteem and community pride during operation and would, therefore, take place at a community level.

The effect on CWB would occur continuously throughout the duration of operation and would be reversible upon closure. There is a high probability that the effect will occur, as at least some employees and community members will experience increased self-esteem and community pride in relation to Project employment. However, the magnitude of the effect is expected to be low, as it is expected that only a small percentage of communities will be employed by the Project, and not all community members will experience an increase in community pride due to the Project's employment of community members. The confidence level is low, as self-esteem and community pride are difficult to measure and evaluate. Overall, the effect of employment on CWB is predicted to be **not significant (minor)**.

Project-related employment may also adversely affect CWB by increasing stress on families in relation to employment rotation schedules. There may also be an increase in substance misuse due to employment-related stress. The effect would be felt at the community level. Stress would occur regularly throughout operation because of the rotation schedule and the demands of employment, and would be reversible upon closure. However, the magnitude of the effect is expected to be low, as work and periodic absence from the home is but one factor that may contribute to stress. Moreover, as LSA communities are economically resource-dependent, it is likely that LSA workers and families would be familiar with the type of employment. Consequently, they may have a degree of resilience to its effects. The probability that the effect will occur is high, as at least some households will experience increased stress associated with rotation schedules. The level of confidence in this assessment is medium; information about community stress is difficult to measure and evaluate, although studies have demonstrated the linkage between substance misuse and work-related stress. Overall, the effect of employment rotation schedules on family stress is predicted to be **not significant (minor)**.

#### **22.8.4.2 Residual Effects of Change in Income on Community Well-being**

Project-related change in income is predicted to have two residual effects on CWB.

Change in income is predicted to have a beneficial effect on CWB due to the associated increase in financial independence and access to goods and services. As Project employees will be located both within and outside the RSA, the effect will extend beyond the region, although the greatest impact is expected to be within the RSA and LSA communities. The effect will last as long as operation, will be continuous throughout the phase, and will only be reversible upon closure. The probability that this effect will occur is high, as is the confidence in the assessment. However, the magnitude of the effect is low, as it is predicted that a relatively small percentage of residents in the LSA will be employed by the Project. Consequently, the effect of change in income on CWB is predicted to be **not significant (minor)**.

**Table 22.8-4. Summary of Residual Effects on Community Well-being**

Description of Residual Effect	Project Component (s)	Timing of Effect	Magnitude	Extent	Duration	Frequency	Reversibility	Context	Likelihood of Effects		Significance Determination	Follow-up Monitoring
									Probability	Confidence Level		
Increase in individual esteem and community pride due to employment (beneficial)	Employment; Procurement of goods and services	Operations	Low	Community	Long	Continuous	Reversible long term	Neutral	High	Medium	Not significant (minor)	Not Required
Increase in stress on families due to employment rotation schedules (adverse), and increase in substance misuse due to employment-related stress (adverse)	Employment; Procurement of goods and services	Operations	Low	Community	Long	Regular	Reversible long term	Neutral	High	Medium	Not significant (minor)	Not Required
Increase in financial independence and access to goods and services due to increased income (beneficial)	Employment; Procurement of goods and services	Operations	Low	Regional	Long	Continuous	Reversible long term	Neutral	High	High	Not significant (minor)	Not Required
Increase in substance misuse due to increase in income (adverse)	Employment; Procurement of goods and services	Operations	Low	Community	Long	Regular	Reversible long term	Neutral	High	Medium	Not significant (minor)	Not Required
Increased community pride due to reversal in population decline (beneficial)	Employment; Procurement of goods and services	Operations	Low	Community	Long	Continuous	Reversible long term	Neutral	Low	Low	Not significant (minor)	Not Required
Increase in social, mental health, and community safety issues in the short-term as community support capacity is outpaced by population change (adverse)	Employment; Procurement of goods and services	Operations	Low	Regional	Medium	Continuous	Reversible short term	Neutral	Medium	Medium	Not significant (minor)	Not Required
Increase in emissions (noise, exhaust) due to increased traffic volume in Stewart	Highway 37 and 37A	Operations	Low	Community	Long	Regular	Reversible long term	Low	High	High	Not significant (minor)	Not Required
Increase in vehicle accidents due to increased traffic volume in Stewart (adverse)	Highway 37 and 37A	Operations	Low	Community	Long	Regular	Reversible long term	Low	Medium	Medium	Not significant (minor)	Not Required
Overall Residual Effect	Employment; Procurement of goods and services; Highway 37 and 37A	Operation	Low	Community	Long	Continuous	Reversible long term	Low	Medium	Medium	Not significant (minor)	Not Required

Conversely, change in income may create an adverse effect on CWB due to an increase in substance misuse. Ratings of this effect are identical to ratings for the effect of change in employment on substance misuse. Similarly, the effect of change in income on CWB is predicted to be **not significant (minor)**.

#### **22.8.4.3 Residual Effects of Change in Population on Community Well-being**

Project-related change in population is predicted to result in two residual effects on CWB.

Population change is expected to create a beneficial residual effect on CWB by instilling community pride associated with a reversal in population decline. This effect is expected to occur at the level of the community. As increased population levels would be maintained for the duration of operation, the effect would be extended over that time frame and would be continuous throughout. The effect would be reversible upon closure. The probability that the effect would occur is high. However, the magnitude of the effect is low, as not all communities will necessarily experience notable changes in population, nor will all residents necessarily perceive the change positively. Moreover, the confidence level of the assessment is low, as community pride is difficult to measure. Consequently, the residual adverse effect of population on CWB, with respect to community pride, is predicted to be **not significant (minor)**.

Conversely, population change is predicted to result in an adverse effect for CWB due to increased levels of social, mental health, and community safety issues associated with the potential for outpacing community services capacity. The effect would be experienced at the regional level during operation, as social services are delivered on a regional, as well as community, basis. The effect would occur continuously, but only for a medium duration, as service capacity is expected to increase to meet demand. As such, the effect is reversible in the short term. Communities are expected to have a degree of resilience to the effect over the long term, as they are able to adapt services to meet demand. The expected magnitude of the effect is predicted to vary by community, depending on existing levels of social issues and support capacity. Overall, however, the magnitude of the effect is expected to be low, as the demand on health and social services is not expected to increase substantially. The probability that the effect will occur is medium, and the level of confidence of the assessment is low because the determinants of community social and mental health are complex and influenced by a number of factors. Consequently, the effect of population change on CWB, with respect to social and mental health issues, is predicted to be **not significant (minor)**.

#### **22.8.4.4 Residual Effects of Traffic on Community Well-being**

Project-related change in traffic is predicted to result in two residual effects on CWB.

Nuisance effects due to an increase in Project-related truck traffic emissions (noise and exhaust) may be experienced at the community level (Stewart). The effect will occur regularly, as it will be tied to the schedule of shipments, will last as long as operation, and will be reversible upon closure. The probability that the effect will occur is high, as is the level of confidence in the assessment. However, the magnitude of the effect is expected to be low, given mitigation measures. Moreover, the community is expected to be highly resilient to the effect, given the

history of resource development–related traffic in the LSA. Consequently, the effect of traffic on CWB, with respect to emissions, is expected to be **not significant (minor)**.

Project-related traffic is also expected to adversely affect CWB by increasing the probability of vehicle accidents in Stewart. The effect would be experienced at the community level. The increased chance of vehicle accidents will occur regularly throughout operation (tied to shipment schedules), and will be reversible upon closure. The probability that the effect will occur is medium, as is confidence in the assessment, because of the complex relationship that exists between traffic volume and vehicle accidents. However, the magnitude of the effect is expected to be low, given mitigation measures. Moreover, the community of Stewart is likely to be resilient to the effect, given the history of resource sector–related traffic in the LSA. Consequently, the effect of traffic on CWB, with respect to traffic safety, is predicted to be **not significant (minor)**.

