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7.2.3 Regional and Community Infrastructure

7.2.3.1 Introduction

This subsection describes the approach and applicable regulatory framework for the assessment of the Regional and Community Infrastructure Valued Component (VC).

The potential social effects of the proposed Blackwater Gold Project (the Project) on this VC will ultimately depend on the extent to which Project-related population growth and Project activities result in increased demands on regional infrastructure, as well as on the ability of this infrastructure to accommodate increasing demands. The key indicators selected to assess the potential Project effects on regional and community infrastructure are housing, utilities, recreational facilities, and regional transportation.

Effects on housing, utilities, and recreational facilities, are mainly dependent on Project-related population growth resulting in increasing demands. Effects on transportation infrastructure, on the other hand, will be directly affected by Project transportation activities (i.e., Project-related traffic). The transportation of equipment, supplies, materials, consumables, mine products, and labour will be an essential component throughout all phases of the Project, and this activity will directly interact with the regional transportation infrastructure, although it is not expected to interact with other infrastructure indicators.

In addition, the assessment of regional transportation not only focuses on the potential Project effects on transportation infrastructure, but also looks at the potential effects on its users (e.g., traffic, safety of road users) and the adjacent environment (e.g., vehicle collisions with wildlife and livestock). Finally, transportation effects are likely to affect other social VCs, specifically Regional and Local Services. For example, changes in traffic on local roads could result in higher demands for public safety services if there is an increase in accidents.

To address these important differences, Project effects on this VC have been separated in Regional and Community Infrastructure Services (housing, utility, and recreational facilities) and Regional Transportation.

7.2.3.1.1 Regional and Community Infrastructure Services

Regional and community infrastructure services focus on three key indicators: utilities, housing, and recreation and leisure.

Utilities and communication services are highly regulated provincial and federal industries while recreation infrastructure is regulated either by the province, in the case of outdoor recreation and land use, or by local government for indoor recreation facilities. The relevancy of the regulatory framework is in the context of the provision, consumption, and cost of services, but lies entirely outside the Proponent's responsibility.

Housing and recreational facilities were included in the Application Information Requirements (AIR)/Environmental Impact Statement (EIS) Guidelines for the Project. Although there is no

specific legislative requirement for consideration of Project effects on these indicators, it is common practice to analyse the potential effects as it assists public and private agencies planning for future capacity requirements.

Information related to regional infrastructure services was based on a review of recent community and regional reports from government agencies, community profiles produced by municipalities, community and regional websites and interviews with infrastructure and service provider representatives. Information includes current local and regional infrastructure and anticipated expansion plans. Relevant traditional community knowledge gathered during the engagement and consultation process for this Project was incorporated when available. Statistical information related to housing was taken from the 2006 and 2011 censuses.

7.2.3.1.2 Regional Transportation

The transportation of equipment, supplies, materials, consumables, mine products, and labour will be an essential Project component throughout all phases of the Project, and this Project activity could have effects on transportation infrastructure, its users and the adjacent environment and resources.

Transportation is addressed under the requirements of the British Columbia *Environmental Assessment Act* (BC *EAA*) for assessing social effects, and it is identified in the approved AIR document. Other relevant legislation, regulations and permits include the federal *Transportation of Dangerous Goods Act* (Government of Canada, 1992), the BC *Transportation Act* (Government of BC, 2004a), the BC *Transportation of Dangerous Goods Act* (Government of BC, 1996c), which includes the *Transport of Dangerous Goods Regulation,* the *Motor Vehicle Act* (Government of BC, 1996b), *Passenger Transport Act* (Government of BC, 2004b), and *Commercial Transport Act* (Government of BC, 1996a) (commercial vehicle permits for oversized loads).

Other relevant provincial and municipal permit or bylaw requirements may include but not be limited to:

- Access Permit (MTI-A) under the *Transportation Act* and *Motor Vehicles Act* (BC Ministry of Transportation and Infrastructure (BC MOTI));
- Approvals for oversize/overweight loads or bulk hauling under the *Motor Vehicles Act* (BC 1996b);
- Road Use Permit under the *Forest and Range Practice Act* (*BC FRPA*), (BC Ministry of Forests, Lands and Natural Resource Operations (BC MFLNRO), 2002);
- City of Prince George *Highway Bylaw No. 8065,* where a permit is required to transport dangerous goods on any highway on which the transportation of dangerous goods is restricted by the city; and
- City of Prince George *Transport of Dangerous Goods Bylaw No. 8192,* which restricts transport of dangerous goods to certain highways within the city.

Generally, accepted Environmental Assessment (EA) methods were used to determine potential Project effects on transportation. Secondary data sources used to compile the baseline and assessment of Project effects on transportation include:

- AMEC M&M, Construction Execution Plan;
- AMEC M&M, Preliminary Logistics Study;
- AMEC M&M, memo correspondence with New Gold Inc. (Proponent);
- AMEC E&I, Transportation and Access Management Plan;
- AMEC E&I, Site Assessment of Potential Locations for an Offsite Transfer Facility;
- AMEC E&I Transportation Route Survey for the Transport of Cyanide to the Mine;
- Allnorth, Blackwater Gold Project – Airstrip Location Study;
- Allnorth, Blackwater Project North Haul Route Analysis;
- Allnorth memos to New Gold regarding current and projected traffic estimates on Highway 16 and the Kluskus Forest Service Road (FSR);
- Aeronigma Solutions, Blackwater Air Services Report; and
- Insurance Corporation of British Columbia (ICBC) website and custom data requests.

In addition to the secondary information collected, primary information was gathered via phone and e-mail from representatives of the Proponent, Canadian Forest Products Limited (Canfor), L&M Lumber Company Ltd., BC Timber Sales, BC MOTI, BC MFLNRO, ICBC website and contacts, and community websites and communication with local and regional Aboriginal and non-Aboriginal stakeholders in contact with the Proponent.

7.2.3.2 Valued Component Baseline

This subsection provides a summary of baseline information on the regional and community infrastructure in the Socioeconomic Regional Study Area (SERSA) and the source of the information; identifies past, present or future projects/activities that may impact the VC; and describes or community knowledge, where available. Traditional knowledge (TK) is not applicable to this VC.

A full description of the regional and community infrastructure baseline is available in **Section 3** and the Social Baseline Report (**Appendix 7.1.1A**). Following is a summary of baseline conditions for:

- Housing and temporary accommodations;
- Utilities;
- Recreation and leisure activities; and
- Regional transportation.

Section 4.3.6.2, discusses the Project Inclusion List (**Table 4.3-11**) and indicates that most of the identified projects either will not overlap temporally with the Project or that there is insufficient information on the demands they will create to include them in a Cumulative Effects Assessment (CEA). **Table 4.3-12** describes the rationale for not including the two other projects.

7.2.3.2.1 Regional and Community Infrastructure Services

7.2.3.2.1.1 Housing and Temporary Accommodation

The 2011 census reported 42,505 private dwelling units in the SERSA, approximately 6% more than in 2006. Of these, 38,421 (90.4%) were considered to be permanently occupied, suggesting that the rest were being used as temporary or seasonal residences, or were vacant. Within the SERSA, the 2011 occupancy rate was lower in the Local Study Area (LSA) (85.5%) than in the Regional Study Area (RSA) (91.1%), although it increased slightly compared to 2006 (82.4%). The demand for temporary accommodation peaked in 2008 and decreased in 2010, but has increased recently, typically for temporary workers. The overall characteristics of Housing in the LSA are as follows:

- Occupancy rates in the LSA were lower than in the rest of the province, with 82% of housing permanently occupied by usual residents;
- In Vanderhoof, a variety of properties are available in the market; in 2012 the median single family home sale price was $183,500 and in 2013 the average home was assessed at $199,965, about 20 per cent of the cost for a house in Vancouver (District of Vanderhoof, 2013);
- Most housing was single-family, detached homes (81%), of which 74% were built pre-1986 and an estimated 13% were in need of major repairs (roof, furnace, etc.);
- The 2006 census reported that the average price for a home in the LSA was $165,000, well below the provincial average. More recent sources indicated that housing prices have increased since 2006, but remain well under the provincial average; and
- The urban centres are the regional service hubs in the LSA, providing services for those living within the communities and in catchment areas of surrounding rural lands.

The overall characteristics of Housing in the RSA are as follows:

- Similar to the rest of BC, usual residents permanently occupied approximately 90% of housing in the RSA;
- Dwelling types were more varied than in the LSA, reflecting the nature of the larger urban centres within the RSA;
- Most (64%) of the housing was single-family detached units; approximately 20% were apartments, and, like the LSA, most residences were constructed before 1986 (76%); and approximately 9% were in need of major repairs;

- As per the 2006 census, the average price for a home in the RSA was $178,000, well below the BC average. Housing values varied by as much as $120,000 between communities. Housing prices were lowest in Burns Lake ($126,000) and highest in the Fraser Fort George Regional District Electoral Area (RDEA) C ($247,000); and
- Prince George has the broadest variety of properties in the market. In 2012, a single-family, four-bedroom, two-bathroom home constructed in the mid- to late-1970s would cost between $179,900 to 195,000 (realtors.ca, 2012), less than 20% of the cost of a similar house in Vancouver.

7.2.3.2.1.2 Utilities

All urban communities in the SERSA have telephone, Internet, and cellular telephone services, and community-based newspapers are available in most of the centres.

BC Hydro provides and distributes electricity to customers throughout the SERSA. Interviews with BC Hydro representatives confirm that the company has had no difficulties serving baseline load growth in the greater area of Prince George, Fort St. James, Vanderhoof, Burns Lake, and Fraser Lake. In terms of potential service expansion, the ability to serve new loads would depend on the size, type, and location of the load (St. Onge, 2013).

The natural gas supply in Prince George is provided by Fortis BC. No issues have been encountered in meeting demand, and the system has sufficient capacity to meet the needs of the communities (Schoberg, 2013).

The natural gas provider in the communities of Burns Lake, Fraser Lake, Vanderhoof, and Fort St. James is Pacific Northern Gas Limited (PNG). At present this facility is significantly under-used and has excess capacity (Sears, 2013).

The community of Fraser Lake draws water from Fraser Lake, while Burns Lake, Fort St. James, Vanderhoof, and Prince George rely on wells for potable water. Vanderhoof upgraded the community's water treatment system in 2010 (District of Vanderhoof, 2011), whereas Fraser Lake, Burns Lake, and Fort St. James are utilizing the original systems and maintaining them as needed. Of these communities, only Vanderhoof and Prince George operate a sewage treatment facility, and the rest rely on lagoons/ponds for liquid waste disposal. Water and sewage treatment services in all the communities are operating under their maximum capacity.

Curbside waste pickup is available in Burns Lake, Fraser Lake, and the downtown region of Vanderhoof, but not in Fort St. James. None of the communities has recycling pickup, but all are moving towards developing and implementing recycling and waste reduction programs by 2014; a number of transfer stations are currently in operation. **Table 7.2.3-1** provides an overview of services available in each community.

