SECTION 6.4

HUMAN ENVIRONMENT

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6.4 HUMAN ENVIRONMENT

The subsections in this Section detail the effects assessments for aspects of the human environment that may be affected by Project construction, operation and closure and which were screened in as VCs by the scoping process (see Section 6.1). These VCs include social and economic effects, traditional knowledge and traditional land use, non-traditional land use, visual and aesthetic resources, human health and heritage resources. The respective section references are the following:

Social and Economic Effects	6.4.1	Visual and Aesthetic Resources	6.4.4
Traditional Knowledge and Traditional Land Use	6.4.2	Human Health	6.4.5
Non-traditional Land Use	6.4.3	Heritage Resources	6.4.6

6.4.1 Socio-Economic Effects

This socio-economic impact assessment (SEIA) analyzes the potential effects of the Project on the Province of Saskatchewan and on a Socio-Economic Regional Study Area (SRSA). Current social and economic conditions in the SRSA, including other economic development projects that have been proposed or are reasonably foreseeable, have been described in Section 5.4.1 (Socio-economic baseline). This socio-economic effects section assesses the potential effects of the Project on regional and local social and economic conditions in the context of other proposed regional developments. Opportunities to mitigate potential negative effects and to enhance positive effects are also identified.

6.4.1.1 Proposed Facilities and Activities Being Assessed

This assessment examines the socio-economic effects of Project construction, operation, and decommissioning and closure. Unlike other disciplines, the identification and management of socio-economic effects is not easily differentiated according to individual activities within each of these three phases of Project development; instead, they result more from a combination of Project activities, most notably capital and operating expenditures and related employment and income. This stimulus, in turn, acts in combination with other conditions in the host economy and society to influence individual, group and business behaviour and government programming.

6.4.1.2 Issues Scoping

The Project will create changing demands on the regional and local communities for labour, materials, and services during construction, operations, and closure and decommissioning. Discussions with Aboriginal groups, government, potentially affected communities, non-

government organizations and the general public have identified a number of issues about the effects that the Project will have on the people and communities in the region.

In many cases, effects were viewed as being positive for some aspects of the Project. For example, Project construction and operation were perceived to offer new employment at the Project site, opportunities for businesses to supply materials and services, and regional economic diversification. However, there were also concerns about the employment and economic effects of mine closure, and the effect of increased traffic on the existing road system was considered potentially to be negative.

Based on the issues identified in the Project Specific Guidelines (PSGs) and those raised during discussions and consultations with potentially affected parties (including through reviews of the draft EIS) as well as on previous experience in assessing the effects of resource development projects on rural communities, a list of key socio-economic themes and issues was developed and used as the basis for selecting the socio-economic indicators used to assess potential Project effects. These issues and themes are identified for each Project component in Table 6.4.1-1 and have been used to determine the scope of the socio-economic impact assessment.

Table 6.4.1-1: Key Socio-Economic Issues and Themes by Project Component

Component	Theme	Issues
Construction	Provincial economy	Gross domestic product, labour income and employment
	Regional economy	Employment opportunities Availability of training and education Sourcing of workforce Business opportunities First Nation and Métis participation
	Housing	Location of workforce and housing requirements
	Regional services	Increased demands on key local government services
	Family and community well-being	Effects of increased income on families, including potential for substance abuse
	Transportation	Effects on traffic and safety
Operation	Provincial economy	Gross domestic product, labour income and employment
		Provincial revenues
	Regional economy	Employment opportunities Availability of training and education Economic diversification Logistics of employment, including commuting Sourcing of workforce First Nation and Métis participation
	Population	New in-migration
	Housing	Location of workforce and housing requirements
	Regional services	Increased demands on key local government services
	Regional infrastructure	Increased demands on key local infrastructure
	Family and community well-being	Effects of increased income on families, including potential for substance abuse
	Transportation	Effects on traffic and safety Effects on traffic from commuting
	Local government finances	Revenues and costs for local governments
Closure and Decommissioning	Provincial economy	Loss of gross domestic product, labour income and employment
		Loss of provincial revenues
	Regional economy	Employment opportunities Loss of operational employment opportunities Creation of legacy recreational sites
	Housing	Relocation
	Family and community well-being	Effects of loss of income and unemployment on families Creation of legacy recreational sites
	Local government finances	Loss of revenues for local governments

In addition to the key themes identified by potentially affected parties, past experience has indicated that provincial governments are often interested in understanding the extent to which Project construction and operation will add to overall economic activity and employment, and serve as a new source of provincial revenues. These issues are also included in Table 6.4.1-1, which summarizes the issues associated with mine development, the source of those issues, and the rationale for including or not including the issues in the EIA process. These issues will be used to identify appropriate Valued Components (VCs) for describing Project effects.

6.4.1.3 Temporal and Spatial Boundaries

Temporal and spatial boundaries for the SEIA are described in this Section.