#### **22.8.4.5 Overall Effect on Community Well-being**

Predicted beneficial residual effects of the Project on CWB include an increased sense of community worth, and increased financial independence and access to goods and services. Predicted adverse residual effects on CWB include increased family stress, increased substance misuse, and increased social and mental health issues. However, none of these effects are predicted to be significant. Overall, the effects of the Project on CWB are expected to be low in magnitude, community in extent, long in duration, continuous in frequency, reversible in the long term, and low in context. The likelihood of the overall residual effect is expected to be medium in probability with a medium level of confidence. Particularly given the low magnitude of all predicted effects, the overall predicted effect of the Project on CWB is **not significant (minor)**.

## **22.9 Potential Cumulative Effects**

After mitigation measures are applied, the Project is predicted to result in a total of 14 beneficial and adverse residual effects to social VCs. While none of these residual effects are assessed as significant for the proposed Project, they may interact with other projects and activities. Consequently, these individual effects are assessed for potential cumulative effects.

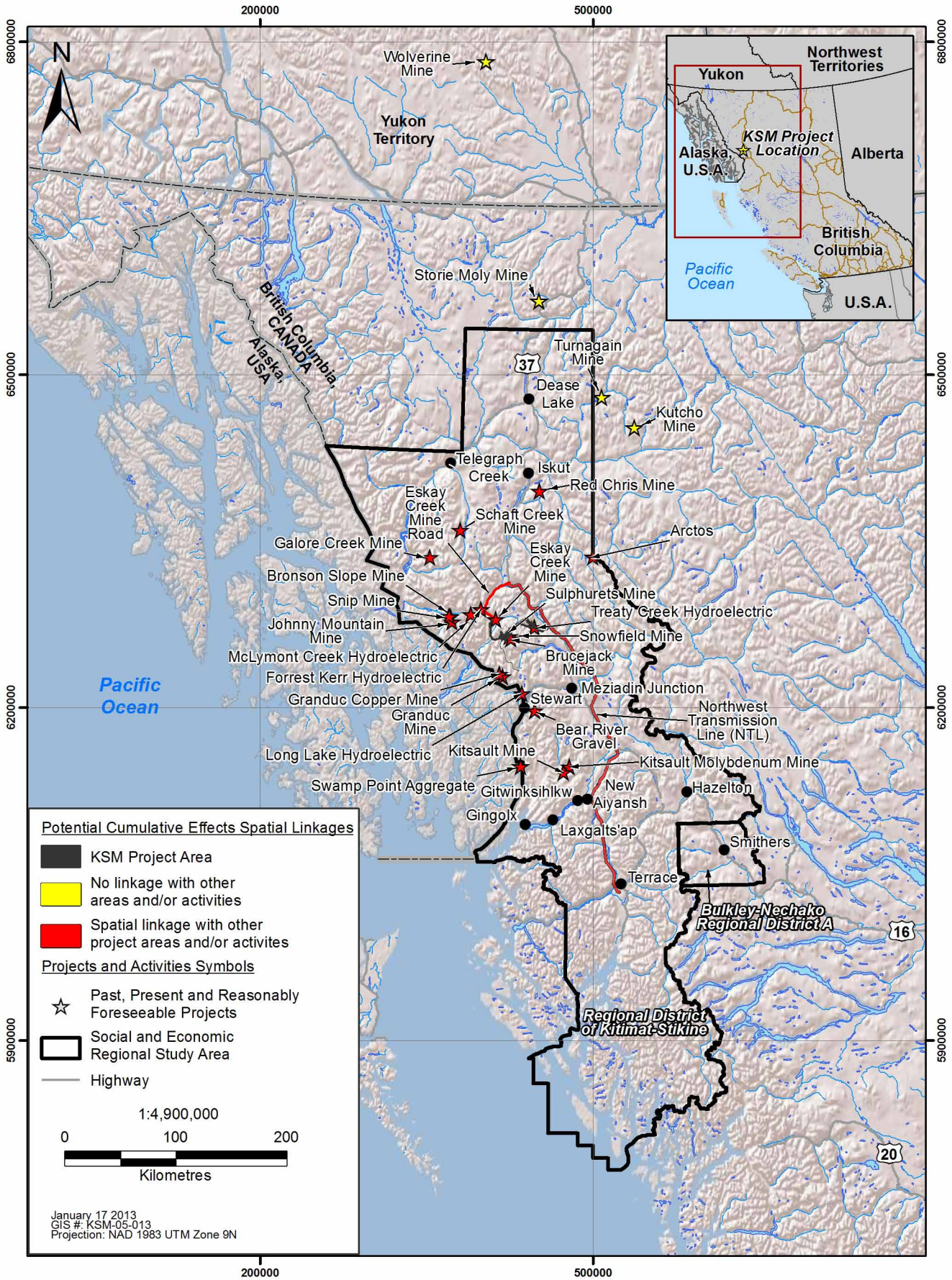
### **22.9.1 Scoping of Cumulative Effects**

#### **22.9.1.1 Spatial Linkages with other Projects and Human Actions**

The spatial boundaries for the social cumulative effects assessment is based on the RSA used for the Social Effects Assessment (Figure 22.1-1). The RSA contains a number of past, present, and reasonably foreseeable projects (mainly mines) that have created, do create, or will create changes in employment, income, population, tax base, and traffic. These projects and activities may interact spatially with the KSM Project's effects on the social conditions of LSA communities and the region.

Projects and activities considered to have a spatial linkage with the KSM Project fall within the RSA (Figure 22.9-1), and include:

- Eskay Creek Mine;
- Granduc Mine;
- Johnny Mountain Mine;
- Kitsault Mine (past producing);
- Snip Mine;
- Sulphurets Project;
- Swamp Point Aggregate Mine Project;
- Forrest Kerr Hydroelectric;
- Long Lake Hydroelectric;
- Northwest Transmission Line (NTL);
- Red Chris Mine;
- Bear River Gravel;
- Bronson Slope Mine;
- Brucejack Mine;
- Galore Creek Mine;
- Granduc Copper Mine;
- Kitsault Mine;
- McLymont Creek Hydroelectric;
- Arctos Anthracite Coal Project;
- Schaft Creek Mine;
- Snowfield Project;
- Treaty Creek Hydroelectric;
- agricultural resources;
- fishing (commercial and recreational);
- guide outfitting;
- Aboriginal harvest (fishing, hunting/trapping, and plant harvest);
- resident trapping;
- mineral and energy resource exploration;
- recreation and tourism (parks and commercial tenures for heli-skiing, rafting, etc.);
- timber harvesting (forestry); and
- traffic and roads.



KSM Cumulative Effects Issue Scoping: Potential Spatial Linkages for Economic and Social Effects

Figure 22.9-1



Wolverine Mine, Kutcho Mine, Storie Moly Mine, and Turnagain Mine are evaluated as not having spatial linkages with the KSM Project because of their distance from the Project.

**22.9.1.2 Temporal Linkages with other Projects and Human Actions**

Present mine and hydroelectric projects (i.e., NTL and Red Chris Mine), future mine and hydroelectric projects, and commercial land use activities (i.e., fishing, guide outfitting, mineral and energy resource exploration, recreation and tourism, and timber harvesting) may cause social changes that are similar to the KSM Project and that occur at a similar time. Past projects and activities are not considered to be temporally linked to the Project, as they no longer produce any social effects. Table 22.9-1 summarizes the linkages between KSM and other projects and activities.