Table 7.2.3-1: Overview of Available Water and Sewage Treatment Services in SERSA

	Burns Lake	Fraser Lake	Fort St. James	Vanderhoof	Prince George
Water	• 3 deep wells. Currently utilizing approximately 30% of available capacity.	• Fraser Lake is the source. Water pulled from the lake is treated at a treatment facility. Current usage is an estimated 50% of available capacity.	• Artesian well system. Usage fluctuates seasonally, but is estimated to be running at 40% to 50% of available capacity.	• Artesian well system. Current demand is about 25% of the available capacity.	• 10 wells draw from underground aquifers. The wells service various parts of the city. Water production is currently running at 60%.
Liquid Wastes	• 6 open ponds lagoon system. Using an estimated 50% of available capacity.	• 3 open ponds lagoon system. Capacity fluctuates with the season; winter months at 50% and can increase to 80% during the spring/summer months.	• Lagoon and treatment facility is able to meet demand and is currently running at an estimated 50% of available capacity.	• Sewage treatment facility currently operating at approximately 50% capacity.	• Wastewater Treatment Centre currently operating at an estimated 60% of available capacity.
Solid Waste and Waste Management	• Weekly curbside pickup. Transported weekly to regional landfill. • Goals to implement recycling program by 2014.	• Weekly curbside pickup. Transported to regional landfill. • No curbside recycling but drop-off at a disposal site is available.	• No curbside pickup. Residents drop off garbage at one of two collection sites. • Recycling limited to businesses that accept recyclables and drop-off depots.	• Curbside pickup available in the downtown area only. Residents can take waste to one of three collection sites in the District. • The community has a transfer station.	• Curbside pickup for city residents. • Recyclables can be dropped off at various recycling stations through-out the city.

Source: Martin, 2013; Hilman, 2013; Hand, 2012; Carver, 2013; McIntosh, 2013; Claughton, 2013; EOCP, 2012; Prince George, 2012b

7.2.3.2.1.3 Recreational and Leisure facilities

A variety of recreation opportunities are available within the communities in the SERSA, ranging from outdoor activities to curling rinks to museums and public libraries. Larger communities typically offer residents a greater variety of recreation facilities, and Prince George has the most extensive range. All communities have at least one public library. New recreation centres have been proposed for both Burns Lake and Prince George (Worthing and Oland, 2012). **Table 7.2.3-2** presents an overview of some of the recreational infrastructure and opportunities available in each community in the SERSA.

Table 7.2.3-2: Recreational Infrastructure and Opportunities in SERSA

Community	Recreation
Burns Lake	Recreation trails, bike park, ice skating, curling, golf, tennis, skiing, skateboard park, Burns Lake Museum, Burns Lake Library, recreation trails, boating, fishing
Fraser Lake	Recreation trails, golfing, ice skating, curling, boating and fishing, kayaking, soccer, Fraser Lake Public Library
Fort St. James	Recreation trails, ice skating, curling, tennis, bicycle park, baseball diamonds, soccer fields, Fort St. James Historical Site, Fort St. James Library, kayaking, boating, fishing
Vanderhoof	Recreation trails, curling rink, running track, bike park, cross-country skiing, shooting range, baseball diamonds, motocross track, bowling (5- and 10-pin), golfing, Vanderhoof Public Library
Prince George	Recreation trails, aquatic centres, recreation centres, golf courses, disc golf courses, ski hills, cross-country skiing, tennis courts, sports fields, Prince George Forestry and Rail Museum, galleries, public libraries

Source: Village of Burns Lake, 2012; Village of Fraser Lake, 2012; Fort St. James District, 2012; District of Vanderhoof, 2012; City of Prince George, 2012

7.2.3.2.2 Regional Transportation

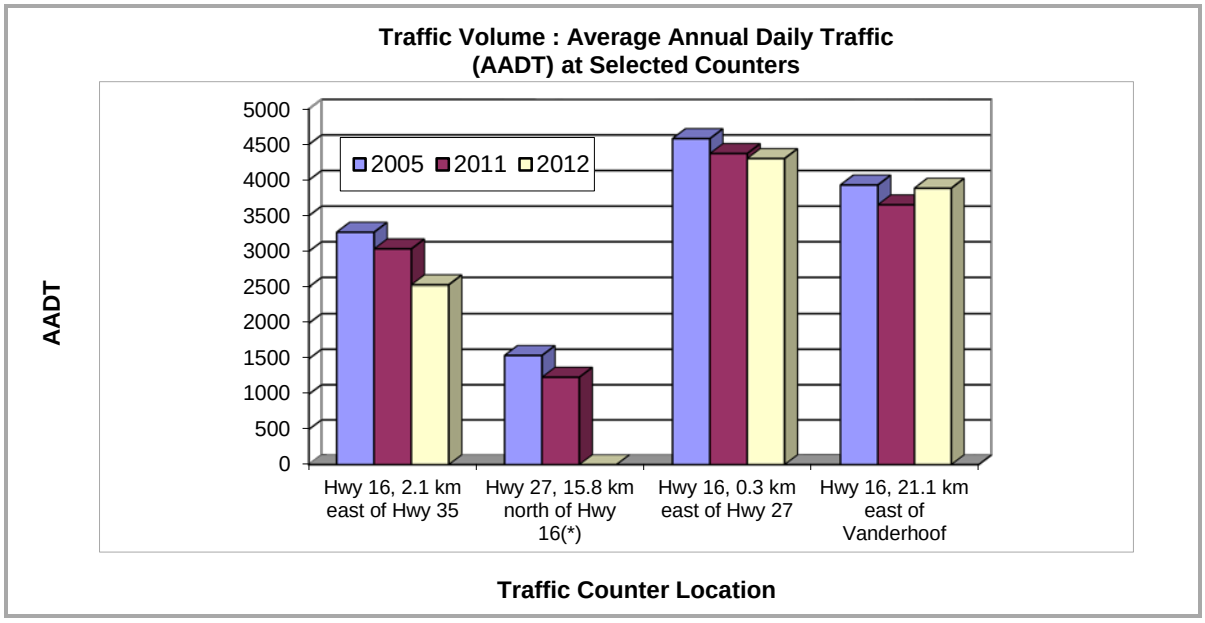
7.2.3.2.2.1 Highways

Highway 16 (also known as the Yellowhead Highway) is the primary east-west highway and trucking route to and through the SERSA, while Highway 27 provides north-south highway access to and within the SERSA.

Highway 16 and Highway 27 are single lane, undivided highways. However, within the SERSA, there are short sections of Highway 16 where there are two lanes in each direction. In addition, there are occasional passing lanes on Highway 16 in hilly terrain. The posted speed limits are 100 km/h for Highway 16 and 90 km/h for Highway 27. Within and in the immediate vicinity of urban centres located on these highways (Prince George, District of Vanderhoof, Village of Fraser Lake, Village of Burns Lake, and District of Fort St. James), the posted speed limits are 50 km/h.

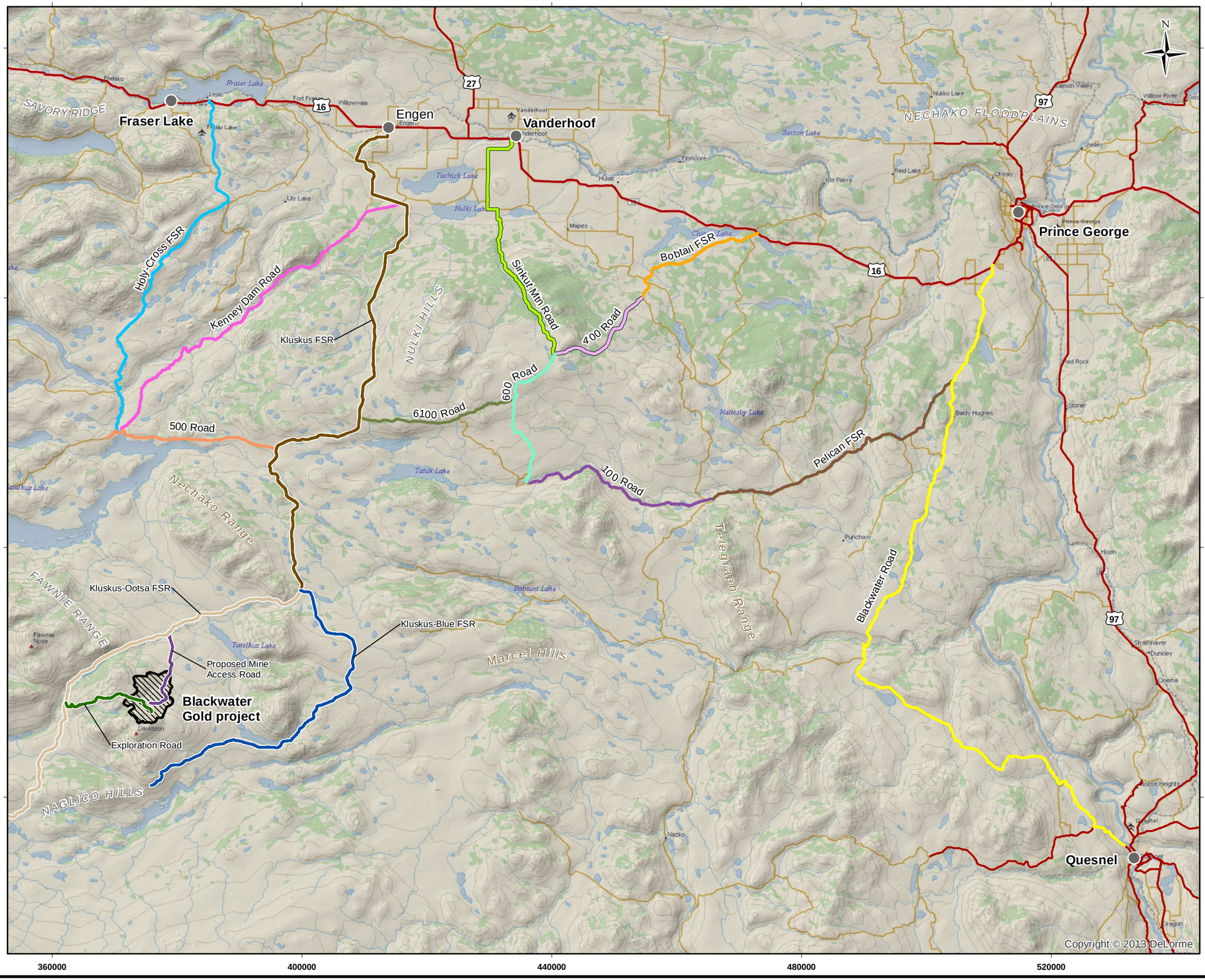
The design capacity (maximum traffic volume that the highway can accommodate) on Highway 16 is generally 1,500 vehicles per hour per lane in each direction, but it can range from 1,200 to 1,800 vehicles per hour per lane at different locations along the highway, due to such factors as road geometry and terrain (Wong, pers. comm., 2012).

Average annual daily traffic (AADT) volumes recorded during the period from 2005 to 2012 at four counter locations in the SERSA (three on Highway 16 and one on Highway 27) are provided in **Figure 7.2.3-1** (refer to **Figure 7.2.3-2** for the location of those counters). The data indicates that 2012 traffic volumes at all counter locations were less than traffic volumes at these locations in 2005. On Highway 27, the AADT was 1,243 in 2011, compared to 1,549 in 2005, a decrease of 306 vehicles per day (-20%). In 2012, AADT on Highway 16 was greatest at the counter located just east of the Highway 27 intersection (4,304 vehicles), followed by the counter located 21 km east of Vanderhoof (3,888 vehicles), and lowest at the counter located just east of Burns Lake (2,532 vehicles).



Notes: 46-011EW: Hwy 16, 2.1 km east of Hwy 35, east of Burns Lake.
45-004EW: Hwy 16, 0.3 km east of Hwy 27, west of Vanderhoof.
45-009EW: Hwy 16, 21.1 km east of Burrard Ave., east of Vanderhoof.
45-003NS: Hwy 27, 15.8 km north of Hwy 16, west of Vanderhoof.
Source: BC MTI, 2013.
(*) Data for 2012 was unavailable for the Hwy 27 traffic counter.