Spatial Boundaries

The Socio-Economic Regional Study Area (SRSA) for the socio-economic assessment consists of those urban and rural communities that are most likely to provide the workers, goods, and services needed to construct and operate the mine and/or that could be directly or indirectly affected by mine construction or operation. There is no local study area (LSA) for the assessment of socio-economic effects because the Project is in a forested area surrounded by farmland, with numerous small population centers within 50 km and two cities (Prince Albert and Melfort) within a 100 km drive. However, some socio-economic effects will have a sub-regional or 'local' geographic extent and, where relevant, these are identified (e.g., road transportation, housing). Five First Nations have indicated that the contemplated open pit diamond mine and related activities in the FalC Forest would be located on land considered to be part of their traditional territories; five have been included in the study area. The First Nations that have been included in the study area are the James Smith Cree Nation, Muskoday First Nation, Red Earth Cree Nation and Sturgeon Lake First Nation; and the Wahpetan Dakota Nation. The Métis Nation – Saskatchewan Eastern Region II and Métis Nation – Saskatchewan Western Region II have also identified the FalC Project site as part of their traditional territories.

The boundary of the SRSA was also chosen to reflect the administrative boundaries and statistical reporting units used by Statistics Canada and the Government of Saskatchewan. The SRSA shown in Figure 6.4.1-1 includes:

- two cities (Prince Albert and Melfort);
- six towns (Nipawin, Choiceland, Tisdale, Kinistino, Star City, Birch Hills);
- 13 villages (Smeaton, Weirdale, Love, White Fox, Codette, Meath Park, Ridgedale, Albertville, Beatty, Aylsham, Weldon, Valparaiso, Zenon Park);
- the on-Reserve populations of five First Nations: the three Bands of the James Smith Cree Nation, Muskoday First Nation, Red Earth Cree Nation (Red Earth 29 and Carrot

River 29A reserves), Sturgeon Lake First Nation (Sturgeon Lake 101 reserve) and Wahpeton Dakota Nation (Wahpeton 94A and Wahpeton 94B reserves); and

- 12 rural municipalities [Tisdale (No. 427), Star City (No. 428), Flett's Springs (No. 429), Connaught (No. 457), Willow Creek (No. 458), Kinistino (No. 459), Birch Hills (No. 460), Prince Albert (No. 461), Nipawin (No. 487), Torch River (No. 488), Garden River (No. 490) and Buckland (No. 491)].

Temporal Boundaries

The temporal boundaries for assessment of social and economic effects reflect the duration of various Project related activities. For assessing the effects of construction, the analysis focuses on Project activities over a five-year window referred to in the Project Description as Years 1 through 5 (currently assumed for costing and economic effects assessment purposes to be from 2013 to 2017). For assessing the effects of operations, the analysis focuses on the 20 year window of Years 5 through 24 (assumed to be 2017 to 2036) and estimates average effects during a typical year of operations. The effects of the decommissioning (mine closure, reclamation) focus on activities that occur in the post Year 24 (assumed to be 2036) period. For ease of reader understanding of the relative time periods represented by the construction, operations and closure phases, this Section of the EIS uses mainly the Years 1 through 5 format for near-term time periods such as construction and the currently assumed calendar years for the longer-term operations and decommissioning.

Socio-Economic Valued Components

Based on stated concerns raised during issues scoping (see Section 6.4.1-2) and professional experience derived from conducting socio-economic assessments of other mines and large projects, nine VCs have been selected to describe the potential socio-economic effects of the Project during Project construction, Project operations, and Project closure and decommissioning. These VCs correspond to the issues identified in Table 6.4.1-1. Three relate to economics: regional employment, provincial economic activity, and government revenues. Four relate to health and socio-cultural well-being: regional population, transportation, regional services, and family and community well-being. The remaining two relate to effects on infrastructure: housing and regional infrastructure.

6.4.1.4 Assessment Methodology

There are no standard methodologies or guidelines for assessing the social or economic effects of proposed projects. The approach used in this assessment is based on previous experience and best practice and incorporates information from three different sources:

- quantitative analyses, such as labour supply and demand analysis, and economic modeling;

- informed source opinions obtained by discussion between Shore Gold Inc. (Shore) and officials; and
- professional judgment, based on the training and experience of the analysts.

All revenue and cost projections are expressed in terms of 2010 Canadian dollars. Estimates of capital costs associated with construction are considered accurate to within ±15 %. Calculations of the economic effects include the margin of error from the engineering estimates as well as a small margin of error inherent in the economic multipliers used to predict effects. This uncertainty should be considered when interpreting the estimates of economic effects.

Estimation of Provincial Effects

Input-output models are widely used in the economic impact analysis of capital projects; they are very useful for predicting how an increase in demand for the products of one industry will affect other industries and, ultimately, the entire provincial economy. The standard approach for measuring direct and indirect effects of project capital and operating costs is the Statistics Canada Interprovincial Input-Output (I-O Model). The I-O Model describes the inter-relationships among 719 commodities, 285 industries and 13 regions and can be used to simulate the potential effects that would result when a project changes the overall output of a specific industry in a specific province or when a project causes increases in final demands for commodities in a specific region.

The Statistics Canada I-O Model, which is classified as an 'open' model, estimates the direct and indirect economic effects that would result from a given 'shock' to the economy. 'Direct effects' are the projected expenditures, hiring and payments to governments by Shore and its contractors. 'Indirect effects' result from backward linkages in the economy, and describe the aggregate involvement of the many companies that will increase their output of equipment, materials and services in order to provide the goods and services required by Shore and its contractors. The measures used to identify provincial economic effects include potential changes in total provincial economic output (as measured in terms of gross domestic product or GDP), employment and labour income.