**Table 22.9-1. Summary of Potential Social Linkages between KSM Project and other Human Actions**

Action/Project		Past	Present	Future
Past Projects	Eskay Creek Mine	NL	NL	NL
	Granduc Mine	NL	NL	NL
	Johnny Mountain Mine	NL	NL	NL
	Kitsault Mine (closed)	NL	NL	NL
	Snip Mine	NL	NL	NL
	Sulphurets Project	NL	NL	NL
	Swamp Point Aggregate Mine	NL	NL	NL
Present Projects	Forrest Kerr Hydroelectric	NL	NL	NL
	Long Lake Hydroelectric	NL	NL	NL
	NTL	NL	X	X
	Red Chris Mine	NL	X	X
	Wolverine Mine	NL	NL	NL
Reasonably Foreseeable Future Projects	Bear River Gravel	NL	NL	X
	Bronson Slope Mine	NL	NL	X
	Brucejack Mine	NL	NL	X
	Galore Creek Mine	NL	NL	X
	Granduc Copper Mine	NL	NL	X
	Kitsault Mine	NL	NL	X
	Kutcho Mine	NL	NL	NL
	McLymont Creek Hydroelectric	NL	NL	X
	Arctos Anthracite Coal Project	NL	NL	X
	Schaft Creek Mine	NL	NL	X
	Snowfield Project	NL	NL	X
	Storie Moly Mine	NL	NL	NL
	Turnagain Mine	NL	NL	NL
	Treaty Creek Hydroelectric	NL	NL	X

(continued)

**Table 22.9-1. Summary of Potential Social Linkages between KSM Project and other Human Actions (completed)**

Action/Project		Past	Present	Future
Land Use Activities	Agricultural resources	NL	NL	NL
	Fishing	NL	X	X
	Guide outfitting	NL	X	X
	Resident and Aboriginal harvest	NL	NL	NL
	Mineral and energy resource exploration	NL	X	X
	Recreation and tourism	NL	X	X
	Timber harvesting	NL	X	X
	Traffic and roads	NL	NL	NL

NL = No Linkage (no spatial and temporal overlap, or potential effects do not act in combination) with action/project.  
X = Potential spatial and temporal linkage with action/project.

### 22.9.2 Cumulative Effects Assessment for Community Demographics, Infrastructure and Services

The Project is predicted to result in beneficial and adverse residual effects to community demographics, infrastructure and services. Beneficial effects include demographic change (depending on personal opinion of such change) and government revenue available to fund infrastructure and services. Adverse effects include demographic change (depending on personal opinion of such change) and increased demand on community infrastructure and services. The current Red Chris Mine, future mines and hydroelectric projects (Table 22.9-1), and commercial land use activities (i.e., fishing, guide outfitting, mineral and energy resource exploration, recreation and tourism, and timber harvesting) have the potential to interact cumulatively with these effects due to the population growth and government tax revenues generated by these projects and activities (Table 22.9-2). The NTL project is not expected to act cumulatively with the KSM Project on community demographics, infrastructure, and services because construction of the NTL will be complete prior to the beginning of KSM Project construction; in addition, during operation, the NTL will employ a small number of workers.

The Red Chris Mine is currently under construction and scheduled to start production in 2014, with an approximate 28-year mine life. In operation, it is expected to directly employ approximately 250 workers. In addition, all identified future projects that temporally overlap with the KSM Project will provide additional employment within the RSA and LSA communities. It is difficult to meaningfully estimate the proportion of employment from all other projects that will be sourced from the LSA communities and the RSA. Among the projects, the total direct construction workforce is estimated at approximately 4,500 and the total operation workforce at approximately 2,600, spread among a number of years. This is in comparison to the direct employment of the KSM Project of approximately 1,800 on average during construction and 1,040 on average during operation, although it is estimated that a relatively small share of this total direct employment will be residents of the RSA and LSA communities (Economic Effects Assessment, Section 20.7.2). In addition, there is other ongoing local and regional employment associated with commercial land use activities.

**Table 22.9-2. Summary of Projects and Activities with Potential to Interact Cumulatively with Expected Project-specific Residual Effects on Community Demographics, Infrastructure and Services**

Description of KSM Residual Effect	NTL	Red Chris Mine	Future Mine and Hydroelectric Projects	Commercial Land Use Activities
Altering of community demographics due to population growth (beneficial and/or adverse, depending on personal opinion)	No Interaction	Possible Interaction	Possible Interaction	Possible Interaction
Demand on community infrastructure may outpace small LSA communities' capacity in the short term due to population growth (adverse)	No Interaction	Possible Interaction	Possible Interaction	Possible Interaction
Increase in government revenues to fund infrastructure and services due to increased tax base (beneficial)	No Interaction	Possible Interaction	Possible Interaction	Possible Interaction

It should be emphasized that not all future projects and activities that have been identified as having the potential to act cumulatively with the KSM Project on community demographics, infrastructure, and services (Table 22.9-2) are certain to occur. Rather, it is likely that not all will occur. However, to acknowledge this uncertainty and to be conservative in the assessment, it is assumed that all identified future projects proceed and activities occur, and that their demand for workers and supplies and services from within the RSA is a high proportion of their total employment and procurement. Thus, the cumulative effects assessment represents a high interaction scenario.

### **22.9.2.1 Cumulative Effect for Change in Demographics**

Together, the current Red Chris Mine, future mines and hydroelectric projects, and commercial land-use activities are expected to contribute to population growth in the RSA and LSA, which, in turn, is expected to cumulatively change community demographic composition. This potential residual effect may be both beneficial and adverse, depending on the perceptions and opinions of the individual resident.

#### **22.9.2.1.1 Project-specific Cumulative Effects Mitigations for Change in Demographics**

As described in Section 22.7.3.1, management practices, monitoring, and adaptive management will be implemented to mitigate and enhance the potential Project effects on community demographics. This includes the Labour Recruitment and Retention Strategy, the Workforce Training Strategy, the community communications plan, and the Employee Assistance Program.

#### **22.9.2.1.2 Other Project/Activity Mitigations to Address Change in Demographics**

There are no specific mitigation or management measures explicitly identified from other projects or activities to address effect on employment. However, it is expected that other large

resource development projects would adopt mitigation and management measures similar to those of the KSM Project.

**22.9.2.1.3 *Determination of Potential for Residual Cumulative Effect and Significance***

While other projects are likely to increase population growth for the RSA and LSA, and thereby change community demographics, the overall increase in population growth will likely remain low, particularly as it will be spread over a number of communities. The confidence rating of the cumulative effect is rated as medium because of the uncertainty associated with the hiring and procurement practices of the other projects. Overall, significance ratings are not expected to change and the cumulative effect of change in demographics is predicted to be **not significant (minor)**.

**22.9.2.2 *Cumulative Effect for Change in Demand on Community Infrastructure and Services***

The identified projects and activities (Table 22.9-2) are expected to contribute to population growth in the RSA and LSA, which, in turn, will increase demand on LSA community infrastructure and services. This may act cumulatively with the residual adverse Project effect of demand on community infrastructure and services outpacing small LSA communities' capacity in the short term.

**22.9.2.2.1 *Project-specific Cumulative Effects Mitigations for Change in Demand on Community Services and Infrastructure***

As described in Section 22.7.3.1, management practices, monitoring, and adaptive management will be implemented to mitigate and enhance the potential Project effects on community infrastructure and services. This includes the Labour Recruitment and Retention Strategy, the Workforce Training Strategy, the community communications plan, and the Employee Assistance Program.

**22.9.2.2.2 *Other Project/Activity Mitigations to Address Change in Demand on Community Services and Infrastructure***

There are no specific mitigation or management measures explicitly identified from other projects or activities to address effect on employment. However, it is expected that other large resource development projects would adopt mitigation and management measures similar to those of the KSM Project.

**22.9.2.2.3 *Determination of Potential for Residual Cumulative Effect and Significance***

Other projects are likely to increase population growth for RSA and LSA communities, and thereby increase demands on community infrastructure and services. The effect will occur mainly at the community level for community infrastructure and the regional level for community services. However, the effect is likely to remain low in magnitude, as population growth is not expected to be very large and will be spread over a number of communities. Moreover, the duration of the effect remains medium and reversible in the short term, as communities are expected to be able to adapt their infrastructure and services to meet demand over time. Consequently, the cumulative effect on demand on community infrastructure and services is predicted to be **not significant (minor)**.

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### 22.9.2.3 Cumulative Effect for Change in Funding for Community Infrastructure and Services

The identified projects and activities (Table 22.9-2) are expected to contribute to population growth in the RSA and LSA, which, in turn, will increase demand on LSA community infrastructure and services. This may act cumulatively with the residual beneficial Project effect of an increase in government revenues to fund infrastructure and services due to an increased tax base.

#### 22.9.2.3.1 *Project-specific Cumulative Effects Mitigations for Increased Government Revenues Available to Fund Infrastructure and Services.*

As described in Section 22.7.5.1, changes in the tax base are predetermined by existing municipal, regional, and provincial regulatory frameworks; as such no specific mitigation is proposed. However, the Workforce Transition Program (Section 20.7.1.1) will assist in the transition of Project employees into new positions, helping to maintain the tax base due to income and consumer spending at Project closure.