Figure 7.2.3-1: Traffic Volumes at Four Locations in the SERSA in 2005, 2011, and 2012



Reference
BC Government GeoBC Data Distribution

CLIENT: newgold		
PROJECT: Blackwater Gold Project		
North Haul Routes		
DATE: March, 2013	ANALYST: MY	**Figure 7.2.3-1**
JOB No: VE52420	QA/QC: WR	PDF FILE: 14-100-023_north_haul_route_v3.pdf
GIS FILE: 14-100-023_north_haul_route_v3.mxd		amec
PROJECTION: UTM Zone 10	DATUM: NAD83	

Y:\GIS\Projects\VE\VE52095_Richfield_BlackwaterMapping\14_socio-economics\Baseline\14-100-023_north_haul_route_v3.mxd

Motor vehicle accident data compiled by ICBC for Highways 16 and 27 during the five-year period from 2007 through 2011 is presented in **Table 7.2.3-3**. The reliability and accuracy of this information is somewhat affected by the fact that incident locations were often missing or poorly described. However, this data provides useful information on the volumes and types of motor vehicle accidents occurring on these highways during this five-year period.

From 2007 to 2011, an annual average of 381 motor vehicle accidents were reported on Highway 16 between Prince George and Burns Lake. Over the five-year period, a total of 1,907 casualty (fatality or injury) and property damage (no fatalities or injuries) collisions were reported on this stretch of Highway 16, of which 723 (38%) resulted in personal fatality or injury, and 1,184 (62%) resulted only in property damage.

During the same five-year period, an annual average of 12 motor vehicle accidents was recorded on Highway 27 between Highway 16 and Fort St. James. A total of 60 collisions were recorded on Highway 27 from 2007 through 2011, of which 45 (75%) resulted in property damage, and 15 (25%) resulted in personal injury or fatality.

From 2005 to 2011, passenger vehicles were involved in 65% of collisions recorded on Highway 16, and 55% of collisions on Highway 27. During this same period, commercial vehicles were involved in 30% of collisions on Highway 16, and 34% of collisions on Highway 27. Unknown vehicle types accounted for the remainder of collisions on the two highways. Light trucks (pickups, crew cabs, vans) accounted for more than two-thirds of the commercial vehicle collisions on the two highways, whereas tractor trailers, flat decks, and logging trucks accounted for less than 10% of collisions involving commercial vehicles (ICBC, 2013).

***Table 7.2.3-3*: Motor Vehicle Accident Data for Highways 16 and 27 (2007-2011)**

Year	Type of Collision		Total
	Casualty/Fatality	Property Damage Only	
Motor Vehicle Collisions: Highway 16; Prince George to Burns Lake (2007-2011)			
2007	167	244	411
2008	162	212	374
2009	140	254	394
2010	119	240	359
2011	135	234	369
Total	**723**	**1184**	**1907**
Motor Vehicle Collisions: Highway 27; Vanderhoof to Fort St. James (2007-2011)			
2007	2	14	16
2008	1	10	11
2009	4	10	14
2010	4	3	7
2011	4	8	12
Total	**15**	**45**	**60**

Source: ICBC, Request 2013RDS0211-0. Crashes by severity, by vehicle type, on Highway 16 from Prince George to Burns Lake, and on Highway 27 from Vanderhoof to Fort St. James.

7.2.3.2.2.2 Country Roads

The Kenney Dam Road will be used to access the transmission line right-of-way (ROW) during construction, operations, and closure. The portion of the Kenney Dam Road between the transmission line ROW and the Kluskus FSR will experience project-related traffic mainly during periods when the transmission line is being constructed. The project-related traffic will diminish once the transmission line is operational as only maintenance vehicle will be required during the operations phase. Once the Project reaches its post-closure phase, the transmission line will no longer be required and it will be decommissioned and the ROW reclaimed. Vehicles will use the Kenney Dam Road during that phase to transport transmission line materials for off-site disposal.

7.2.3.2.2.3 Local Forest Service Roads

Road access from Highway 16 to the proposed mine site is available from a network of FSRs. Six possible access routes to the proposed mine site are available from five locations along Highway 16. They include:

- From Lejac on Highway 16 and sections of the Holy Cross FSR, 500 Road, Kluskus FSR, and Kluskus-Ootsa FSR and the mine access road;
- From Engen on Highway 16 and sections of Kluskus FSR, 500 Road, Kenny Dam FSR, Kluskus-Ootsa FSR, and the mine access road;
- From Engen on Highway 16 and sections of Kluskus FSR, Kluskus-Ootsa FSR, and the mine access road;
- From Vanderhoof on Highway 16 and a section of Kenny Dam Road, the Sinkut Mountain FSR, 600 and 6,100 Roads, a section of Kluskus FSR, Kluskus-Ootsa FSR, and the mine access road;
- From Bednesti on Highway 16 on Bobtail FSR, the 400, 600, and 6,100 Roads, a section of Kluskus FSR, the Kluskus-Ootsa FSR, and the mine access road; and
- From Vanway on Highway 16 and Blackwater Highway, Pelican FSR, 100, 600, and 6,100 Roads, a section of Kluskus FSR, Kluskus-Ootsa FSR, and the mine access road.

Each of these FSR routes has been evaluated as a potential haul road for goods (including dangerous goods), services, and workers during construction, operations, decommissioning, and closure phases of the mine. The route evaluation took into consideration the following: road length from Prince George to the proposed mine site; design capacity of the roads; condition and width of road surface and bridge structures; seasonal weight restrictions; suitability for transporting 100% legal highway loads year-round; and cost for road and structure upgrades and maintenance. The route evaluation found that, from a least cost perspective, the best route to transport goods and workers starts at Engen, adjacent to Canfor's Plateau Division Sawmill, and follows the Kluskus FSR, a section of the Kluskus-Ootsa FSR, and the mine access road to the proposed mine site. The distance from Engen to the proposed mine site via this route is 149.7 km. The distance from Prince George to the proposed mine site via Highway 16 to Engen and then following this route is

267 km. **Figure 7.2.3-2** shows the preferred route from Engen to the proposed mine site via the Kluskus FSR and Kluskus-Ootsa FSR and the mine access road.

In 2012, the number of vehicle return trips per day on the Kluskus FSR between Engen and KM 99.5 (which excludes the Kluskus-Ootsa FSR and the mine access road) was estimated at 42 vehicles; this has been extrapolated to 15,040 return vehicle trips annually using this route (Allnorth, 2012). Eighty-nine percent, or about 13,385 of the 2012 return trips on the Kluskus FSR, were Canfor vehicles. Of the remaining 11% of vehicles using this route, the Project accounted for about 4%, or 570 vehicles throughout the year.

As shown in **Table 7.2.3-4**, the AADT traffic on the Kluskus FSR in 2013 is estimated to be 29 return vehicle trips per day, a decrease of 31% or 13 return vehicle trips per day compared to the 2012 traffic on this road. Over the course of the year, it is estimated that there could be about 9,040 vehicle return trips on this road. Canfor will account for about 69% of the vehicles, and the Proponent could account for about 12% of the traffic on the Kluskus FSR in 2013.

It is estimated that light trucks (mainly pickups, crew cabs, and vans) owned and operated by the public, private road users, and BC government agencies account for an average of about four return trips per day throughout the year, or 16% of the total traffic on the road. However, this traffic is expected to increase during the summer and fall months when local and regional residents camp, fish, and hunt in this area south of Highway 16 (V. Sewell, pers. comm. 2013). Some of the light truck traffic could be linked to nine guide outfitters and 20 trappers with hunting and trapping areas that overlap the Kluskus FSR, and four private lake resorts and one dude ranch located adjacent to the Kluskus FSR.

As the main user of the Kluskus FSR, Canfor is responsible for maintenance, upkeep, dust suppression, and snow removal on this road. Other industrial users of this road, including the Proponent, have signed road management agreements with Canfor, whereby they agree to pay a portion of the cost for ongoing road maintenance, repair, and snow removal, based on the projected volume of industrial traffic that will use the FSR month to month throughout the year. The road management agreements are in effect for one year, but renewable on an ongoing basis.

ICBC documents the numbers and types of motor vehicle accidents on primary highways in BC, but not on local roads, industry roads, or FSRs. If or when motor vehicle accidents occur on local roads or FSRs providing access to the Project, they are reported to the Vanderhoof RCMP detachment. However, no motor vehicle accidents have been reported during the past three years on the Kluskus FSR, the Kluskus-Ootsa FSR, or any other FSRs south of Highway 16 that provide access to the Project (Dyck, pers. comm., 2013).

Table 7.2.3-4: Traffic Volumes on Kluskus FSR 2012 and 2013

Traffic Source	2012 Traffic Estimates		2013 Traffic Estimates	
	AADT[5]	AAT	AADT[5]	AAT
Canfor Plateau[1]	37	13,650	21	6,250
BC Timber Sales[2]	Nil	Nil	Nil	Nil
L&M Timber Sales[3]	Nil	Nil	Nil	Nil
Blackwater Project[4]	2	570	3	1,040
Other Industrial Users*	1	250	1	290
Pickups and other private road users	2	570	4	1,460

Note: [1]Update provided by Canfor, July 2013.
[2]Update provided by MFLNRO, July 2013.
[3]Update provided by L&M Timber Sales, July 2013.
[4]Update provided by the Proponent, July 2013.
[5]Numbers refer to return trips as opposed to one way trips.
*Assumes 15% increase in other industrial users due to increase in mineral exploration over last five years. Estimates based on discussion with other road users and government agencies.
Between 2005 and 2009, traffic along the Kluskus FSR during forestry operational periods was estimated to reach up to 700 round trips per day. This traffic estimates are for working days (i.e. Monday and Friday) and exclude the break-up period (BC MFLNRO pers. comm., 2015)

Source: Allnorth, 2012; Canfor; L&M Timber; BC Timber Sales; and MFLNRO, 2013.

7.2.3.2.2.4 Transportation of Dangerous Goods

Dangerous goods can be transported on all highways in BC (including within the SERSA on Highways 16 and 27), on local FSRs, and via rail, provided that the dangerous goods and the vehicles or rail cars transporting them are in compliance with the applicable international, federal, and provincial guidelines, acts, and regulations. These regulations include, but are not limited to: the International Cyanide Management Code (ICMC) (ICMI, 2012); Environment Canada's (EC) Environmental Code of Practice for Metal Mines (EC, 2009); Canadian *Transportation of Dangerous Goods Act* and Regulations; and BC *Transportation of Dangerous Goods Act* and Regulations.

It is anticipated that materials transported to the proposed mine site would fall under several dangerous goods classifications, and could include reagents such as cyanide, fuel and lubricants, explosives, and blasting agents.

The City of Prince George Highways Bylaw No. 8065 regulates the use of highways within the city boundaries. Under Section 4 of *Bylaw 8065*, any person who operates any vehicle transporting dangerous goods on any highway on which the movement of dangerous goods is permitted must have a permit or written approval from the City of Prince George.

The City of Prince George Transport of Dangerous Goods Bylaw No. 8192 restricts the transport of dangerous goods to certain designated highways and roads in the city in order to reduce the risk to public health and safety, the natural environment, and public works.