A third type of effect, termed 'induced effects', relates to the increased economic activity that would arise from consumer spending of the additional income that has been derived directly or indirectly from the mine. While some provinces have developed 'closed models' to estimate these induced effects, there is some debate as to whether closed models actually overstate these effects because the models assume all direct and indirect labour income will be spent in the Canadian economy when in reality there will be some leakage. Thus, the impact assessments produced from the Statistics Canada model can be considered conservative, because they understate total project effects by not including induced effects.

Statistics Canada publishes a set of economic multipliers for each province. These multipliers describe the extent to which a $1 change in economic output for individual industries will affect provincial GDP, labour income and employment. The current multipliers are based on the 2006 I-O Model. Estimation of provincial-level economic effects was undertaken by developing project construction and operations expenditure profiles that estimate total expenditures by industry group and then applying the appropriate industry multipliers. The relevant project expenditure data were supplied by Shore.

Like all input-output models, the Statistics Canada I-O Model has some inherent limitations. One of these is that changes in Saskatchewan's industrial structure and linkages since 2006 are not reflected in the modeling results. This also means that any changes in the technology of producing goods and services, input patterns and relative prices since 2006 are not reflected in the impact estimates. Another limitation is that input-output models are static models in which dynamic changes over time are not explicitly represented. Although I-O models estimate the effects on major economic variables, they do not calculate the amount of time required for the propagation of all effects. Despite these limitations, I-O models are widely used to quantify the potential effects of proposed projects on provincial and national economic activity and employment.

Estimation of Regional Effects

There are no models for estimating the potential economic effects for specific regions within Saskatchewan. Consequently, estimation of the direct employment of regional residents to construct and operate the Project involved matching the labour requirements of the Project with the qualifications of the available labour supply within the study area, in the context of Shore's commitments to training and hiring regional residents and its regional procurement policies (see Section 7.3). Matching of labour demand and supply to estimate Project effects is fairly subjective and requires close examination of the most current information on the availability and skills of the regional labour supply.

Indirect regional employment effects were estimated using economic base analysis (Nourse 1968). This approach examines the economic base of the region in terms of the ratio of jobs in service industries (non-basic employment) to jobs in the goods-producing industries (basic employment). Diverse economies, which have a high ratio of non-basic to basic employment, attract more consumer spending and consequently have a higher multiplier effect than economies that are less diverse.

Characterization and Assessment of Significance

The characterization of potential changes in the socio-economic environment resulting from the Project is based on the criteria outlined in Section 6.1, Environmental Assessments Methods, and employs the attributes defined in Tables 6.1-2 and 6.1-3. Determination of

the significance of potential socio-economic effects initially employs the process described in Section 6.1.5. However, for purposes of environmental assessments, the determination of significance focuses on identifying and describing potential adverse effects whereas socio-economic effects can be either positive or negative in direction, and are sometimes both. In situations where a socio-economic effect can have both positive and negative consequences, the net impact is estimated and the predominant direction stated. If the overall effect is negative, the determination of significance follows the process in Section 6.1.5.

In the case of positive effects, the analysis assesses project benefits in terms of their geographic extent, duration and magnitude, which is measured in terms of selected socio-economic thresholds that reflect expected economic and population growth in the absence of the Project. Positive effects are described in terms of their overall effects (minor, moderate and major) instead of significance (which is related only to adverse effects). The overall effects ratings are based on the following criteria:

- **Minor**: Low-level effects are distinguishable but not measurable. These are usually limited to the short-term and are geographically circumscribed.
- **Moderate**: Effects are clearly distinguishable and result in benefits to defined populations or communities. Usually are short-term to medium-term in duration.
- **Major**: Effects are highly distinguishable or result in substantive benefits to defined populations and communities.

Approach to Cumulative Effects

The importance of potential Project effects was assessed by comparing the effects to baseline conditions and future trends that reflect the effects of approved and reasonably foreseeable projects that are expected to be developed within the near future. The assessment examines the effects of the Project in combination with the effects of other proposed projects in the study region, and can therefore be considered a cumulative effects assessment.

6.4.1.5 Project Description

Project components that are related to the SEIA are described in this Section. Collectively, these data and the baseline data presented in Section 5.4.1 form the basis of the analysis and assessment of socio-economic effects.

Construction Phase

Preliminary estimates indicate that construction of the Project would cost $1,919 million (2011$). This cost estimate is considered to be accurate to ±15%. . As shown in Figure

6.4.1-2, equipment purchases over the four-year construction period will amount to $633 million, or 33 % of total costs. Construction of the processing plant will cost $341 million and account for 18 % of total costs.

Mine development would cost $348 million and account for 18% of total costs while pre-production construction indirect costs would account for another 13% of costs ($247 million). The cost estimate also includes construction of a road to the mine, utilities and other infrastructure; these costs total $208 million, or 11% of total costs. The cost estimate includes a contingency of $142 million (7.4% of costs). Additional capital costs would be incurred during operations, and such costs are factored into the assessment of operating costs.