#### 22.9.2.3.2 *Other Project/Activity Mitigations to Address Increased Government Revenues Available to Fund Infrastructure and Services*

There are no specific mitigation or management measures identified or expected from other projects or activities to address the effect of increased government revenues available to fund infrastructure and services.

#### 22.9.2.3.3 *Determination of Potential for Residual Cumulative Effect and Significance*

With the additional effects of Red Chris Mine, future mine and hydroelectric projects, and commercial land use activities, the duration of the effect of increased government revenues available to fund infrastructure and services will increase, but is still rated as long term. The magnitude of the effect will also increase from low to medium for both construction and operation, as government tax revenue in the region will increase cumulatively if all future projects and activities proceed. For all other descriptors for the residual effects, the ratings do not change (Table 22.9-3). Consequently, the cumulative effect of the Project on change in income and value added is predicted to be **not significant (minor)**.

### 22.9.2.4 Overall Cumulative Effect on Community Demographics, Infrastructure, and Services

Overall, a positive cumulative effect is predicted for community demographics, infrastructure, and services (Table 22.9-3). The total cumulative effect is assessed as being low in magnitude, regional in extent, long in duration, continuous in frequency, reversible in the short term, and neutral in context. The likelihood of the effect is assessed as high in probability and medium in confidence level. Consequently, the overall cumulative effect of the Project on community demographics, infrastructure, and services is predicted to be **not significant (minor)**.

## 22.9.3 Cumulative Effects Assessment for Education, Skills, and Training

The Project is predicted to result in beneficial residual effects to education, skills, and training. The educational profile of RSA and LSA communities is expected to be improved due to employment-related training and work experience, in-migration of skilled workers, and improved

educational facilities. The Red Chris Mine, future mine and hydroelectric projects (Table 22.9-1), and some commercial land-use activities (primarily mineral and energy resource exploration) have the potential to interact cumulatively in a similar manner due to their employment and procurement of goods and services (Table 22.9-4).

It should be emphasized that not all future projects and activities that have been identified as having the potential to act cumulatively with the KSM Project on education, skills, and training (Table 22.9-4) are certain to occur. Rather, it is likely that not all will occur. However, to acknowledge this uncertainty and to be conservative in the assessment, it is assumed that all identified future projects proceed and activities occur, and that their demand for workers and supplies and services from within the RSA is a high proportion of their total employment and procurement. Thus, the cumulative effects assessment represents a high interaction scenario.

### **22.9.3.1 Cumulative Effect for Change in Educational Profile**

The identified projects and activities (Table 22.9-4) are expected to contribute to the demand for skilled workers in the RSA and LSA communities. Due to the education and skills required for employment with these projects, project-related training, and in-migration of skilled workers, these projects and activities are expected to contribute to the education, skills, and training of the LSA and RSA workforce. This is predicted to cumulatively: 1) increase the educational profile of the workforce; and 2) improve the educational profile of the LSA communities and the RSA.

#### **22.9.3.1.1 *Project-specific Cumulative Effects Mitigations for Change in Educational Profile***

As described in Sections 22.7.1.1 and 22.7.3.1, management practices, monitoring, and adaptive management will be implemented to enhance the potential Project effects on education, skills, and training. This includes a Labour Recruitment and Retention Strategy, a Procurement Strategy, a Workforce Training Strategy, and a community communications plan.

#### **22.9.3.1.2 *Other Project/Activity Mitigations to Address Change in Educational Profile***

There are no specific mitigation or management measures explicitly identified from other projects or activities to address effects on education, skills, and training. However, it is expected that other large resource development projects would adopt mitigation and management measures similar to those of the KSM Project.

#### **22.9.3.1.3 *Determination of Potential for Residual Cumulative Effect and Significance***

With the additional effects of Red Chris Mine, future mine and hydroelectric projects, and commercial land use activities, the magnitude of the effect of a change in employment, resulting in an increase in the educational profile of the local, regional, and provincial workforce is predicted to increase but remain low, due to the relatively small percentage of the RSA and LSA populations that will likely be employed on these projects. The extent of the effect will range from community to regional levels, as it does for the KSM Project alone. The effect will continue to be long term, as it will be tied to the length of the projects, be continuous throughout the period, and be reversible upon closure of the projects. The probability of the effect remains high, as does confidence in the assessment. Consequently, the cumulative effect of change in communities' educational profile is predicted to be **not significant (minor)**.

**Table 22.9-3. Summary of Cumulative Residual Effects on Community Demographics, Infrastructure, and Services**

Description of Residual Effect	Other Project(s)/ Activity(ies)	Timing of Effect	Magnitude	Magnitude Adjusted for CE	Extent	Extent Adjusted for CE	Duration	Duration Adjusted for CE	Frequency	Frequency Adjusted for CE	Reversibility	Reversibility Adjusted for CE	Context	Context Adjusted for CE	Likelihood of Effects				Significance Determination	Significance Determination Adjusted for CE	Follow-up Monitoring	Follow-up Monitoring Adjusted for CE
															Probability	Probability Adjusted for CE	Confidence Level	Conf. Level Adjusted for CE				
Altering of community demographics due to population growth (beneficial and/or adverse, depending on personal opinion)	Red Chris Mine; future mine and hydroelectric projects; commercial land use activities	Operations	Low	Low	Community	Community	Long	Long	Continuous	Continuous	Reversible long-term	Reversible long-term	Low	Low	High	High	High	Medium	Not significant (minor)	Not significant (minor)	Not Required	Not Required
Demand on community infrastructure and services may outpace small LSA communities' capacity in the short term due to population growth (adverse)	Red Chris Mine; future mine and hydroelectric projects; commercial land use activities	Operations	Low	Low	Regional	Regional	Medium	Medium	Continuous	Continuous	Reversible short-term	Reversible short-term	Low	Low	High	High	High	Medium	Not significant (minor)	Not significant (minor)	Not Required	Not Required
Increase in government revenues to fund infrastructure and services due to Increased tax base (beneficial)	Red Chris Mine; future mine and hydroelectric projects; commercial land use activities	Operations	Low	Medium	Regional	Regional	Long	Long	Continuous	Continuous	Reversible short-term	Reversible short-term	Neutral	Neutral	High	High	High	High	Not significant (minor)	Not significant (minor)	Not Required	Not Required
Overall Effect	Red Chris Mine; future mine and hydroelectric projects; commercial land use activities	Operations	Low	Low	Regional	Regional	Long	Long	Continuous	Continuous	Reversible short-term	Reversible short-term	Low	Neutral	High	High	High	Medium	Not significant (minor)	Not significant (minor)	Not Required	Not Required

Note: CE = Cumulative Effect.

**Table 22.9-4. Summary of Projects and Activities with Potential to Interact Cumulatively with Expected Project-specific Residual Effects on Education, Skills, and Training**

Description of KSM Residual Effect	NTL	Red Chris Mine	Future Mine and Hydroelectric Projects	Commercial Land Use Activities
Increase in the educational profile of the local, regional, and provincial workforce due to employment-related training and work experience (beneficial)	No Interaction	Possible Interaction	Possible Interaction	Possible Interaction
Improvement in the educational profile of LSA and RSA communities due to in-migration of skilled workers (beneficial)	No Interaction	Possible Interaction	Possible Interaction	Possible Interaction
Improvement in the capacity of educational institutions due to population-fueled demand (beneficial)	No Interaction	Possible Interaction	Possible Interaction	Possible Interaction

Similarly, with the additional projects and activities, the magnitude of the effect change in population resulting in an improvement in the educational profile of LSA communities and the RSA is predicted to increase but remain low, due to the relatively small percentage of the RSA and LSA populations that will likely be employed on these projects. The extent of the effect will range from community to regional levels, as it does for the KSM Project alone. The effect will continue to be long, as it will be tied to the length of the projects, be continuous throughout the period, and be reversible upon closure of the projects. The probability of the effect remains high, as does confidence in the assessment. Consequently, the cumulative effect of change in communities' educational profile is predicted to be **not significant (minor)**.