7.2.3.2.2.5 Rail

Rail freight service to and through the SERSA is provided by Canadian National Rail (CN Rail). CN Rail freight trains make regular stops at a staging yard in Prince George, as well as at sidings located in Vanderhoof, Engen, Fort St. James, Fraser Lake, and Burns Lake. The train stops at these locations are based on customer demand and deliveries (CN Rail, 2012). CN Rail operates freight services from Prince George to Cache Creek on a spur line that parallels Highway 97. From Cache Creek, freight can be transferred to the Canadian Pacific (CP) Rail network that runs west to Vancouver or east to Calgary, Regina, Winnipeg, and beyond.

The Proponent has identified an existing transload and temporary storage site in Prince George where large milling and mining equipment, materials, and vehicles could be transferred from rail cars onto trucks for the remainder of the journey to the proposed mine site during the construction phase. This transload site could also be used to transfer granular cyanide from trains to trucks to the mine site during Project operations. Additional details on the transload facility are presented in **Section 2.2**.

7.2.3.2.2.6 Air

The Prince George Airport, YXS, functions as a regional hub, and is the only commercial airport in the SERSA. It is open 365 days a year, with daily direct flights to Vancouver, Kamloops, Kelowna, Smithers, Terrace, and Fort St. John via West Jet, Air Canada (Express), and Central Mountain Air. It also handles international flights, and has customs services. The airport is able to accommodate all sizes of commercial passenger and large cargo planes (Green, 2012). The number of air passengers using the Prince George airport increased from 402,000 in 2010 to 420,000 in 2011. YXS is anticipating a further 3% increase in passengers over the next five years (Green, 2012). The airport facilities have recently been updated.

The communities of Vanderhoof (CAU4), Fort St. James (CYJM), Fraser Lake (CBZ9), and Burns Lake (CYPZ) operate registered airstrips that are used for air emergency medical transportation, small private jets, and single and dual engine private and charter aircraft carrying passengers and cargo. The local communities maintain the runways at these airstrips, and all feature paved landing and taxiing surfaces.

To date, air travel to the proposed mine site is via helicopter. However, the Proponent is intending to construct an airstrip near the mine site prior to the start of Project construction. Several potential airstrip sites have been evaluated, including an existing airstrip at Tatelkuz Lake. A preferred airstrip site has been selected approximately 15 km north of the proposed mine site, next to the Kluskus-Ootsa FSR. When developed, the airstrip would accommodate fixed-wing aircraft up to and including Dash 8–100.

7.2.3.2.3 Past, Present and Future Projects and Activities

Section 4, Subsection 4.3.6.2, Table 4.3-11 shows the Summary Project Inclusion List developed for CEA (**Appendix 4C** contains the comprehensive Project Inclusion List). Changes in regional

and community infrastructure would be driven by changes in population, which, in turn, are driven by employment demands. Activities associated with and could include:

- Mining – exploration and existing;
- Forestry – logging; and
- Pipeline Projects.

7.2.3.3 Potential Effects of the Proposed Project and Proposed Mitigation

This subsection:

- Identifies and analyses potential effects resulting from the proposed Project's construction, operations, and closure phases;
- Identifies and describes any potential effects from other known past, present, certain and reasonably foreseeable future project or activities in the proposed Project area; and
- Describes measures to mitigate the potential adverse effects identified above.

This section assesses the extent to which Project-related population growth and Project activities would result in increased demands on regional infrastructure. This includes examining the potential additional demands on regional and municipal infrastructure, housing and temporary accommodation, and the transportation network infrastructure. The assessment is based on forecasts population growth (**Section 7.2.2**) and employment demands (**Section 6.2.3**), which has been undertaken in the context of potential, reasonable and foreseeable future changes in economic activity in the region.

The types of interactions associated with project activities and project components in relation to the Regional and Community Infrastructure VC are classified as: key interactions, moderate interactions, or negligible interactions (**Table 4.3-2** Project Component and Activity Interaction Matrix for Selected VCs, **Section 4**). The interactions are with the Project as a whole and the Mine Site is selected as representative for the whole Project.

The potential effects and mitigation measures are first presented for regional and community infrastructure services, followed by a discussion of potential effects and mitigation for regional transportation.

7.2.3.3.1 Regional and Community Infrastructure Services

7.2.3.3.1.1 Potential Project Effects

Project activities could directly affect regional and community infrastructure services by placing additional demands on regional utilities such as water, energy and waste disposal. As noted in the Project Description, the Project will be self-contained. It will have an on-site camp, and water and sewage management facilities. In addition, a road and electrical transmission line to the site will be constructed as part of the Project. While most waste generated by the Project will be handled

on-site, some wastes may be sent to regional landfills; however, the payment of tippage fess will result in no costs to the regional district.

The main potential effects of the Project on regional and community infrastructure services (housing, utilities, and recreational facilities) will depend on the extent to which Project-related population growth result in increased pressure in regional and local infrastructure. Neither residents working on the Project nor non-residents who commute to the Project would create population impacts or otherwise affect the demand for regional and community infrastructure. Non-residents who relocate to the SERSA would create a population impact and therefore increase the demand for regional and local infrastructure services.

Section 7.2.2 Demographics examined how the Project will add to the existing populations in the SERSA. During the construction phase, the provision of camps and the short duration of construction will create no population effects on the SERSA and will therefore have no effects on regional and community infrastructure. During the operations phase, however, up to 290 people (100 families) may choose to relocate to the SERSA and will therefore create some additional demands on regional and community infrastructure services including housing, utilities, and recreational facilities.

Within the SERSA, the city of Prince George is anticipated to attract the majority of the workers who choose to relocate due to its wider range of services and facilities and broader housing supply than any other SERSA community. The city offers a full range of urban amenities and is the centre for health, education, transportation, shopping, and business in Northern BC. It is estimated that up to 232 people (80 families) would relocate to Prince George.

In addition, the district of Vanderhoof is expected to attract 58 people (20 families). Although a small community, Vanderhoof is expected to be attractive to in-migrants due to the following reasons:

- Vanderhoof is the most accessible community to the Project and is the Project transportation hub;
- Vanderhoof is the biggest community in the LSA and has an Ambassador Program to facilitate the relocation of interested families into the district; and
- The Proponent will have an Incentives and Inducements Program to encourage workers to relocate to the LSA (specifically Vanderhoof).

Both Prince George and Vanderhoof have good capacity of infrastructure services ─ housing, utility, recreation, and leisure – and approved expansion plans (**Section 7.1.1**) that can easily accommodate the potential additional demands created by the arrival of 232 people to Prince George and 58 people to Vanderhoof. Besides, a positive influx of permanent residents is desirable since it aligns with the communities' desires for attracting new residents and increasing the local tax base.

Given the limited increase in demand for housing (80 families in Prince George and 20 families in Vanderhoof), current vacancy rates, and reported increase in residential building permits in both communities, no effects are expected in housing prices or rents in either community. Similarly, the

current good capacity of utility services and recreation and leisure infrastructure, in combination with the small demand created by the arrival of up to 290 people or approximately 100 families (0.3% of the SERSA population) suggest that the effects would be negligible.

During closure, a small decline in population is expected and, therefore, the demand for infrastructure services, including housing, utility, and recreation, is expected to decline. This may mean that the remaining population would be faced with the costs of continuing to operate the infrastructure locally and regionally, but this change falls within historic norms, and infrastructure providers are used to fluctuations in their client bases. Besides, it is uncertain whether the in-migrants would leave the region, since this depends on the work opportunities available in the region by the time of closure and personal preferences. If the majority of in-migrants decide to leave, demand for infrastructure services would return to base case conditions during post closure.

Changes in the demand for infrastructure service as outlined in **Table 7.2.3-5** are carried forward in this assessment. Even though the magnitude of change is minor, the direction is characterized as alternately adding then subtracting from total demand.

7.2.3.3.1.2 Mitigation Measures

Discussion of appropriate mitigation measures is a shared responsibility between the Proponent, the government, and the public. Governments are responsible for planning and implementing social programs and delivering public infrastructure services that address social effects concerns. Individuals and families must make lifestyle decisions that are consistent with enhanced social circumstances. The Proponent needs to fulfill its commitments in hiring from within the SERSA and providing competitive work packages and training when relevant. As a result, all these parties must share responsibility for social effects management for it to be effective.

The Project is not anticipated to have direct adverse effects on regional and community infrastructure services. The Project will be self-contained, with its own accommodations and water and sewage facilities and its own access road and electrical transmission line to site. While most waste generated by the Project will be handled on-site, some wastes may be sent to regional landfills; however, the implementation of an Industrial and Domestic Waste Management Plan and payment of tippage fees will result in no negative effects to the regional district.

The limited size of the workforce that may choose to relocate (290 people or 100 families), along with the current good capacity of infrastructure services in Prince George and Vanderhoof, the communities' desires for attracting new residents, and the Proponent's incentives program conclude that the effects on infrastructure services will be minimal and within the capacity of the host communities. More details on Project effects and their mitigation per each identified Infrastructure service indicator is available in **Table 7.2.3-6**.

Table 7.2.3-5: Potential Project Effects on Regional and Community Infrastructure Services

Interaction with Project	Project Phase	Potential Project Effect	Likelihood of Occurrence
Housing			
In-migration of job seekers	C	In- migration creates additional demand for housing services	Low
In-migration of workers and their dependents	O	In-migration creates additional demand for housing services	Medium
Out-migration of workers and their dependents	CL	Out-migration decreases demand for housing services	Medium
n/a	PC	n/a	n/a
Utilities			
In-migration of job seekers	C	In- migration creates additional demand for utility services	Low
In-migration of workers and their dependents	O	In-migration creates additional demand for utility services	Medium
Out-migration of workers and their dependents	CL	Out-migration decreases demand for utility services	Medium
Project activities (including mine and camp operations)	C, O	Project activities could create additional demand for solid waste disposal facilities	Medium
n/a	PC	n/a	n/a
Recreational Facilities			
In-migration of job seekers	C	In- migration creates additional demand for recreation and leisure services	Low
In-migration workers and their dependents	O	In-migration creates additional demand for recreation and leisure services	Medium
Out-migration of workers and their dependents	CL	Out-migration decreases demand for recreation and leisure services	Medium
n/a	PC	n/a	n/a

Note: C = construction; CL = closure; O = operations; PC = post-closure

Table 7.2.3-6: Mitigation Measures and Potential Residual Effects for Regional and Community Infrastructure Services

Project Phase	Potential Project Effect	Mitigation and Management	Type of Residual Effect	Potential Residual Effect
Housing				
C	In-migration creates additional housing demand	Use of construction camp with capacity to accommodate 1,500 workers will offset Project's demands for housing services Provision of an airstrip on-site to transport construction workers from outside the SERSA Short term of construction phase Success Rating: Moderate	Neutral	No appreciable increase in housing demand is expected
O	In-migration of workers and dependants creates additional housing demand	The Proponent intends to hire the majority of the operations workforce from within the SERSA Use of operations camp with capacity to accommodate 500 workers will offset Project's demands for housing services The Proponent will provide incentives and inducements for workers who are interested in moving in permanently to the LSA The Proponent will encourage its management team to reside in the SERSA Success Rating: Moderate	Neutral	Increase in housing demands that are within the current SERSA capacity and approved expansion plans
CL	Out-migration of workers decreases housing demand	Work with local service providers to incorporate potential decline in population in planning Work with the SERSA communities to develop a mine closure plan that identifies strategies and actions to help minimize the potential adverse effects of closing the mine Success Rating: Moderate	Adverse	Decrease in housing demands due to potential out-migration of worker
PC	n/a	n/a	n/a	n/a