Construction could potentially start as soon as 2013, and be completed by approximately Q3 2017, a period of five calendar years. In Year 1, the key capital cost items would include down payments on the equipment plus construction of the road, utilities and other infrastructure. Equipment purchases would continue in 2014 and 2015. Mine development and construction of the processing plant could commence in 2013 and continue through 2017. Construction activities would peak in 2014 (see Figure 6.4.1-3).

An average of 669 workers would be required for Project construction during this period, although the number of people working on the Project at any one time could vary from 100 to 1,000 workers. Total labour effort over the five years would be 3,345 person-years.

About 20 % of the construction workforce would consist of general labourers. Another 20 % would be trades people, including industrial mechanics, electricians, heavy duty mechanics, and welders. Specialty truck and equipment operators would account for 25 % of the workforce. About 20 % of the workforce would be professionals such as engineers, geologists, metallurgists and health and safety specialists. Another 10 % of the construction workforce would consist of construction managers and supervisors, and office staff. The remaining 5 % would be engaged in various other occupations, including security.

Operations Phase

Project operations could commence in Q3 2017, with mining expected to continue for 20 years. Operating costs are estimated to average $215.2 million per year. As shown in Figure 6.4.1-4, just over half of the annual costs (55%) will be associated with mining activities, with ore processing accounting for 20% of costs. Another 16% of costs are associated with general and administration functions. Marketing costs would account for 7% of annual operating costs while pit de-watering would account for 2% of annual costs.

There would be some additional capital replacement costs over the 20 years of production. On average, these sustaining capital costs (with contingency) would add an average of $29.5 million per year to total annual costs. The actual annual capital replacement costs could add between $0 and $94.6 million to the costs in any given year.

When these additional costs are added, the average annual cost of operations would be $244.7 million per year. Annual operating costs would be highly variable from year to year. This variability is shown in Figure 6.4.1-5. The annual costs reach as high as $389.6 million in 2026 due to high costs of mining and capital replacement. Operating costs would tail off as the mine reaches the end of its operating life, dropping to $38.0 million in 2036.

On average, the mine would directly employ about 730 people annually when in production. The workforce would have seven components:

- Mining operations would require an average of 200 workers. However, as the volume of material being moved varies considerably, the number of people employed in mining operations could range from a peak of 380 workers in 2026 to less than 100 per year after 2029;
- In-pit crushing and conveying (IPCC) would require 95 workers per year;
- Processing would require 59 workers during each year of operations;
- Maintenance related to mining and processing would employ an average of 186 people, although this varies from 270 at peak to 106 at the end of plant operations;
- The sorthouse would require 31 personnel;
- 21 managers would be required; and
- General and administration would require 128 workers.

The annual labour requirements by component are shown in Figure 6.4.1-6.

Operations would occur year-round. For most staff this would involve one of two 12-hour shifts per day on a rotational basis. There will be two, 12-hour shifts per day with most workers working one of those shifts. Office staff would work a 40-hour work week. There would be no worker accommodations at the mine site during operations. Employees would be expected to live in various communities in the study area and commute daily to the mine site.

Closure and Decommissioning Phase

Mine closure and decommissioning could begin in 2037, at an estimated cost of $84.8 million to be spent over three years.

General Mitigation and Enhancement Measures

General measures that will be used to enhance the potential beneficial economic effects during construction and operations include:

- working with local training institutions to identify training that can be provided locally, as well as targeting specific areas outside of the FalC area for recruitment for positions which require specialized technical skills;
- developing a workforce representative of the geographic areas in which Shore operates, including communities and cultural groups, such as First Nations and Métis, surrounding the Project. It is Shore's intention to maximize local employment where practical;
- building relationships with local suppliers and businesses to obtain quality, competitively priced goods and services in a timely fashion. Shore recognizes that neighbouring communities include First Nations and Métis Regions, which have had successful and representative business relationships to date with Shore;
- working with training institutions local to the FalC area to determine the training programs that would best meet the needs of the Project, with a focus on training local workers and members of local First Nations and Métis groups;
- operating a dedicated training department responsible for all on-site training required to assist employees in safely and efficiently performing their role;
- continuing to participate as a board member of the Northern Career Quest, Aboriginal Skills and Employment Program (a training-to-employment partnership including the federal and provincial governments, training institutions, industry, and First Nations and Métis groups in central and northern Saskatchewan); and
- continuing to honour responsibilities associated with being a signatory to the FalC Employment Partnership whereby the parties agree that Aboriginal persons are significantly under-represented in the provincial workforce and that efforts on the part of all of the partners are needed to facilitate a representative workforce, where Aboriginal people are employed in all classifications in proportion to their representation in the working age population.

Shared Responsibility

Many socio-economic effects cannot be managed by Shore alone because:

- the causes of the effects are often too complex, due to many other contributing influences; and
- desirable outcomes involve too many inter-related or interdependent variables (i.e., individual behaviour decisions, family support, political leadership, public policy and service delivery agency response).

Effective mitigation measures must reflect the complex and inter-related causes of socio-economic effects, and will require that responsibility for managing these effects be shared among:

- Shore and its contractors;
- Aboriginal and provincial government agencies; and
- affected communities and individuals.