### 22.9.3.2 Cumulative Effect for Change in Educational Facilities

The identified projects and activities (Table 22.9-4) are expected to contribute to the demand for skilled workers in the RSA and LSA communities. The education and skills levels required for employment in these projects will place increasing demands on local educational institutions for improved industry-relevant education. In addition, these projects and activities are expected to contribute to government tax revenues. Some of the revenue generated, in turn, is expected to be available to fund improvement of educational facilities.

#### 22.9.3.2.1 *Project-specific Cumulative Effects Mitigations for Improvement of Educational Facilities*

As noted in Section 22.7.4.1, management practices, monitoring, and adaptive management will be implemented to mitigate potential effects on community infrastructure and services, including education. A community communications plan will be pursued to clearly and regularly



communicate to all LSA communities and across the RSA regarding project design, schedule, and activities. On the basis of this information and increased tax revenue, local municipal governments and local educational institutions will be enabled to plan educational services and infrastructure to meet demand.

#### **22.9.3.2.2 *Other Project/Activity Mitigations to Address Improvement of Educational Facilities***

No specific mitigation or management measures are explicitly identified from other projects or activities to address effects on educational facilities. However, it is expected that other large resource development projects would adopt mitigation and management measures similar to those of the KSM Project.

#### **22.9.3.2.3 *Determination of Potential for Residual Cumulative Effect and Significance***

With the additional effects of Red Chris Mine, future mine and hydroelectric projects, and commercial land use activities, the magnitude of the effect change in population resulting in an improvement in the capacity of educational institutions is expected to increase, but to remain low, as increased demand on educational institutions is expected to be specific to the natural resources sector and will not result in comprehensive educational improvements. Other significance ratings are not expected to change (Table 22.9-5). Consequently, the cumulative effect of improved educational facilities is predicted to be **not significant (minor)**.

#### **22.9.3.3 Overall Cumulative Effect on Education, Skills, and Training**

Overall, beneficial cumulative effects are predicted for education, skills, and training (Table 22.9-5). The total cumulative effect is assessed as being low in magnitude, regional in extent, long in duration, continuous in frequency, reversible in the long term, and neutral in context. The likelihood of the effect is assessed as high in probability and medium in confidence level. Consequently, the overall cumulative effect of the Project on education, skills, and training is predicted to be **not significant (minor)**.

#### **22.9.4 Cumulative Effects Assessment for Community Well-being**

The Project is predicted to result in both beneficial and adverse residual effects on CWB. Beneficial residual effects include: 1) increase in individual esteem and community pride due to employment; 2) increase in financial independence and access to goods and services due to increased income; and 3) increase in community pride due to reversal in population decline. Adverse residual effects include: 1) increased family stress on families due to employment rotation schedules, and increase in substance misuse due to employment-related stress; 2) increase in substance misuse due to increase in income; 3) increased social and mental health and community safety issues in the short term as community capacity is outpaced by population change; 4) increase in emissions (noise, exhaust) due to increased traffic volume in Stewart; and 5) increase in vehicle accidents due to increased traffic volume in Stewart.

The Red Chris Mine, future mine and hydroelectric projects (Table 22.9-1), and some commercial land use activities (i.e., guide outfitting, mineral and energy resource exploration, recreation and tourism, and timber harvesting) have the potential to interact cumulatively with these effects (Table 22.9-6).

**Table 22.9-5. Summary of Cumulative Residual Effects on Education, Skills, and Training**

Description of Residual Effect	Other Project(s)/ Activity(ies)	Timing of Effect	Magnitude	Magnitude Adjusted for CE	Extent	Extent Adjusted for CE	Duration	Duration Adjusted for CE	Frequency	Frequency Adjusted for CE	Reversibility	Reversibility Adjusted for CE	Context	Context Adjusted for CE	Likelihood of Effects				Significance Determination	Significance Determination Adjusted for CE	Follow-up Monitoring	Follow-up Monitoring Adjusted for CE
															Probability	Probability Adjusted for CE	Confidence Level	Conf. Level Adjusted for CE				
Increase in the educational profile of the local, regional and provincial workforce due to employment-related training and work experience (beneficial)	Red Chris Mine; future mine and hydroelectric projects; commercial land use activities		Low	Low	Regional	Regional	Long	Long	Continuous	Continuous	Reversible short-term	Reversible long-term	Neutral	Neutral	High	High	High	High	Not significant (minor)	Not significant (minor)	Not Required	Not Required
Improvement in the educational profile of LSA and RSA communities due to in-migration of skilled workers (beneficial)	Red Chris Mine; future mine and hydroelectric projects; commercial land use activities	Operations	Low	Low	Community	Community	Long	Long	Continuous	Continuous	Reversible long-term	Reversible long-term	Neutral	Neutral	High	High	High	High	Not significant (minor)	Not significant (minor)	Not Required	Not Required
Improvement in the capacity of educational institutions due to population-fuelled demand (beneficial)	Red Chris Mine; future mine and hydroelectric projects; commercial land use activities	Operations	Low	Medium	Regional	Regional	Long	Long	Continuous	Continuous	Reversible long-term	Reversible long-term	Neutral	Neutral	Medium	Medium	Low	Low	Not significant (minor)	Not significant (minor)	Not Required	Not Required
Overall Effect	Red Chris Mine; future mine and hydroelectric projects; commercial land use activities		Low	Low	Regional	Regional	Long	Long	Continuous	Continuous	Reversible long-term	Reversible long-term	Neutral	Neutral	High	High	High	Medium	Not significant (minor)	Not significant (minor)	Not Required	Not Required

Note: CE = Cumulative Effect.

**Table 22.9-6. Summary of Projects and Activities with Potential to Interact Cumulatively with Expected Project-specific Residual Effects on Community Well-being**

Description of KSM Residual Effect	NTL	Red Chris Mine	Future Mine and Hydroelectric Projects	Commercial Land Use Activities
Increase in financial independence and access to goods and services due to increased income (beneficial)	No Interaction	Possible Interaction	Possible Interaction	Possible Interaction
Increase in individual esteem and community pride due to employment (beneficial)	No Interaction	Possible Interaction	Possible Interaction	Possible Interaction
Increase in community pride due to reversal in population decline (beneficial)	No Interaction	Possible Interaction	Possible Interaction	Possible Interaction
Increase in stress on families due to employment rotation schedules, and increase in substance misuse due to employment-related stress (adverse)	No Interaction	Possible Interaction	Possible Interaction	Possible Interaction
Increase in substance misuse due to increase in income (adverse)	No Interaction	Possible Interaction	Possible Interaction	Possible Interaction
Increase in social, mental health, and community safety issues in the short-term as community support capacity is outpaced due to population change (adverse)	No Interaction	Possible Interaction	Possible Interaction	Possible Interaction
Increase in emissions due to increased traffic volume in Stewart (adverse)	No Interaction	Possible Interaction	Possible Interaction	Possible Interaction
Increase in vehicle accidents due to increased traffic volume in Stewart (adverse)	No Interaction	Possible Interaction	Possible Interaction	Possible Interaction

Again, it should be emphasized that not all future projects and activities that have been identified as having the potential to act cumulatively with the KSM Project on CWB (Table 22.9-6) are certain to occur. Rather, it is likely that not all will occur. However, acknowledging this uncertainty and in order to be conservative in the assessment, it is assumed that all identified future projects proceed and activities occur, and that their demand for workers and supplies and

services from within the RSA is a high proportion of their total employment and procurement. Thus, the cumulative effects assessment represents a high interaction scenario.

#### **22.9.4.1 Cumulative Effect for Change in Employment and Population (Community Pride)**

The identified projects and activities (Table 22.9-6) are expected to contribute to a change in employment and population in the RSA and LSA communities that are expected to, in turn, act cumulatively with the Project residual effects of an increase in individual esteem and community pride due to an increase in employment and reversal in population decline.

##### **22.9.4.1.1 Project-specific Cumulative Effects Mitigations for Change in Population (Community Pride)**

As noted in Sections 22.7.1.1 and 22.7.3.1, management practices, monitoring, and adaptive management will be implemented to enhance potential effects on CWB due to employment and population change. This will include the Labour Recruitment and Retention Strategy, and Workforce Training Strategy, and the community communications plan.