Project Phase	Potential Project Effect	Mitigation and Management	Type of Residual Effect	Potential Residual Effect
Utilities				
C	In-migration creates additional demand for utilities	Use of construction camp with capacity to accommodate 1,500 workers will offset Project's demands for utility services Provision of an airstrip on-site to transport construction workers from outside the SERSA Short term of construction phase Success Rating: Moderate	Neutral	No appreciable increase in demand for utilities is expected
O	In-migration creates additional demand for utility services	The Proponent intends to hire the majority of the operations workforce from within the SERSA Use of operations camp with capacity to accommodate 500 workers will offset Project's demands for utility services The Proponent will provide incentives and inducements for workers who are interested in moving in permanently to the LSA The SERSA has good capacity of utility services and approved expansion plans Success Rating: Moderate	Neutral	Increase in demands for utility services that are within the current SERSA capacity and approved expansion plans
O, C	Project activities could create additional demand for solid waste disposal facilities	Implement an Industrial and Domestic Waste Management Plan; Payment of tippage fees to regional district	Neutral	Increase in demands for regional landfill services that are within the SERSA capacity. The Project will pay tippage fees that will result in no additional costs to the regional district
CL	Out-migration decreases demand for utility services	No mitigation required Success Rating: n/a	Adverse	Out-migration of workers could reduce demands for utilities
PC	n/a	n/a	n/a	n/a

Project Phase	Potential Project Effect	Mitigation and Management	Type of Residual Effect	Potential Residual Effect
Recreational Facilities				
C	In-migration creates additional demand for recreation and leisure services	Use of construction camp with capacity to accommodate 1,500 workers will offset Project's demands for recreation and leisure services Provision of an airstrip on-site to transport construction workers from outside the SERSA Short term of construction phase The SERSA has a variety of recreation and leisure services and approved new plans with adequate capacity Success Rating: Moderate	Neutral	No appreciable increase in demand for recreation and leisure services is expected
O	In-migration creates additional demand for recreation and leisure services	The Proponent intends to hire the majority of the operations workforce from within the SERSA Use of operations camp with indoor and outdoor recreation facilities will offset Project's demands for recreation and leisure services The SERSA has a variety of recreation and leisure services and approved new plans with adequate capacity Success Rating: Moderate	Neutral	Increase in demands for recreation and leisure services that are within the current SERSA capacity and approved expansion plans
CL	Out-migration decreases demand for recreation and leisure services	Work with local service providers to incorporate potential decline in population in planning Work with the community to develop a mine closure plan that identifies strategies and actions to help minimize the potential adverse effects of closing the mine Success Rating: Moderate	Adverse	Out-migration of workers could reduce demands for recreational and leisure services
PC	n/a	n/a	n/a	n/a

Note: C = construction; CL = closure; O = operations; PC = post-closure; n/a = not applicable; SERSA Socioeconomic Regional Study Area

7.2.3.3.2 Regional Transportation

7.2.3.3.2.1 Potential Project Effects

The assessment of potential Project effects on regional transportation considers Project ground transportation activities (transportation of workers, equipment, goods, and services) at Highway 16, the Kluskus and Kluskus-Ootsa FSRs, and the mine access road, as well as rail and air transportation activities. This section includes considerations discussed in **Section 7.2.6.4** – Residual Effects on Non-Traditional Land Use, particularly in regards the use of the road transportation and access matters.

The assessment of regional transportation takes into consideration other past and present activities and projects in the SERSA, which are included in the baseline conditions. Future projects and land and resource use activities identified in the Project Inclusion List (**Appendix 4C**) have also been considered, to the extent that quantitative information on these other projects, activities, and land and resource uses was available.

The assessment of this indicator is presented by Project phase and type of transportation infrastructure, including ground, rail and air.

7.2.3.3.2.1.1 Construction Phase

Ground Transportation

Construction at the proposed mine site and off-site infrastructure locations would require delivery of a range of freight, including construction equipment, permanent equipment, office and contractor trailer modules and other temporary camp related buildings, fuel, and a range of materials, including structural steel, pipe, concrete, gravel, wooden poles, power cable, and mechanical products. A portion of the Kluskus FSR will be upgraded between 101+650 and 123+973 km (mine access road junction) to handle the addition of truck traffic (**Section 2.2.4.2**).

Over the two-year construction period, there will be an average of 28 daily return trips on Highway 16, the Kluskus FSR, Kluskus-Ootsa FSR, and the mine access road, of which 13 (46%) would be heavy trucks transporting large equipment, freight, fuel, and consumables to the proposed mine site, transmission power line, and water pipeline work sites. This would amount to approximately 6,630 return truck trips over the two-year construction period, assuming deliveries five days a week, fifty-one weeks a year[1]. It is estimated that 80% of the heavy truck traffic will be destined for the mine and water pipeline, and 20% will be going to and from the power transmission line via the Kluskus and other FSRs, including Holy Cross and Kenny Dam FSRs, and the 500 Road. It was assumed that the majority of the construction equipment, materials, and services would be procured from within the SERSA.

An average of 10 (36%) light vehicles (pickups, crew cabs, cube vans) will make daily return trips to the mine and related off-site infrastructure sites. Vendors, sales and service representatives, and

[1] Assuming a one week Christmas/New Year shutdown.

expediter services will use these vehicles. Over the two-year construction period, these vehicles will account for about 5,100 return trips on Highway 16 and the Kluskus and Kluskus-Ootsa FSRs.

During this two-year period, an average of one bus per day, over the five-day rotation every two weeks, or 4% of total daily Project-related traffic, will make two-way trips from a muster point at Vanderhoof to transport construction workers to and from the proposed mine site via the Kluskus and Kluskus-Ootsa FSRs because personal vehicles will not be permitted to drive to and from the proposed mine site. In addition, at the time of rotation seven buses per day will make a return trip between the new airstrip and the camp at the mine site, using the Kluskus Ootsa FSR. **Table 7.2.3-7** provides a breakdown of average daily return vehicle trips to the proposed mine site, which total 7,140 vehicles return trips (all types) per year, and 14,280 vehicle return trips over the two-year construction period on Highway 16 between Prince George and Engen, and on the Kluskus and Kluskus-Ootsa FSRs. The average daily construction worker traffic in personal vehicles en route to and from the muster site at Vanderhoof from east and west on Highway 16 is 14 and 11 vehicle return trips per day respectively. This incremental traffic will occur five days a week, fifty one weeks a year throughout the two-year construction period., When added to the other Project-related traffic, average annual daily traffic on Highway 16 could increase by 78 vehicles west of Vanderhoof, and by 84 vehicles east of Vanderhoof. This is equivalent to an average daily traffic increase on Highway 16 of 1.7% west of Vanderhoof, and 2.1% east of Vanderhoof and still far below the design capacity of the highway.

Table 7.2.3-7: Mine Construction Traffic: Average Daily Return Trips and Vehicle Types

Transportation Route	Passenger Vehicles (workers)	Heavy Trucks (mine and camp modules, supplies, equipment & garbage)	Buses(*) (workers)	Pickups & Light Trucks (vendors, expediter and other misc.)	Tanker & Midsize Trucks (fuel, propane)	Total No. Vehicle Return Trips
Hwy 16 from Prince George and Vanderhoof to Engen	-	13	1	10	4	28
Hwy 16 from Prince George to Vanderhoof	14	-	-	-	-	14
Hwy 16 from Burns Lk,, Fraser Lk. & Ft. St. James to Vanderhoof	11	-	-	-	-	11
Airstrip to mine site camp via Kluskus FSR			7			7
Engen to mine and off-site infrastructure via Kluskus and Kluskus-Ootsa FSRs	-	13	1	10	4	28

Note: Assumes a peak of 1,500 workers on site during construction phase.
Assumes 14% (210) of construction workforce recruited from SERSA and 86% (1290) from outside SERSA.
Assume all workers on 2-weeks-on/1-week-off work rotation that is staggered over 5 days every two weeks.
Assume workforce from outside SERSA will live in an onsite camp and fly in/fly out to airstrip near mine site and bused to/from the camp.
Assume 105 of SERSA workers will be from Prince George, 80 from communities in SERSA west of Vanderhoof, and 25 from Vanderhoof.
Assumes 1.5 workers/passenger vehicle traveling to/from the muster site at Vanderhoof.
(*)Assumes 40-passenger buses transport SERSA workers between Vanderhoof muster site and proposed mine site and from airstrip to the camp at the mine site.
Traffic estimates are averaged over 12 hour day, 5 days per week per year, 51 weeks per year.
During peak construction in Q1 2016, the number of daily heavy truck and fuel truck return trips will double

Source: New Gold Inc. and AMEC M&M, 2013.

Project-related traffic (all vehicle types) on the Kluskus and Kluskus-Ootsa FSRs would generate a substantial increase in average daily two-way traffic on these roads. The average daily increase of 28 vehicle return trips on these FSRs would represent a 67% increase in two-way traffic compared to 2012 traffic volumes, and a 97% increase in two-way traffic compared to 2013 traffic volumes. Assuming that this daily traffic increase will largely occur over a 12-hour period from 6 am to 6 pm, this will amount to an average of 4.7 vehicles per hour passing any point along the route from Engen to the proposed mine site. When added to the 4.8 vehicles per hour that currently use these FSRs, the two-way traffic on the FSRs will increase to 9.5 vehicles per hour during the construction phase. However, during peak construction (from January to April 2016), the number of heavy truck and fuel trucks will double increasing the total two-way traffic on the FSRs to 12.3 vehicles per hour.

During the five-day staggered work rotation that occurs every second week throughout the construction phase, 7 buses per day will make return trips between the onsite camp and the airstrip near the mine site.

Rail

A 2012 preliminary logistics study undertaken for the Proponent determined that 28 extraordinary heavy-haul loads could be transported to the Project proposed mine site during the construction phase, using a combination of rail and heavy truck hauling. The extraordinary loads would be moved by rail to an existing transload site in Prince George, where they would be transferred to heavy-haul trucks for the remainder of the journey to the proposed mine site via Highway 16 to Engen, the Kluskus and Kluskus-Ootsa FSRs, and the mine access road.

Air

The Proponent identified a need for an airstrip near the Project proposed mine site during the construction phase to transport workers to the Project from outside the region in accordance with prescribed rotational work schedules. Existing airstrips located south of Highway 16 were evaluated, as was the development of a new airstrip site near the Project.

The findings of this evaluation resulted in a decision by the Proponent to build a new airstrip at a previously cleared forestry cut block adjacent to the Kluskus-Ootsa FSR about 15 km north of the proposed mine site. The airstrip will include all necessary lighting and navigation equipment and a gravel-surfaced airstrip approximately 5,500 ft (1,675 m) long to accommodate either a Dash 8-100 or Bombardier Q-400 aircraft. Upon landing at the airstrip, the non-regional construction workers would board buses for the short drive to the camp located at the proposed mine site.

There could be up to three flights per day arriving over three or four days per week from air transportation hubs at Vancouver, Calgary, and Kelowna.

An existing helipad for emergency response transportation is located at the mine site.

7.2.3.3.2.1.2 Operations Phase

Ground Transportation

The mine operations and maintenance phase will span 17 years, starting in 2017 and overlapping a portion of the second year of the construction phase. The number and types of Project-related vehicles travelling to the mine via Highway 16 and the Kluskus and Kluskus-Ootsa FSRs will be similar to traffic during the construction phase, including the busing of workers, heavy truck transport of camp supplies, garbage, fuel, and propane, and light vehicles used by vendors, expediters, and maintenance contractors. New types of loads will include mine and plant processing consumables, such as cyanide, reagents, and blasting materials. Mine products (gold and silver doré bars) will be transported from the proposed mine site by armoured vehicle and/or air transportation.