In addition, successful mitigation of socio-economic effects also depends more on establishing a joint process for monitoring and addressing issues than by identifying specific conditions to be addressed by Shore alone. Consequently, as shown in Figure 6.4.1-7, the Shore will work with local communities as well as provincial and local government agencies to monitor and improve local quality of life.

6.4.1.6 Provincial Economic Effects

Provincial economic effects for the construction, operations, and closure and construction phase are described in this Section. These include the distribution of expenditure and supplier industry effects.

Construction Phase

Total construction costs are estimated to be $1,919 million. Overall, about 44 % of this amount, or $846.9 million, will be spent in Saskatchewan. As shown in Table 6.4.1-2, this will include the majority of spending on wages and salaries, construction, professional services, fuel, utilities and other goods and services. The majority of machinery and spare parts will be imported from other parts of Canada. Some machinery and mining related services will be imported from other countries.

Table 6.4.1-2: Distribution of Construction Expenditures

Expenditure Categories	Total (millions)	Saskatchewan	Other Canada	Imports
Direct labour (wages and salaries)	$350.4	$280.3	$70.1	$0.0
Construction	$162.4	$81.2	$81.2	$0.0
Professional, scientific and technical services	$57.9	$46.3	$11.6	$0.0
Machinery	$1,078.1	$215.6	$808.5	$53.9
Spare parts and maintenance.	$29.6	$5.9	$22.2	$1.5
Fuel	$74.9	$74.9	$0.0	$0.0
Utilities (electricity)	$72.4	$72.4	$0.0	$0.0
Other goods	$55.8	$44.6	$11.2	$0.0
Mining related services	$27.3	$16.4	$8.2	$2.7
Other services	$10.4	$9.4	$0.5	$0.5
TOTAL	$1,919.0	$846.9	$1,013.4	$58.6
		44%	53%	3%

Source: Adapted from information provided by Shore (2011).

Based on this pattern of expenditure and using the appropriate multiplier coefficients, the potential economic impacts of construction spending on the Saskatchewan economy can be calculated. The resulting estimates are summarized in Table 6.4.1-3. Over the five-year construction period, it is expected that purchases of $846.9 million in Saskatchewan will directly and indirectly generate $726.1 million in provincial GDP; this represents an average of about $145.2 million in GDP per year. About 39% of this activity will result from direct expenditures by Shore while another 33% will be generated by contractors and companies directly supplying goods and services for the project. Indirect effects will account for the other 28% of GDP effects.

During construction, the project would be expected to directly provide 3,345 person-years of employment of which Saskatchewan residents would account for about 80 %, or 2,675 person years. Another 2,815 person-years of employment would occur through hiring by Saskatchewan businesses to directly support project construction. Indirect employment resulting from purchases of goods and services by Shore and its contractors would generate another 3,180 person-years of employment. Thus, project construction would generate a total of 8,670 person-years of employment over the five-year construction period. This is equivalent to about 1,735 jobs lasting for five years.

Table 6.4.1-3: Estimated Effects of Construction of the Star-Orion South Diamond Project on the Saskatchewan Economy, 2013-2017

Economic Indicator		Direct	Indirect	Total
GDP at factor cost ($M)	Project Expenditure	$280.3	$204.3	$726.1
	Supplier Industry Effects	$241.6		
Employment (person-years)	Project Expenditure	2,675	3,180	8,670
	Supplier Industry Effects	2,815		
Household Income ($M)	Project Expenditure	$280.3	$201.2	$632.7
	Supplier Industry Effects	$151.3		

Income generated by project construction spending would total about $632.7 million. This includes $280.3 million for the 2,675 person-years of direct employment by Shore and this suggests the average fully burdened cost to the company (which includes annual wages, benefits, employer paid government premiums, corporate payroll taxes, etc.) of $104,780 per person-year. Another $151.3 million in wages and benefits would be earned by contractors and their workers directly supporting construction. Indirect employment would generate another $201.2 million in labour income.

In the context of the entire Saskatchewan economy, which reported GDP of $41.5 billion in 2010 (Enterprise Saskatchewan 2011a), project construction would increase annual provincial GDP by an average of 0.3%. And while the 1,735 person-years of employment created in each year of project construction would represent a 4.2% increase in Saskatchewan's construction industry (which currently employs 41,600 people [Saskatchewan Bureau of Statistics, 2011]), it would increase provincial employment, which was estimated to be 515,700 people in 2011 (Enterprise Saskatchewan 2011b), by about 0.3%. In absolute terms, the GDP and employment generated by the project are quite small when compared to the provincial totals.

However, given that Saskatchewan GDP is currently projected to grow by 2.9% in 2012 and 3.5 % in 2013(Conference Board of Canada, 2012), the importance of the economic impacts of construction of this single project become more apparent. On an annual basis, the impacts of project construction would be equivalent to about 8 % of estimated GDP growth in Saskatchewan for 2013. Furthermore, potential project effects could effectively increase the annual rate of GDP growth by 0.2 percentage points, resulting in expected GDP growth in 2013 increasing from 3.5% to as much as 3.7%, almost 6% of the total growth. However, it is not clear whether the forecasts already incorporate all new mineral development, such as the Star-Orion South Diamond Project. Thus, project construction would represent a benefit for the Saskatchewan economy; project effects are characterized as positive,

provincial (beyond regional), short-term, and high in magnitude and consequently are given an overall effect rating of major.