##### **22.9.4.1.2 Other Project/Activity Mitigations to Address Change in Population (Community Pride)**

No specific mitigation or management measures are explicitly identified from other projects or activities to address effects due to change in employment and population. However, it is expected that other large resource development projects would adopt mitigation and management measures similar to those of the KSM Project.

##### **22.9.4.1.3 Determination of Potential for Residual Cumulative Effect and Significance**

Project-related increases in employment and reversals in population decline are predicted to instill community pride and increase individual esteem. The Red Chris Mine and other projects are expected to interact with this effect. While the magnitude of the effect will likely increase, it will remain low, as only a percentage of the population will be employed in these projects or likely feel pride in enhanced community population. All other significance ratings are similarly expected to remain the same. Confidence in the assessment will remain medium for employment-related effects and low for population-related effects (because of uncertainty regarding resident perceptions of population change). Consequently, the cumulative effects on change in community pride are predicted to be **not significant (minor)**.

#### **22.9.4.2 Cumulative Effect for Change in Employment (Family Stress and Substance Misuse)**

The identified projects and activities (Table 22.9-6) are expected to contribute to a change in employment in the RSA and LSA communities that are expected to, in turn, act cumulatively with the Project's residual effect of an increase in family stress due to the rotation schedule likely to be associated with the other mine projects, as well as the long periods away from home associated with other activities (such as mineral exploration and guide outfitting). Similarly, substance misuse may increase due to employment-related stress.

**22.9.4.2.1 Project-specific Cumulative Effects Mitigations for Change in Employment (Family Stress and Substance Misuse)**

As noted in Section 22.7.1.1, management practices, monitoring, and adaptive management will be implemented to mitigate potential effects on CWB associated with work rotation schedules. This will include the Labour Recruitment and Retention Strategy.

**22.9.4.2.2 Other Project/Activity Mitigations to Address a Change in Employment (Family Stress and Substance Misuse)**

No specific mitigation or management measures are explicitly identified from other projects or activities to address effects on family stress and substance misuse due to a change in employment. However, it is expected that other large resource development projects would adopt mitigation and management measures similar to those of the KSM Project.

**22.9.4.2.3 Determination of Potential for Residual Cumulative Effect and Significance**

The projects and activities identified in this assessment are expected to cumulatively affect family stress and substance misuse due to change in employment. As more residents will be employed in work that keeps them away from home for extended periods, the magnitude of the effect is expected to increase. However, the magnitude is expected to remain low, as only a relatively small percentage of LSA and RSA residents are expected to be employed in this type of work. All other significance ratings remain the same, except for a reduction in confidence level due to lack of certainty concerning the other projects. Consequently, the cumulative effect of increased family stress is predicted to be **not significant (minor)**.

**22.9.4.3 Cumulative Effect for Change in Income (Financial Independence and Access to Goods and Services)**

The identified projects and activities (Table 22.9-6) are expected to contribute to a change in income in the RSA and LSA communities that are expected to, in turn, act cumulatively with the Project's residual effect of an increase in financial independence and access to goods and services.

**22.9.4.3.1 Project-specific Cumulative Effects Mitigations for Change in Income (Financial Independence and Access to Goods and Services)**

As noted in Section 22.7.2.1, management practices, monitoring, and adaptive management will be implemented to enhance potential effects on CWB due to an increase in income. This will include a Labour Recruitment and Retention Strategy, a Procurement Strategy, and Workforce Training Strategy with financial management and general life skills training.

**22.9.4.3.2 Other Project/Activity Mitigations to Address Change in Income (Financial Independence and Access to Goods and Services)**

No specific mitigation or management measures are identified from other projects or activities to address effects on financial independence and access to goods and services. However, it is expected that other large resource development projects would adopt mitigation and management measures similar to those of the KSM Project.

#### **22.9.4.3.3**     *Determination of Potential for Residual Cumulative Effect and Significance*

The projects and activities, depending on timing, are expected to act cumulatively to increase the income of RSA and LSA residents, thereby increasing their financial independence and access to goods and services. As there will be more economic activity in the region with these projects potentially operating at the same time, the magnitude of the effect is predicted to increase from low to medium. The duration will remain long term, as it will be tied to the length of the projects, will be experienced on a continuous basis, and will be reversible upon the end of the projects. Despite the increase in magnitude predicted, the cumulative effect of increased financial independence and access to goods and services is predicted to be **not significant (minor)**.

#### **22.9.4.4**     **Cumulative Effect for Change in Income (Substance Misuse)**

The identified projects and activities (Table 22.9-6) are expected to contribute to a change in income in the RSA and LSA communities that are expected to, in turn, act cumulatively with the Project's residual effect of an increase in substance misuse among workers.

##### **22.9.4.4.1**     *Project-specific Cumulative Effects Mitigations for Change in Income (Substance Misuse)*

As noted in Sections 22.7.2.1, management practices, monitoring, and adaptive management will be implemented to mitigate potential effects on CWB associated with change in income. This will include a zero tolerance drug and alcohol policy and an Employee Assistance Program.

##### **22.9.4.4.2**     *Other Project/Activity Mitigations to Address Change in Income (Substance Misuse)*

No specific mitigation or management measures are explicitly identified from other projects or activities to address effects due to a change in income. However, it is expected that other large resource development projects would adopt mitigation and management measures similar to those of the KSM Project.

#### **22.9.4.4.3**     *Determination of Potential for Residual Cumulative Effect and Significance*

The projects and activities identified in this assessment are expected to result in a cumulative effect of increases in income within the RSA and LSA communities. This, in turn, is predicted to increase substance misuse. However, the magnitude of this effect is expected to remain low, given minimization of the effect through mitigation measures including measures adopted by projects to avoid substance misuse among workers, as well as available health and social services. All other significance ratings are expected to remain the same. Consequently, the cumulative effect of change in substance misuse is predicted to be **not significant (minor)**.

#### **22.9.4.5**     **Cumulative Effect for Change in Population (Social and Mental Health)**

The identified projects and activities (Table 22.9-6) are expected to contribute to a change in population in the RSA and LSA communities that are expected to, in turn, act cumulatively with the Project's residual effect of an increase in social, mental health, and community safety issues in the short term as community support capacity is outpaced by population change. However, in the long term, support capacity is expected to increase to meet demand.

**22.9.4.5.1 Project-specific Cumulative Effects Mitigations for Change in Population (Social and Mental Health)**

As noted in Section 22.7.3.1, mitigation strategies, including management practices, monitoring, and adaptive management, and enhancement will be developed and implemented to minimize the adverse effects of population change on CWB. This will be realized primarily through the community communications plan and Employee Assistance Program.

**22.9.4.5.2 Other Project/Activity Mitigations to Address Change in Population (Social and Mental Health)**

No specific mitigation or management measures are identified from other projects or activities to address effects on social and mental health due to a change in population. However, it is expected that other large resource development projects would adopt mitigation and management measures similar to those of the KSM Project.

**22.9.4.5.3 Determination of Potential for Residual Cumulative Effect and Significance**

The projects and activities identified in the assessment are expected to create a cumulative effect on CWB as it pertains to a change in population resulting in a residual effect on social, mental health, and community safety issues. Population growth associated with these projects and activities is predicted to further outpace the capacity of social services to address social and mental health issues in the short term. However, the magnitude of the effect is expected to remain low, as increased demand on these services is not expected to be substantial. Moreover, communities will be able to adapt over the long term and to increase service capacity to meet demand. All significance ratings remain the same. Consequently, the cumulative effect on social and mental health is predicted to be **not significant (minor)**.

**22.9.4.6 Cumulative Effect for Change in Traffic (Emissions)**

There are a number of other foreseeable mining projects that are expected to temporally overlap with the KSM Project and, to the extent that these projects utilize the port in Stewart, these projects may create cumulative effects on emissions within Stewart due to increased traffic.

**22.9.4.6.1 Project-specific Cumulative Effects Mitigations for Change in Traffic (Emissions)**

As noted in Section 22.7.5.1, a number of measures will be put into place to mitigate the nuisance effects of traffic noise and air pollution in Stewart. This will include compliance with the BC Air Action Plan (Province of British Columbia 2013), a community communications plan (Section 22.7.3-1), and a Traffic and Access Management Plan (Chapter 26.25).