Throughout the operations and maintenance phase, there will be an average of 28 daily return trips on Highway 16, the Kluskus and Kluskus-Ootsa FSRs, and mine access road, of which 9 (32%) will be heavy trucks transporting mine and plant consumables, large equipment, camp supplies, and garbage. An average of 10 (36%) light vehicles (pickups, crew cabs, and cube vans) will make daily return trips to the mine, along with four tanker trucks (14%) hauling fuel and propane, three armoured vehicles (10%) transporting gold and silver doré bars produced at the mine, and three busses per day (at time of rotation) (11%). The busses will be transporting workers between the Vanderhoof muster site and the mine because staff and contract workers will not be permitted to drive personal vehicles to and from the mine site. **Table 7.2.3-8** provides a breakdown of the 28 average daily return vehicle trips to the proposed mine site, which amounts to an additional 14,280 vehicles (all types) per year over the 17-year operations and maintenance phase of the Project travelling on Highway 16 between Prince George and Engen, the Kluskus and Kluskus-Ootsa FSRs, and the mine access road.

It is estimated that a daily average of 28 return trips will be made over the three-day staggered rotation every week on Highway 16 by the operations workforce travelling from Prince George to and from the muster site at Vanderhoof. During the same three-day rotation period, a daily average of 11 return vehicle trips will be made by operating workers travelling to Vanderhoof from communities located west of Vanderhoof. When added to the other types of Project-related traffic it would result in a daily average of 56 return vehicle trips on Highway 16 east of Vanderhoof and 39 return vehicle trips on Highway 16 between Vanderhoof and Engen. This Project operations traffic will increase the baseline AADT east of Vanderhoof by 1.4% and increase AADT baseline traffic between Vanderhoof and Engen by 0.9%. In both cases this represents a very small increase in AADT on Highway 16 and far below the design capacity of this highway.

Table 7.2.3-8: Mine Operations Traffic: Average Daily Return Trips and Vehicle Types

Transportation Route	Passenger Vehicles[(1)] (workers)*	Heavy Trucks (mine/ processing consumables and equipment, camp supplies, garbage)	Buses (workers)**	Pickups & Light Trucks (vendors, expediters and maintenance)	Tankers & Midsize Trucks (fuel, propane, gold & silver doré bars)	Total No. Vehicle Return Trips
Hwy 16 from Prince George and Vanderhoof to Engen	-	9	2	10	7	28
Hwy 16 from Prince George to Vanderhoof	27	-	1	-	-	28
Hwy 16 from Burns Lk, Fraser Lk. and Ft. St. James to Vanderhoof[(1)]	11	-	-	-	-	11
Engen to mine and off site infrastructure via Kluskus and Kluskus-Ootsa FSRs	-	9	2	10	7	28

Note: Assumes a total direct operations workforce of 500 and an average of 250 workers on site at any time.
[(1)]Assumes 65% (325) of operations workforce recruited from SERSA, and 35% (175) from outside SERSA.
Assume 50% (163) of workers hired from within SERSA live in Prince George, 20% (65) live in Vanderhoof, and 30% (97) live in communities west of Vanderhoof.
Assume 80 of the 175 workers hired from outside SERSA will relocate to Prince George and 20 will relocate to Vanderhoof. Therefore, the number of workers living in Prince George increases to 243, Vanderhoof increases to 85 and communities west of Vanderhoof remains unchanged at 97.
75 workers from outside SERSA fly to Prince George over 3-day staggered rotation, take one bus per day to Vanderhoof, and transfer to another bus from muster point to mine site.
* personal vehicles to muster site at Vanderhoof and busing workers from Vanderhoof to mine site occurs over 3 days every week during two week on two week off work rotation.
**Assumes 40 passenger buses transport SERSA workers between Vanderhoof muster point and mine site.
Assumes 1.5 workers per passenger vehicle travelling to/from muster point at Vanderhoof.
Traffic estimates are based on averages over a 5-day week, 51 weeks per year.

Source: New Gold Inc. and AMEC M&M 2013.

Project-related traffic (all vehicle types) on the Kluskus and Kluskus-Ootsa FSRs would generate a substantial increase in average daily two-way traffic on these roads. The average daily increase of 28 vehicle return trips on these FSRs would represent a 67% increase in two-way traffic compared to 2012 traffic volumes, and a 97% increase in two-way traffic compared to 2013 traffic volumes. Assuming that this daily traffic increase occurs over a 12-hour period (6 am to 6 pm), this amounts to 2.3 return trips, or 4.6 vehicles per hour, travelling past any point on the route from Engen to the proposed mine site. Added to the 2013 baseline traffic on these FSRs, the total number of vehicles travelling in both directions would increase to 9.5 vehicles per hour.

Rail

It is anticipated that CN Rail will transport granular cyanide in sealed rail cars by regularly scheduled rail service to an existing transfer site in Prince George that is approved and used for handling and storage of hazardous materials. From there, the cyanide will either be loaded onto trucks for continuation of the journey to the proposed mine site, or be temporarily stored in a secure warehouse at the transfer site until such time as it is needed at the mine site.

It is anticipated that 4 truckloads of cyanide per week will be transported from the transload facility to the mine via the Kluskus and Kluskus-Ootsa FSRs.

Air

After completion of the construction phase, the Proponent airstrip will no longer be used to fly non-regional operations and maintenance workers to the mine site. Instead, the Proponent strategy is to hire as many qualified management, staff, hourly workers, and contractors as possible from within the SERSA. It may be necessary to recruit some of the operations and maintenance workforce from outside the SERSA and the Proponent will encourage them to relocate to the District of Vanderhoof or elsewhere in the SERSA, and to commute to work by bus from the Vanderhoof muster site.

It is assumed that approximately 175 of the 500 operations and maintenance workforce will be recruited from beyond the SERSA. It is further assumed that 100 of the 175 workers will relocate to communities within the SERSA. As a result, 75 workers from outside the SERSA will fly to Prince George and be bused to Vanderhoof where they will board a Project bus with the other operations and maintenance workers on route to the mine site.

7.2.3.3.2.1.3 Decommissioning, Closure, and Post-Closure Phases

Ground Transportation

When the mine enters the two-year decommissioning and closure phase in Year 17, there will be about 50 workers on site. That number would decrease to 30 during the second year of decommissioning/closure. About half of the workforce would be the Proponent employees, and half would be contract personnel. It is assumed that the Proponent employees and most, if not all, of the contractor workforce will be recruited from within the SERSA. The Proponent's employees and contract personnel would stay at the onsite camp in accordance with the prescribed work rotation schedule.

The decommissioning and closure workforce will be involved in a variety of activities, including mine overburden hauling and resloping, plant decommissioning, and removal of onsite buildings and equipment. The closure phase will end when the open pit is flooded and water begins to discharge to the TSF. At that point, pumping water from Tatelkuz Lake would no longer be necessary and decommissioning of the freshwater supply system and transmission line will take place. Disturbed areas will be revegetated in a manner consistent with end land use objectives.

Table 7.2.3-9 shows an average of six to seven Project-related daily return trips on Highway 16 and the Kluskus and Kluskus-Ootsa FSRs, a negligible increase over the 2012 AADT on Highway 16, and a 24% increase over the 2013 baseline traffic on the Kluskus and Kluskus-Ootsa FSRs.

Table 7.2.3-9: Mine Decommissioning and Closure Traffic: Average Daily Return Trips and Vehicle Types

Transportation Route	Worker Passenger Vehicles	Supplies (heavy trucks)	Buses[2]	Other (pickups & light trucks)	Hazardous Loads (fuel)[3]	Total No. Vehicle Return Trips
Hwy 16 from Prince George and Vanderhoof to Engen	-	4	0.2	2	0.5	6.7
Hwy 16 from Prince George to Vanderhoof[1]	16	-	-	-	-	16
Hwy 16 from Burns Lk., Fraser Lk., and Ft. St. James to Vanderhoof[1]	10	-	-	-	-	10
Engen to mine and offsite infrastructure via Kluskus and Kluskus-Ootsa FSRs[3]	-	4	0.2	2	0.5	6.7

Note: Estimated for during 1st year of mine decommissioning and closure, when 50 employees on site.
[1]Assumes 50 onsite workers and 1.5 workers/passenger vehicle driving to Vanderhoof.
[2]Assumes 40-person passenger buses used to transport workers between muster point and proposed mine site.
[3]Assume a fuel tanker every second day, and two buses every 14 days.

Source: New Gold Inc. and AMEC M&M, 2013.

During the post-closure phase, there will be three Proponent staff on site on a continuous basis monitoring flows and taking water samples until the pumping system from Tatelkuz Lake is decommissioned. After the lake pumping station is shut down, there will be no New Gold employees on site. Instead, a New Gold employee based out of the regional office in Vanderhoof will make weekly trips to site to monitor and take samples. Over time, the frequency of sampling will progressively be reduced to monthly, quarterly, and annually. The intended travel route for the environmental monitors to and from the mine site is Highway 16 to Engen and the Kluskus and Kluskus-Ootsa FSRs. This travel would be undetectable against baseline traffic on Highway 16 and the FSRs providing access to the mine site.

Table 7.2.3-10 summarizes the potential interaction of the Project with the regional transportation indicator and the potential Project effects resulting from the interaction.

Table 7.2.3-10: Potential Project Effects on Regional Transportation

Interaction with Project	Project Phase	Potential Project Effect	Likelihood of Occurrence
Regional Transportation			
Mine and associated offsite infrastructure related traffic	C, O, D/C	Transportation of workers, equipment, services and materials to/from mine site and off site infrastructure will create additional vehicle traffic, resulting in increased potential for motor vehicle accidents and increased road wear and maintenance	Low to Medium

Note: C = construction; D/C = decommissioning and closure; O = operations; PC = post-closure

7.2.3.3.3 Past, Present and Future Projects and Activities

Activities associated with changes in population have the potential to affect the regional and community infrastructure VC, including those listed in **Section 7.2.3.2.3**. These include demographic changes attributable to in and out-migration associated with workforce demands in these industrial sectors. The demand for regional and community infrastructure is driven by population. Mining exploration and logging activities are already part of the inherently cumulative project-specific effects assessment because they are incorporated in BC Stats official population projections.

7.2.3.3.4 Mitigation Measures

The mitigation measures to address Project effects on regional transportation are applicable to all phases of the Project life cycle, but will be most important during the construction and operations phases, when higher traffic volumes are anticipated.

7.2.3.3.4.1 Ground Transportation

Project-related traffic on Highway 16 will result in an increase of traffic above 2012 AADT baseline volumes of 2.1% during the construction phase, and 1.4% during the operations and maintenance phase of the mine. The total AADT on Highway 16 is well below the design capabilities of this highway, and would not necessitate any upgrades or increased maintenance, nor represent an increased risk to other users of this highway. Notwithstanding, the Project personnel, contractors, and visitors will all be instructed to obey posted speed limits on rural and urban sections of the highway, and to adjust their speed in accordance with the weather and road conditions.

To reduce the Project-related volume of traffic on Highway 16 and the Kluskus and Kluskus-Ootsa FSRs, busing of construction and operations personnel, hired from within the SERSA, will be provided from a secure muster site at Vanderhoof. It will be the worker's responsibility to drive personal vehicles to and from the Vanderhoof muster site, in accordance with the prescribed work rotation schedule, and board buses for the remainder of the journey to the proposed mine site. Personal vehicles will not be permitted to travel to the proposed mine site. In addition, an airstrip will be built near the mine for a fly in/fly out rotation of construction workers from outside the SERSA. These workers will be bussed between the airstrip and on-site camp in accordance with the prescribed work rotation schedule. The fly in/fly out and local busing plan will reduce Project-related traffic volumes on Highway 16 and the Kluskus FSR that provides mine access.