Operations Phase

As noted previously, average annual operating costs for the mine would be $215.2 million. Estimates provided by Shore suggest that 96 % of this amount, or $207.4 million per year, would be spent in Saskatchewan. As shown in Table 6.4.1-4, there would be some purchases of machinery and spare parts from other parts of Canada. Routine operations would not require any imports of goods or services from outside Canada.

Table 6.4.1-4: Distribution of Average Annual Operational Expenditures

Expenditure Categories	Total (millions)	Saskatchewan	Other Canada	Imports
Direct labour (wages and salaries)	$87.2	$87.2	$0.0	$0.0
Professional, scientific and technical services	$22.5	$22.5	$0.0	$0.0
Machinery	$11.6	$8.1	$3.5	$0.0
Spare parts and maintenance.	$14.5	$10.1	$4.4	$0.0
Fuel	$18.1	$18.1	$0.0	$0.0
Utilities (electricity)	$47.1	$47.1	$0.0	$0.0
Construction	$1.0	$1.0	$0.0	$0.0
Mining related services	$13.3	$13.3	$0.0	$0.0
TOTAL	$215.2	$207.4	$7.8	$0.0
		97%	4%	0%

Source: Adapted from information provided by Shore (2011).

The estimate in Table 6.4.1-4 does not include expenditures on capital replacement which would average $29.5 million per year over the 20-year operating life. It is assumed that these ongoing equipment purchases would follow the same pattern as for Project construction, with 20 % being obtained from Saskatchewan suppliers, 75 % from other provinces and 5 % from other countries. Thus, annual spending on capital replacement in Saskatchewan is estimated to average $5.9 million per year.

Estimated annual effects of the Project's operations phase on the Saskatchewan economy are summarized in Table 6.4.1-5. The table shows that spending in Saskatchewan of $213.3 million per year for operations (including sustaining capital) would increase provincial GDP by $224.6 million per year. Direct employment will account for 39% of these economic effects while supplier industry effects and induced effects will each account for about 30% of total GDP effects.

Table 6.4.1-5: Estimated Annual Effects of Operating the Star-Orion South Diamond Project on the Saskatchewan Economy

Economic Indicator		Direct	Indirect	Total
GDP at factor cost ($M)	Project Expenditure	$87.2	$68.2	$224.6
	Supplier Industry Effects	$66.9		
	Sustaining Capital	$2.2		
Employment (person-years)	Project Expenditure	730	955	2,475
	Supplier Industry Effects	760		
	Sustaining Capital	30		
Household Income ($M)	Project Expenditure	$87.2	$52.6	$178.5
	Supplier Industry Effects	$37.1		
	Sustaining Capital	$1.6		

As noted previously, project operations would directly employ 730 people, and the estimated annual payroll would be $87.2 million, so the average fully burdened cost to the company (which includes annual wages, benefits, employer paid government premiums, corporate payroll taxes, etc.) would amount to about $119,500 per job. Industries directly supplying goods and services used by the project are expected to increase their output by $66.9 million as a result of the mine operation. This would create 760 jobs for Saskatchewan residents and income of $37.1 million. Capital replacement involving purchases of equipment from Saskatchewan companies would generate another 30 jobs and $1.6 million of household income.

In total, it is estimated that operation of the Star-Orion South Diamond Project would create about 2,475 jobs in Saskatchewan and provide more than $178.5 million in additional household income in the province annually. These benefits will be quite large over the life of the project ($4.5 billion in GDP over the 20 years of operations). On an annual basis, project operation would contribute approximately 0.6% of provincial GDP (Saskatchewan GDP was $39.4 billion in 2010) and account for 0.5% of provincial employment (there were 515,700 employed workers in 2011). The GDP associated with mine operations would be equivalent to 4 % of economic activity currently being generated by the mining and petroleum industry in Saskatchewan ($5.3 billion in 2010, according to Enterprise Saskatchewan 2011a, Internet site). This is an important effect because the Star-Orion South Diamond Project would establish a new mining industry in the province, thus diversifying the provincial economy. Project operation would represent a benefit for the Saskatchewan economy; project effects are characterized as positive, provincial (beyond regional), long-term, moderate in magnitude, and consequently are given an overall effect rating of major.

Closure and Decommissioning Phase

The total cost of closure and decommissioning is estimated to be $84.8 million (2011 dollars) that would be spent over a three year period, commencing in 2037 after 20 years of production. Estimation of provincial economic effects is based on the assumption that all work would be completed by Saskatchewan companies in the waste management and remediation services industry. The resulting economic effects are provided in Table 6.4.1-6.

Table 6.4.1-6: Estimated Effects of Mine Closure and Decommissioning on the Saskatchewan Economy

Economic Indicator		Direct	Indirect	Total
GDP at factor cost ($M)	Project Expenditure	$56.5	$13.4	$69.9
Employment (person-years)	Project Expenditure	580	195	775
Household Income ($M)	Project Expenditure	$26.7	$7.3	$34.1

Closure and decommissioning of the project is expected to generate about $69.9 million in economic activity, create about 775 person-years of employment, and generate $34.1 million in labour income. Thus, project decommissioning would represent a minor benefit for the Saskatchewan economy; project effects are characterized as positive, provincial (beyond regional), short-term, low in magnitude and consequently given an overall effect rating of minor.