**22.9.4.6.2 Other Project/Activity Mitigations to Address Change in Traffic (Emissions)**

No specific mitigation or management measures are explicitly identified from other projects or activities to address effects on the quality of the natural environment in Stewart due to a change in traffic. However, it is expected that other large resource development projects would adopt mitigation and management measures similar to those of the KSM Project.

**22.9.4.6.3 Determination of Potential for Residual Cumulative Effect and Significance**

The level of future industrial development relying on the port of Stewart is uncertain. It is unlikely that all currently proposed mine projects will be developed at the same time. Therefore, two possible future scenarios were evaluated for potential overall cumulative effects on traffic safety: 1) a “likely development” scenario, with one to three mining projects being concurrently in production, and 2) an “unlikely development” scenario where all or most projects go ahead as planned.

Under the unlikely development scenario, the Red Chris Mine and other foreseeable mining projects are expected to interact with the KSM Project to produce a cumulative impact on the quality of the environment by increasing vehicle emissions in Stewart. The increase in traffic volume is predicted to increase the magnitude of the effect from low to medium. All other significance ratings will remain the same, except for the confidence level which reduces somewhat, due to lack of information on the other projects and uncertainty regarding when projects will proceed. Due to the increased magnitude of the effect, the cumulative effect on quality of the natural environment is predicted to be **significant (major)**. Under the likely development scenario, the magnitude of the effect is expected to remain low. Consequently, the cumulative effect on the quality of the natural environment is predicted to be **not significant (moderate)**.

**22.9.4.7 Cumulative Effect for Change in Traffic (Traffic Safety)**

There are a number of other foreseeable mining projects that are expected to temporally overlap with the KSM Project and, to the extent that these projects utilize the port in Stewart, these projects may create cumulative effects on traffic safety within Stewart due to increased traffic.

**22.9.4.7.1 Project-specific Cumulative Effects Mitigations for Change in Traffic (Traffic Safety)**

As noted in Section 22.7.5.1, a number of measures will be put into place to mitigate the effects of traffic in Stewart. Project-related transport haulage load and dimensions will conform to prescribed limits and to all bulletins on seasonal axle weight restrictions. Appropriate traffic control measures will be implemented according to BC’s Occupational Health and Safety Regulation (BC Reg. 296/97). The Proponent will develop and implement a community communications plan (Section 22.7.3.1) for the Project that will include notifications to Stewart community members regarding major traffic activities and scheduling. Project vehicles will be required to adhere to the Traffic and Access Management Plan (Chapter 26.25).

**22.9.4.7.2 Other Project/Activity Mitigations to Address Change Traffic (Traffic Safety)**

No specific mitigation or management measures are identified from other projects or activities to address effects on traffic safety in Stewart. However, it is expected that other large resource development projects would adopt mitigation and management measures similar to those of the KSM Project.

**22.9.4.7.3 Determination of Potential for Residual Cumulative Effect and Significance**

As part of the unlikely development scenario, the Red Chris Mine and other foreseeable mining projects are expected to interact with the KSM Project to produce a cumulative effect on traffic



safety in Stewart due to an increase in traffic volumes. Given expected increases in traffic, the magnitude of this effect will increase from low to medium. All other significance ratings remain the same, except for the confidence level of the assessment, which is reduced due to lack of information on the other projects, and uncertainty regarding when projects will proceed. Considering the increased magnitude of the effect in combination with existing road and traffic safety designs within the community, the cumulative effect on traffic safety in Stewart is predicted to be **not significant (moderate)**. Under the likely development scenario, the magnitude of the effect is expected to remain low. Consequently, the cumulative effect on the quality of the natural environment is predicted to be **not significant (minor)**.

#### **22.9.4.8 Overall Cumulative Effect on Community Well-being**

In the cumulative effects assessment for CWB, two significant adverse residual effects are predicted due to a change in traffic—an increase in vehicle accidents, and an increase in emissions affecting the quality of the environment (Table 22.9-7). Overall, however, the cumulative effect on CWB is expected to be low, community-level in extent, long in duration, continuous in frequency, and reversible in the long term. Community members and service providers are expected to be resilient to adverse effects. Given the low magnitude of the effect, its bi-directionality, and community resilience, the overall cumulative effect on CWB is predicted to be **not significant (minor)**.

### **22.10 Summary of Assessment of Potential Environmental Effects on Social Conditions**

Table 22.10-1 summarizes the assessment of the potential environmental effects of the KSM Project on social conditions.

### **22.11 Social Conclusions**

The proposed Project is expected to result in a number of social effects. Specifically, activities related to hiring and procurement and traffic are expected to interact with three valued social components: 1) community demographics, infrastructure, and services; 2) education, skills, and training; and 3) CWB.

Community demographics are expected to change due to population growth associated with in-migrating workers. Increased population, in turn, is likely to increase demands on community services and infrastructure in the short term. However, an increased tax base due to Project-related spending will likely increase government revenues available to fund infrastructure and services.

The education, skills, and training of local communities are expected to change due to Project-related employment and related population changes. Training in support of employment, as well as on-the-job training, is expected to enhance the educational profile of the workforce, primarily at local and regional levels. The in-migration of skilled workers will also contribute to the effect on local communities. All residual effects on education, skills, and training are predicted to be beneficial.

CWB will likely be affected through a number of changes. Beneficial effects may arise through Project-related employment and related population gains, which may increase individual esteem and community pride. Increased income will likely add to this effect through increased financial

independence and access to goods and services. Conversely, adverse effects on CWB may arise. Conditions associated with employment (such as the rotation schedule) may increase family stress and substance misuse. Increased income, despite its beneficial effects, may also fund substance misuse. Predicted adverse effects also include an increase in social, mental health, and community safety in the short term as community support capacity is outpaced by population change; however, this effect is predicted to be mitigated over the longer term as communities adjust based on changes in demand. Finally, Project-related traffic may increase vehicle accidents and emissions in Stewart.

Management practices, monitoring, and adaptive management will be implemented to mitigate and enhance potential Project-related social effects. A Labour Recruitment and Retention Strategy will maximize employment and income within the LSA communities and the RSA. The potential for Project-related substance misuse will be minimized through a zero tolerance drug and alcohol policy. An Employee Assistance Program will provide support to Project employees. A Procurement Strategy will encourage the involvement of local and regional businesses in the Project. A Workforce Training Strategy will maximize the work experience, education, and skill levels of the regional workforce, and a Workforce Transition Program will help workers secure suitable employment elsewhere at closure and, thus, minimize adverse effects of employment loss upon closure. Finally, a community communications plan will facilitate planning by governments and service providers. This plan will also include actions to communicate to residents of Stewart regarding Project-related traffic, while a Traffic and Access Management Plan will minimize traffic-related effects.

After mitigation measures have been implemented, a number of residual beneficial and adverse social effects are predicted to occur. However, the magnitude of each residual effect is expected to be relatively low and no residual effects are predicted to be significant. This is largely due to the relatively modest share of residents in LSA communities that are expected to experience Project-related employment.

When residual effects are assessed for potential cumulative effects in relation to other foreseeable projects and activities in the unlikely development scenario, a decrease in traffic safety is predicted to be not significant (moderate) whereas an increase in vehicle emissions is predicted to result in a significant (major) adverse effect. The cumulative effects are predicted in Stewart and do not extend to other LSA communities. This is predicted because of the increased volume of traffic expected through Stewart should all identified projects and activities coincide. Under the likely development scenario, two adverse effects remain predicted in Stewart, however due to their decreased magnitude these are predicted to be not significant (minor) for a decrease in safety and not significant (moderate) for vehicle emissions. Overall, there are expected to be a number of beneficial cumulative effects. This includes an increase in government revenues available to fund infrastructure and services, an increase in the educational profile of the workforce and the LSA communities, and an increase in financial independence and individual esteem.

In summary, the proposed Project is expected to produce a number of beneficial and adverse effects on community demographics, infrastructure, and services; education, skills, and training; and CWB. Mitigation measures will minimize adverse effects and enhance beneficial effects resulting in, on balance, an expectation for overall positive social effects due to the Project.