In anticipation of heavy truck traffic, including some extraordinary loads (oversized and over- legal ground transportation weight), the FSRs will be surveyed prior to construction and upgrades provided by the Proponent to road surfaces and one bridge structure, as necessary. Upgrades will be completed to enhance transportation safety as described the Transportation and Access Management Plan (TAMP). The trucking company(s) moving the extraordinary loads from the rail offload site to the mine will obtain oversize/overweight permits from the BC MOTI. To prevent deterioration of the FSRs and mine access road, the heavy haul truck transport company(s) will

use a combination of tractor-trailer units, boosters, and jeeps to distribute the load weight. In addition, the mine access road will be designed and constructed to accommodate the volumes, weights, and types of loads anticipated during all phases of the Project.

Canfor is the primary industrial user of the Kluskus and Kluskus-Ootsa FSRs, and as such has been delegated the responsibility for ongoing maintenance of these roads by the BC MFLNRO. In turn, Canfor has developed a Road Management Agreement that other industrial users of these FSRs must abide by in order to use these roads. The agreement is for a period of one year and is renewable. The agreement includes monthly fees for road users to cover the cost of road maintenance and repair, dust suppression, and snow removal. The agreement imposes load weight restrictions during spring break up in alignment with BC MFLNRO guidelines. It includes road safety restrictions on industrial road users, including safe driving practices, adherence to posted speed limits, and radio calling procedures on all vehicles using the road. The BC MFLNRO has posted speed limits on the FSRs and warning signs at known wildlife crossings. Where the Proponent is the sole user of portions of the Kluskus and Kluskus-Ootsa FSRs, Canfor may delegate to them the responsibility for maintenance, dust suppression, and snow removal on these sections of the FSRs. In addition, Canfor may ask BC MFLNRO to transfer the industrial use permit for ongoing maintenance of these roads to the Proponent because they would become the primary industrial user of these roads during Project construction and operations.

It is noteworthy that there have been no reported motor vehicle accidents on these FSRs in the past three years.

The Proponent has developed a TAMP (**Section 12.2.1.18.4.14**) that will be implemented during all phases of the Project. It includes a Traffic Management Plan that provides measures that, when implemented, will ensure the safe movement of all mine traffic at the proposed mine site, on the mine access road, and on the FSRs that provide access to the mine from Highway 16. The Traffic Management Plan is multifaceted, including a traffic control plan that contains a road use handout, a road use contract for all road users requiring acknowledgement and compliance with all road safety measures, including the use of radio frequency call-ins when travelling on the FSRs and mine access road.

An incident management plan has been developed to provide guidance when an incident occurs. This could be any vehicle malfunction, spill, or event that impedes the normal flow of traffic and threatens the safety of the driver, other road users, or natural resources. It includes procedures on what to do in the event of a spill of hazardous materials.

The TAMP addresses a variety of issues, some of which are addressed in other environmental management plans (EMPs). The TAMP scope and EMPs that have relevance and linkages to regional transportation include:

- Emergency and Spill Preparedness Response Plan (ESPRP) (**Section 12.2.1.18.4.13**);
- Hazardous Materials Management Plan (HMMP) (**Section 12.2.1.18.4.12**);
- Cyanide Management Plan (CYP) (**Section 12.2.1.18.4.19**); and

- Reclamation and Closure Plan (RCP) (**Section 2.6**).

The TAMP contains access management measures for mine safety and security and for preventing potential adverse effects on livestock and local and regional wildlife populations and habitat. Measures to mitigate wildlife collisions are also presented in the Transportation and Access Section of the Wildlife Management Plan (**Section 12.2.1.18.4.6.7**).

Access restrictions that are relevant to regional transportation include the following:

- Locking gates will be installed on the mine access road to prevent public use of the road;
- Speed limits on the mine access road will be posted, as they are on the FSRs. Travel speeds will be adjusted according to road conditions, weather, and wildlife presence when and where required;
- Signs will be posted to alert drivers of potential wildlife presence at wildlife migration corridors and crossing points, and reduced travel speeds will be posted where required. This type of signage currently exists along the FSRs;
- To improve visibility from dust, the mine access road will be sprayed with water and salt will be applied to the road surface as necessary, during dry periods;
- Snow will be plowed from the mine access road when necessary, and products having low environmental impact (e.g., sand, gravel, non-palatable salts, etc.) will be used as needed to ensure safe road conditions;
- Wildlife sightings will be reported to supervisory personnel as soon as possible; and
- Wildlife incidents (e.g., traffic accidents) will also be reported to supervisory personnel immediately.

7.2.3.3.4.2 Rail Transportation

Rail transport during the construction phase will include approximately 26 extraordinary loads (oversized and/or overweight) that exceed the legal weight for ground transport on BC highways and FSRs. Mobile cranes will transfer these extraordinary loads from trains to heavy trucks at an existing siding/warehouse transfer facility in Prince George. The loads may be temporarily stored at the warehouse facilities, or transported directly to the proposed mine site via Highway 16 to Engen, the Kluskus and Kluskus-Ootsa FSRs, and the mine access road.

During the operations phase, rail transportation will be minimal. It is possible that granular cyanide will be transported by rail to Prince George for temporary storage or immediate transfer to trucks for the remainder of the journey to the proposed mine site. If transported by rail, it will be in sealed cars with the appropriate tags and documentation. Similarly, when transferred to truck, it will be placed in a sealed container with the proper hazardous symbol displayed, and appropriate documentation.

Both the rail operator and the trucking operator will have an emergency and spill preparedness response plan in the event of an incident.

No rail transportation is required during the decommissioning, closure, and post-closure phases.

7.2.3.3.4.3 Air Transportation

An on-site airstrip will be constructed to facilitate transport of construction workers from outside the SERSA and provide grouped transportation between Vanderhoof and the mine construction camp. Buses will also be provided between Vanderhoof and the operations camp. The airstrip, located about 15 km north of the proposed mine site, will be equipped with all-weather, radio-triggered airstrip lighting and snow removal equipment. Buses will be marshalled from the on-site camp or Vanderhoof at the time of aircraft arrivals and departures. Use of the airstrip will be discontinued after Project construction and commissioning is complete, except for the potential transport of ill or injured workers where fixed-wing aircraft are required, and for the possible transportation of gold and silver doré bars. If the decision is made not to use the airstrip for these purposes, it will be closed and the site reclaimed after the construction phase.

The helipad located at the proposed mine site will be used for emergency transportation of ill or injured workers during all phases of the Project where a fixed wing aircraft is not required.

Table 7.2.3-11 summarizes the mitigation measures described in this section and the potential residual effects.

Table 7.2.3-11: Mitigation Measures and Potential Residual Effects for Regional Transportation

Project Phase	Potential Project Effect	Mitigation and Management	Type of Residual Effect	Potential Residual Effect
Regional Transportation				
C	• Transportation of workers, equipment, services and materials to/from mine site and off site infrastructure will create additional vehicle traffic, increased potential for motor vehicle accidents, and increased road wear and maintenance	• Busing construction workers from Vanderhoof and airstrip near mine site to reduce traffic volume • Fly in/fly out workforce rotation to/from an airstrip 15 km from mine on Kluskus FSR • Adherence of Project-related traffic to terms and conditions of the Kluskus Road Management Agreement and New Gold Traffic and Access Management Plan • Upgrades to a bridge and small section of Kluskus FSR	Adverse	• Traffic volume within normal range on Hwy 16 and substantial on FSR, but proposed mitigation for FSRs and mine access road effectively addresses potential effects

Project Phase	Potential Project Effect	Mitigation and Management	Type of Residual Effect	Potential Residual Effect
		• Short term of construction phase • Success Rating: Good		
O	• Transportation of workers, equipment, services and materials to/from mine site will create additional vehicle traffic, increased potential for motor vehicle accidents and increased road wear and maintenance	• Busing operations workers between Vanderhoof and mine to reduce traffic volume • Adherence of Project-related traffic to terms and conditions of the Kluskus Road Management Agreement and New Gold Traffic and Access Management Plan • Success Rating: Good	Adverse	• Traffic volume within normal range on Hwy 16 and a substantial increase on FSR but proposed mitigation for FSRs and mine access road effectively addresses potential effects
D/C	• Transportation of workers, equipment, services and materials to/from mine site and off site infrastructure will create additional vehicle traffic, increased potential for motor vehicle accidents and increased road wear and maintenance	• Busing decommissioning and closure workers between Vanderhoof and mine to reduce traffic volume • Adherence of Project-related traffic to terms and conditions of the Kluskus Road Management Agreement and New Gold Traffic and Access Management Plan • Success Rating: Good	Neutral	• Traffic volume undetectable on Hwy 16 and low on FSR • Proposed mitigation on FSRs and mine access road effectively addresses potential effects
PC	n/a	n/a	n/a	n/a

Note: C = construction; D/C = decommissioning and closure; O = operations; PC = post-closure; n/a = not applicable; SERSA = Socioeconomic Regional Study Area

7.2.3.3.4.4 Effectiveness of Mitigation

Table 7.2.3-12 provides ratings for effectiveness of mitigation measures to avoid or reduce potential effects on regional community infrastructure during mine site development. Mitigation measures will be based on site-specific information and construction engineering and are therefore preliminary at this stage.

Table 7.2.3-12: Mitigation Measures and Effectiveness of Mitigation to Avoid or Reduce Potential Effects on Regional and Community Infrastructure during Mine Site Development

Likely Project Effect	Project Phase	Mitigation/Enhancement Measure	Effectiveness of Mitigation Rating
Additional vehicle traffic, increased potential for motor vehicle accidents, and increased road wear and maintenance	Construction	Busing construction workers from Vanderhoof and airstrip near mine site to reduce traffic volume	High
		Fly in/fly out workforce rotation to/from an airstrip 15 km from mine on Kluskus FSR	High
		Adherence of Project related traffic to terms and conditions of the Klusklus Road Management Agreement and New Gold Traffic and Access Management Plan	High
		Upgrades to a bridge and small section of Kluskus FSR to enhance transportation safety TAMP.	High
	Operations	Busing operations workers between Vanderhoof and mine to reduce traffic volume	High
		Adherence of Project related traffic to terms and conditions of the Kluskus Road Management Agreement and New Gold Traffic and Access Management Plan	High
	Closure	Busing decommissioning and closure workers between Vanderhoof and mine to reduce traffic volume	High
		Adherence of Project related traffic to terms and conditions of the Kluskus Road Management Agreement and New Gold Traffic and Access Management Plan	High

Note: FSR = Forest Service Road

In summary, low success rating means mitigation has not been proven successful, moderate success rating means mitigation has been proven successful elsewhere, and high success rating means mitigation has been proven effective. The effectiveness of mitigation measures was rated high because the proposed mitigation measures are widely used in mining and proven to be effective.

7.2.3.4 Residual Effects and their Significance

This subsection:

- Identifies and describes any residual effects after mitigation;
- Where residual effects have been identified, provide an assessment of the significance of those residual effects considering, magnitude, geographic extent, duration, reversibility, frequency;
- Assesses the likelihood of the effect;

- Assesses the significance of the residual effects; and
- Assesses/discusses the level of confidence and risk in the determination of significance and likelihood of the residual effect.