Closure of the mine and the ultimate loss of the 2,475 direct and indirect operating jobs would have an adverse effect on the Saskatchewan economy. The magnitude of these losses is difficult to predict and will depend on other economic development that occurs in the SRSA over the next 20 years. There is a possibility that diamond mining operations may continue past 2036 if other resources are proven, or that other economic development will be able to absorb the Project workforce. There is also a possibility that some of the workforce will simply choose to retire when the Project ceases operation. Although mine closure is inevitable, this is expected to occur more than 20 years in the future, which allows plenty of time for Shore to develop and implement various strategies that would minimize the effects of closure. The adverse effects of closure represent a problem for most mining operations and, in recognition of this problem, the mining industry and various governments around the world have accepted the concept of “planning for closure” (ANZMEC 2000; International Institute for Environment and Development 2002) and have developed some objectives and principles to guide this process. One of the key principles is communication and consultation with stakeholders to ensure that the interests of all potentially-affected parties are considered in mine closure plans. Another key principle is the establishment of a

set of indicators that can be used to assess the successful completion of the closure process. A third principle is that closure planning requires regular and critical review to ensure that the plan reflects changing circumstances.

While it is not possible at this time to establish a list of specific mitigative actions that would ultimately prove to be effective 20 years or more in the future, Shore is committed to working with the affected communities and government agencies to develop (and regularly revise) a mine closure plan that includes a strategy for buffering the effects on the Project workforce. Elements of the plan could include such things as continuing to offer skills upgrading to workers to provide them with the capacity to find other non-mining jobs after mine closure, assisting in the development of new economic development opportunities, and working with other regional employers to identify job opportunities for mine employees. One of the initial objectives of developing the mine closure plan will be to work with the communities to identify their desired post closure outcomes and to establish a set of indicators that will be used to guide the evolution of the mine closure plan. With the collaborative development and implementation of a mine closure plan it is expected that the residual effects of mine closure on the Saskatchewan economy would be minimized such that the resulting adverse effects would be characterized as long-term, local and low to moderate in magnitude and therefore, not significant.

6.4.1.7 Saskatchewan Government Revenues

Effects on Saskatchewan government revenues for the construction, operations, and closure reclamation phases are described in this Section.

Construction Phase

Estimated effects of the Project's construction phase on government tax revenues are summarized in Table 6.4.1-7. These numbers include $119.0 million in income taxes paid on workers' earnings, $21.4 million in net commodity taxes (principally provincial and federal sales taxes), and $7.5 million in taxes on production (such as land and capital taxes). Tax revenues directly resulting from Project construction would amount to $110.9 million over the four years of construction and represent 75 % of total taxes. Tax revenues attributable to indirect Project effects are estimated to be $37.1 million. Over the five-year construction period, the annual revenues to governments would be $29.6 million, of which the Government of Saskatchewan would receive $10.4 million.

Table 6.4.1-7: Estimated Effects of the Star-Orion South Diamond Project Construction Phase on Government Tax Revenues, 2013-2017

Economic Indicator		Direct	Indirect	Total
Tax Revenue ($M)	Personal income tax	$87.8	$31.2	$119.0
	Indirect taxes on products	$17.4	$4.0	$21.4
	Indirect taxes on production	$5.7	$1.8	$7.5
	Total	$110.9	$37.1	$148.0
Allocation by Level of Government ($M)				
Federal		$67.5	$24.4	$91.9
Saskatchewan		$39.8	$12.2	$52.0
Other provinces		$2.3	$0.0	$2.3
Local		$1.3	$0.5	$1.9

Source: Calculated using coefficients from the Statistics Canada economic multipliers for Saskatchewan and average personal tax rates.

Note: Totals may not add due to rounding.

Table 6.4.1-7 also shows how total tax payments would be distributed between federal, provincial and local (municipal and school division) governments.

Federal taxes will account for 62 % of the total while provincial taxes will account for most of the balance (35 %). Most of the remaining taxes (2 %) will be paid to local governments.

To put these numbers into perspective, the 2010-2011 Saskatchewan budget reports total tax revenues of $5.13 billion in 2011, to which personal taxes contributed $1.80 billion with another $1.16 billion from corporate taxes and $1.19 billion from the provincial sales tax (Government of Saskatchewan 2011). In relative terms, the $10.4 million per year in provincial tax revenues would be equivalent to 0.6 % of revenues from personal taxes and could appear relatively small in terms of total government revenues (0.3 %). However, given that annual tax revenues in Saskatchewan only increased by an average of $202 million per year between 2005-06 and 2010-11 (Government of Saskatchewan, Finance, various years), the tax revenues of the Star-Orion South Diamond Project would be equivalent to about 5 % of the annual increase in total Saskatchewan tax revenues. In addition, with government revenues currently being highly reliant on two industries (potash and oil and gas), the additional revenues provided by the project will help diversify and stabilize revenues. Thus, project construction would represent a major overall effect on Saskatchewan government revenues; project effects are characterized as positive, provincial (beyond regional), short-term, and high in magnitude.