**Table 22.9-7. Summary of Cumulative Residual Effects on Community Well-being**

Description of Residual Effect	Other Project(s)/ Activity(ies)	Timing of Effect	Magnitude	Magnitude Adjusted for CE	Extent	Extent Adjusted for CE	Duration	Duration Adjusted for CE	Frequency	Frequency Adjusted for CE	Reversibility	Reversibility Adjusted for CE	Context	Context Adjusted for CE	Likelihood of Effects				Significance Determination	Significance Determination Adjusted for CE	Follow-up Monitoring	Follow-up Monitoring Adjusted for CE
															Probability	Probability Adjusted for CE	Confidence Level	Conf. Level Adjusted for CE				
Increase in individual esteem and community pride due to employment (beneficial)	Red Chris Mine; future mine and hydroelectric projects; commecial land use activities	Operations	Low	Low	Community	Community	Long	Long	Continuous	Continuous	Reversible long-term	Reversible long-term	Neutral	Neutral	High	High	Medium	Medium	Not significant (minor)	Not significant (minor)	Not Required	Not Required
Increase in financial independence and access to goods and services due to increased income (beneficial)	Red Chris Mine; future mine and hydroelectric projects; commecial land use activities	Operations	Low	Low	Regional	Regional	Long	Long	Continuous	Continuous	Reversible long-term	Reversible long-term	Neutral	Neutral	High	High	High	High	Not significant (minor)	Not significant (minor)	Not Required	Not Required
Increase in stress on families due to employment rotation schedules, and increase in substance misuse due to employment-related stress (adverse)	Red Chris Mine; future mine and hydroelectric projects; commecial land use activities	Operations	Low	Low	Community	Community	Long	Long	Regular	Regular	Reversible long-term	Reversible long-term	Neutral	Neutral	High	High	Medium	Low	Not significant (minor)	Not significant (minor)	Not Required	Not Required
Increase in substance misuse due to increase in income (adverse)	Red Chris Mine; future mine and hydroelectric projects; commecial land use activities	Operations	Low	Low	Community	Community	Long	Long	Regular	Regular	Reversible long-term	Reversible long-term	Neutral	Neutral	High	High	Medium	Medium	Not significant (minor)	Not significant (minor)	Not Required	Not Required
Increase in community pride due to reversal in population decline (beneficial)	Red Chris Mine; future mine and hydroelectric projects; commecial land use activities	Operations	Low	Low	Community	Community	Long	Long	Continuous	Continuous	Reversible long-term	Reversible long-term	Neutral	Neutral	Low	Low	Low	Low	Not significant (minor)	Not significant (minor)	Not Required	Not Required
Increase in social, mental health, and community safety issues in the short term as community support capacity is outpaced by population change (adverse)	Red Chris Mine; future mine and hydroelectric projects; commecial land use activities	Operations	Low	Low	Regional	Regional	Medium	Medium	Continuous	Continuous	Reversible short-term	Reversible short-term	Neutral	Neutral	Medium	Medium	Medium	Medium	Not significant (minor)	Not significant (minor)	Not Required	Not Required
Increase in emissions due to increased traffic volume in Stewart (adverse) (likely)	Red Chris Mine; future mine and hydroelectric projects; commecial land use activities	Operations	Low	Low	Community	Community	Long	Long	Regular	Regular	Reversible long-term	Reversible long-term	Low	Low	High	High	High	Medium	Not significant (minor)	Not significant (moderate)	Not Required	Not Required
Increase in emissions due to increased traffic volume in Stewart (adverse) (unlikely)	Red Chris Mine; future mine and hydroelectric projects; commecial land use activities	Operations	Low	Medium	Community	Community	Long	Long	Regular	Regular	Reversible long-term	Reversible long-term	Low	Low	High	High	High	Low	Not significant (minor)	Significant (major)	Not Required	Required
Increase in vehicle accidents due to increased traffic volume in Stewart (adverse) (likely)	Red Chris Mine; future mine and hydroelectric projects; commecial land use activities	Operations	Low	Low	Community	Community	Long	Long	Regular	Regular	Reversible long-term	Reversible long-term	Low	Low	Medium	Medium	Medium	Medium	Not significant (minor)	Not significant (minor)	Not Required	Not Required
Increase in vehicle accidents due to increased traffic volume in Stewart (adverse) (unlikely)	Red Chris Mine; future mine and hydroelectric projects; commecial land use activities	Operations	Low	Medium	Community	Community	Long	Long	Regular	Regular	Reversible long-term	Reversible long-term	Low	Low	Medium	Medium	Medium	Low	Not significant (minor)	Not significant (moderate)	Not Required	Required
Overall Effect	Red Chris Mine; future mine and hydroelectric projects; commecial land use activities	Operations	Low	Low	Community	Community	Long	Long	Continuous	Continuous	Reversible long-term	Reversible long-term	Low	Neutral	Medium	Medium	Medium	Medium	Not significant (minor)	Not significant (minor)	Not Required	Not Required

**Table 22.10-1. Summary of Assessment of Potential Environmental Effects: Social**

Valued Component	Phase of Project	Potential Effect	Key Mitigation Measures	Significance Analysis of Residual Effects	Significance Analysis of Cumulative Residual Effects
Community Demographics, Infrastructure, and Services	Operation	Altering of community demographics due to population growth (beneficial and/or adverse, depending on personal opinion)	community communications plan	Not Significant (minor)	Not Significant (minor)
	Operation	Demand on community infrastructure and services may outpace small LSA communities' capacity in the short term due to population growth (adverse)	community communications plan; Employee Assistance Program	Not Significant (minor)	Not Significant (minor)
	Operation	Increase in government revenues to fund infrastructure and services due to increased tax base (beneficial)	None	Not Significant (minor)	Not Significant (minor)
Education, Skills, and Training	Construction and Operation	Increase in the educational profile of the local, regional and provincial workforce due to employment-related training and work experience (beneficial)	Recruitment and Retention Strategy; Procurement Strategy; Workforce Training Strategy	Not Significant (minor)	Not Significant (minor)
	Operation	Improvement in the educational profile of LSA and RSA communities due to in-migration of skilled workers (beneficial)	Recruitment and Retention Strategy; Workforce Training Strategy	Not Significant (minor)	Not Significant (minor)
	Operation	Improvement in the capacity of educational institutions due to population-fueled demand (beneficial)	Workforce training Strategy; community communications plan	Not Significant (minor)	Not Significant (minor)
Community Well-being	Operation	Increase in individual esteem and community pride due to employment (beneficial)	Recruitment and Retention Strategy; Workforce Training Strategy	Not Significant (minor)	Not Significant (minor)
	Operation	Increase in stress on families due to employment rotation schedules (adverse), and increase in substance misuse due to employment-related stress (adverse)	Recruitment and Retention Strategy	Not Significant (minor)	Not Significant (minor)
	Operation	Increase in financial independence and access to goods and services due to increased income (beneficial)	Recruitment and Retention Strategy; Procurement Strategy; financial management and general life skills development training program	Not Significant (minor)	Not Significant (minor)
	Operation	Increase in substance misuse due to increase in income (adverse)	Employee Assistance Program; zero tolerance drug and alcohol policy	Not Significant (minor)	Not Significant (minor)
	Operation	Increased community pride due to reversal in population decline (beneficial)	Recruitment and Retention Strategy	Not Significant (minor)	Not Significant (minor)
	Operation	Increase in social, mental health, and community safety issues in the short-term as community support capacity is outpaced by population change (adverse)	community communications plan; Employee Assistance Program	Not Significant (minor)	Not Significant (minor)
	Operation	Increase in emissions (noise, exhaust) due to increased traffic volume in Stewart	Compliance with BC Air Action Plan (Province of British Columbia 2013); Company Safety Management System; community communications plan; Traffic and Access Management Plan	Not Significant (minor)	Not Significant (moderate)
	Operation	Increase in vehicle accidents due to increased traffic volume in Stewart (adverse)	Compliance with BC's Occupational Health and Safety Regulation (BC Reg. 296/97); Company Safety Management System; community communications plan; Traffic and Access Management Plan	Not Significant (minor)	Not Significant (moderate)

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