The detailed discussion of traffic levels in relation to existing traffic and road capacities contained in **Section 7.2.3.3** form the basis for quantifying and evaluating effect attributes. The criteria used for determination of significance are described in **Section 4.3.5.3** and **Table 4.3-9** and have been well-tested in previous socioeconomic impact assessments for resource developments in this and similar regions.

The following discussion focuses first on regional and community infrastructure services, then by the discussion for regional transportation.

7.2.3.4.1 Regional and Community Infrastructure Services

Given the use of camps during the construction phase, the Project construction residual effects on infrastructure services-housing, utilities, recreation – are characterized as neutral, low in magnitude, regional, short-term, continuous, reversible, and medium in certainty. The effects are considered to be Not Significant (negligible).

Project operations residual effects are characterized as neutral, low in magnitude, local, long-term, continuous, and reversible. Given the good capacity of infrastructure services in Vanderhoof and Prince George, (i.e., available selection and supply; reasonable, stable prices) the effect of limited increased demand for housing, utilities, and recreation and leisure services is considered to be neutral and is rated as Not Significant (minor). Confidence in this assessment for the SERSA is high.

The effects of mine closure on infrastructure services are described as negative (undesirable decrease demand for housing, utility, and recreation and leisure services), low in magnitude, local, short-term continuous, and reversible. Confidence in this assessment is less than for the construction and operations assessments because of the time factor; closure will occur far into the future, by which time the prevailing baseline conditions will have changed considerably. Nevertheless, given the magnitude of the effects, they are considered to be Not Significant (negligible).

A summary of residual effects on infrastructure services is presented in **Table 7.2.3-13**. Residual effects for all but post-closure are expected to be low in magnitude, contained within the communities in the SERSA (mainly Vanderhoof and Prince George), continuous, reversible and medium in certainty throughout the 17 years leading up to post-closure.

Effects are considered short term during construction and long term for operations and closure. For both construction and operations, effects are expected to be neutral; they are expected to be negative during closure. Effects are expected to be Not Significant (negligible during construction, minor during operations, and negligible during closure). There is a high level of confidence in this assessment.

7.2.3.4.2 Regional Transportation

Taking into account the mitigation measures embedded in the Project design, and the Proponent's corporate policies, plans, and procedures, the residual effects on regional transportation in terms of potential road deterioration, road user safety, and potential vehicle collisions with wildlife and livestock would be adverse; however, low to medium in magnitude and local to regional in extent during the construction, operations, decommissioning, and closure phases, and not detectable during the post-closure phase of the Project (**Table 7.2.3-14**).

The residual effects for regional transportation consider the risk of motor vehicle accidents and road wear within normal range for Highway 16 and FSRs during the construction and operations phases of the Project. The significance of the residual effect is Not Significant (minor).

Residual effects of potential spills of hazardous materials during transport to the Project site are addressed under accidents or malfunctions in **Section 10**.

Table 7.2.3-13: Significance of Potential Residual Effects for Regional and Community Infrastructure Services

Parameter	Stage of Development/Rating			
	Construction	**Operations**	**Closure**	**Post-Closure**
Housing				
Residual Effect	No appreciable increase in housing demand is expected	Increase in housing demands that are within the current SERSA capacity and approved expansion plans	Decrease in housing demands due to potential out-migration of workers	n/a
Effect Attribute				
Context	Neutral	Neutral	Negative	n/a
Magnitude	Low	Low	Low	n/a
Geographic extent	Regional	Regional	Regional	n/a
Duration	Short-term	Long-term	Long-term	n/a
Reversibility	Yes	Yes	Yes	n/a
Frequency	Continuous	Continuous	Continuous	n/a
Likelihood Determination	Low	High	Moderate	
Level of Confidence for Likelihood	High	High	High	n/a
Significance Determination	Not Significant (negligible)	Not Significant (minor)	Not Significant (negligible)	n/a
Level of Confidence for Significance	High	High	High	n/a
Utility				
Residual Effect	No appreciable increase in demand for utilities is expected	Increase in demands for utility services that are within the current SERSA capacity and approved expansion plans	Out-migration of workers could reduce demands for utilities	n/a
Effect Attribute				
Context	Neutral	Neutral	Negative	n/a
Magnitude	Low	Low	Low	n/a
Geographic extent	Regional	Regional	Regional	n/a
Duration	Short-term	Long-term	Long-term	n/a
Reversibility	Yes	Yes	Yes	n/a

Parameter	Stage of Development/Rating			
	Construction	**Operations**	**Closure**	**Post-Closure**
Frequency	Continuous	Continuous	Continuous	n/a
Likelihood Determination	Low	High	Moderate	n/a
Level of Confidence for Likelihood	High	High	High	n/a
Significance Determination	Not Significant (negligible)	Not significant (minor)	Not Significant (negligible)	n/a
Level of Confidence for Significance	High	High	High	n/a
Recreational facilities				
Residual Effect	No appreciable increase in demand for recreation and leisure services is expected	Increase in demands for recreational facilities that are within the current SERSA capacity and approved expansion plans	Out-migration of workers could reduce demands for recreational and leisure services	n/a
Effect Attribute				
Context	Neutral	Neutral	Negative	n/a
Magnitude	Low	Low	Low	n/a
Geographic extent	Regional	Regional	Regional	n/a
Duration	Short-term	Long-term	Long-term	n/a
Reversibility	Yes	Yes	Yes	n/a
Frequency	Continuous	Continuous	Continuous	n/a
Likelihood Determination	Low	High	Moderate	n/a
Level of Confidence for Likelihood	High	High	High	n/a
Residual Effect Significance	Not Significant (negligible)	Not Significant (minor)	Not Significant (negligible)	n/a
Level of Confidence for Significance	High	High	High	n/a

Notes: [1] Method for the consideration of context is discussed in Section 4, Assessment Methodology.
n/a = not applicable

Table 7.2.3-14: Significance of Potential Residual Effects for Regional Transportation

Parameter	Stage of Development/Rating			
	Construction	**Operations**	**Closure**	**Post-closure**
Regional Transportation				
Residual Effect	Risk of motor vehicle accidents and road wear within normal range for Hwy 16 and FSRs	Risk of motor vehicle accidents and road wear within normal range for Hwy 16 and FSRs	With sharp decline in workforce and truck traffic, no noticeable effect on motor vehicle safety and road wear	n/a
Effect Attribute				
Context	Neutral	Neutral	Neutral	n/a
Magnitude	Low-Medium	Low-Medium	Low	n/a
Geographic extent	Local-Regional	Local-Regional	Local	n/a
Duration	Short-term	Long-term	Long-term	n/a
Reversibility	Yes	Yes	Yes	n/a
Frequency	Continuous	Continuous	Continuous	n/a
Likelihood Determination	Low	Low	Low	n/a
Level of Confidence for Likelihood	High	High	High	n/a
Significance Determination	Not Significant (minor)	Not Significant (minor)	Not Significant (negligible)	n/a
Level of Confidence for Significance	High	High	High	n/a

Notes: [1] Method for the consideration of context is discussed in Section 4, Assessment Methodology.
n/a = not applicable

7.2.3.5 Cumulative Effects

This subsection determines the need for assessing cumulative effects. The discussion is separated into a section regarding regional and community infrastructure services and a section regarding regional transportation.

The following discussion focuses first on regional and community infrastructure services, then by the discussion for regional transportation.

7.2.3.5.1 Regional and Community Infrastructure Services

Demand on infrastructure services is driven by demographics. As described in **Section 7.2.2.5**, during construction and closure phases the residual effects on demographics are determined to be negligible. During operations, the adverse residual effects are expected to be minor for demographics, and thus for regional and community infrastructure and services. The residual Project's effects on infrastructure services are very small and are unlikely to be detectable at the regional level. There is good existing capacity in infrastructure services within the SERSA.

Because the demographic analysis and related infrastructure assessment were assessed in the context of current and forecasted economic activity and future expansion plans, and are inherently cumulative in nature, no further assessment of cumulative effects is required.

7.2.3.5.2 Regional Transportation

The assessment of regional transportation takes into consideration other past and present activities and projects in the SERSA, which are included in **Section 4**, **Appendix 4C**. Future projects and land and resource use activities identified in the Project Inclusion List have been considered in the regional transportation effects assessment and proposed mitigation, to the extent that quantitative information on these other projects, activities, and land and resource uses is available. As a result, the assessment of residual Project effects on regional transportation is inherently a cumulative effects assessment, and no further assessment of cumulative effects is required.

7.2.3.6 Limitations

This subsection presents assumptions and limitations relative to the assessment of Project effects and the assessment of cumulative effects. The discussion is separated into a section regarding regional and community infrastructure services and a section regarding regional transportation.

7.2.3.6.1 Regional and Community Infrastructure Services

The assessment of potential Project effects on infrastructure services ─ housing, utility, and recreation — relies in large part on the population effects assessment, which concluded that population change attributable to the Project will be limited to 100 workers (290 people). This represents 57% of the operations workforce hired from outside the SERSA.

The main limitation in this assessment is the accuracy of the estimated number of operation workers who will choose to relocate to the SERSA. This estimate is based on experience in other mining projects in BC and considers the Proponent's Human Resources Strategy, including commitments to training and hiring locally, encouraging managers to reside in the SERSA, and providing relocation incentives for moving to Vanderhoof. However, there is uncertainty in this estimate since it depends on many economic, cultural, social, and geographical factors, and also on personal preferences such as willingness to relocate to a small community and change lifestyle. With the provision of camps during the construction and operations phases and the Proponent's intention to hire from within the SERSA, the chances are that this percentage would be smaller but not bigger; and therefore, it will not affect the assessment.

7.2.3.6.2 Regional Transportation

Limitations of the assessment of the Project effects on regional transportation are linked to gaps in available baseline AADT information on Highway 16, resulting in an assessment based on a composite rather than a complete and up-to-date picture of current background conditions in the SERSA. However, given the projected small increase in traffic on Highway 16 over the baseline conditions, this is not a serious shortcoming.

Recent historical road use related to mineral exploration, development, and logging associated with forest tenures in the Project area is well understood and was used in the assessment; however, these data are not well defined beyond 2013, so quantitative estimates of associated traffic on the Kluskus and Kluskus-Ootsa FSRs are not available. However, the Project mitigation measures are sufficiently robust to address these uncertainties.

7.2.3.7 Conclusion

This subsection provides a conclusion regarding the significance of residual effects and cumulative effects if applicable. The discussion is separated into a section regarding regional and community infrastructure services and a section regarding regional transportation.

7.2.3.7.1 Regional and Community Infrastructure Services

The Proponent's preference to recruit from within the SERSA, together with the Proponent's plan to provide a camp during the construction and operations phase of the Project and training opportunities, along with competitive work packages, lead to small population impacts in the LSA or the SERSA. The good capacity of community infrastructure services in Prince George and Vanderhoof, along with their plans to attract new residents, is expected to absorb the potential new demand resulting from Project operations workforce and dependants that choose to relocate (232 people to Prince George and 58 people to Vanderhoof). In addition, the provision of camp accommodations of a good standard that include good social and recreational facilities will mitigate any Project pressure on regional recreational and leisure services. As a result, the residual effects on infrastructure services are likely to be Not Significant (negligible and minor).

7.2.3.7.2 Regional Transportation

After taking into account the potential effects and proposed mitigation measures, the residual effects of Project-related traffic on road infrastructure (i.e., incremental traffic, potential safety of other road users, potential road deterioration, and motor vehicle collisions with wildlife and livestock) during construction and operations is expected to be minor and not significant. With the sharp decrease in Project-related traffic and related effects during mine decommissioning and closure, and post-closure, the risks to such transportation issues would be negligible.