Operations Phase

Estimated effects of the Project's operations and closure phases on tax revenues are summarized in Table 6.4.1-8. Total tax revenues generated directly from project operations are expected to total $176.7 million per year. This includes corporate income taxes ($97.0 million), royalties paid to Saskatchewan ($40.0 million), personal income taxes ($27.6 million), commodity taxes paid on goods and services ($4.9 million), indirect taxes on production ($1.0 million), local property taxes ($4.6 million, including municipal and school board), and lease payments to Saskatchewan ($1.7 million). It is estimated that indirect economic activity resulting from project operations will generate another $9.1 million per year in terms of personal income taxes and taxes paid on goods and services. Overall, project operations would directly and indirectly generate about $185.9 million in tax revenues for all three levels of government each year.

Table 6.4.1-8: Estimated Annual Effects of the Star-Orion South Diamond Project Operations on Provincial Tax Revenues

Economic Indicator		Direct	Indirect	Total
Tax Revenue ($M)	Personal income tax	$27.6	$7.5	$35.1
	Royalties	$40.0	$0.0	$40.0
	Corporate income tax	$97.0	$0.0	$97.0
	Lease payments	$1.7	$0.0	$1.7
	Local property taxes	$4.6	$0.0	$4.6
	Indirect taxes on products	$4.9	$1.1	$6.0
	Indirect taxes on production	$1.0	$0.5	$1.5
	Total	$176.8	$9.1	$185.9
Allocation by Level of Government ($M)				
Federal		$74.8	$5.4	$80.2
Saskatchewan		$96.8	$3.4	$100.3
Other provinces		$0.3	$0.0	$0.3
Local		$4.9	$0.2	$5.1

Source: Calculated using coefficients from the Statistics Canada economic multipliers for Saskatchewan, average personal tax rates, and tax estimates from Shore.

Note: Totals may not add due to rounding.

About 54 % of tax revenues will go to the Saskatchewan government. Of this, 43 % would come from corporate income taxes while 40 % would come from provincial royalty payments. Another 44 % of Project-related tax revenues during operations would accrue to the federal government, with corporate income taxes accounting for about 67 % of this amount.

Direct payments to local governments in the form of property taxes and indirect taxes would generate about $5.1 million per year.

In absolute terms, the annual government revenues generated by project operation for Saskatchewan would be relatively minor:

- annual revenues of $100.3 million would represent 0.9 % of total provincial revenues from all sources ($11.1 billion in 2011)
- annual royalty payments of $40.0 million would be equivalent to 1.6 % of the $2.53 billion in revenues from non-renewable resources in 2011 (Government of Saskatchewan 2011, Internet site)
- $43.1 million in corporate income taxes would be equivalent to 3.7 % of revenues from corporate income taxes in 2011.
- $12.0 million in personal income taxes would be equivalent to 2.0 % of total income from personal incomes taxes in 2011

However, when assessed in terms of expected growth in government revenues, the $58.5 million in project-related tax revenues would be equivalent to about 23 % of the average annual increase in Saskatchewan tax revenues that occurred between 2005 and 2011 ($256.8 million) and the project-related annual revenues from royalties and lease payments would be equal to 24 % of the average annual increase in Saskatchewan non-renewable resource revenues that occurred over the same period ($175.6 million). For these reasons, project operation would represent a major overall beneficial effect on Saskatchewan government revenues; project effects are characterized as positive, provincial (beyond regional), long-term, and high in magnitude.

Closure and Decommissioning Phase

Project expenditures on closing and decommissioning would also generate provincial and federal tax revenues. As shown in Table 6.4.1-9, expenditure of $84.8 million in 2037 through 2039 is expected to result in direct and indirect tax revenues of nearly $8.7 million or $2.9 million per year. Of this, tax revenues collected by the federal government over the three years will amount to $4.3 million, with $3.5 million in taxes being collected by the provincial government. The annual tax revenues being generated by the project would be equivalent to 0.02 % of current annual tax revenues for the province. Consequently, the cost of Project decommissioning would represent a minor overall beneficial effect on Saskatchewan government revenues; Project effects are characterized as positive, provincial (beyond regional), short-term, and low in magnitude.

Table 6.4.1-9: Estimated Effects of Mine Closure and Decommissioning Activity on Provincial Revenues

Economic Indicator		Direct	Indirect	Total
Tax Revenue ($M)	Personal income tax	$2.7	$0.4	$3.1
	Indirect taxes on products	$2.6	$0.3	$2.9
	Indirect taxes on production	$2.1	$0.6	$2.6
	Total	$7.4	$1.3	$8.7
Allocation by Level of Government ($M)				
Federal		$3.7	$0.6	$4.3
Saskatchewan		$2.9	$0.5	$3.5
Other provinces		$0.2	$0.0	$0.2
Local		$0.5	$0.2	$0.7

Source: Calculated using coefficients from the Statistics Canada economic multipliers for Saskatchewan and average personal tax rates.

Note: Totals may not add due to rounding.

Annual tax revenues will cease once the Project has been completely decommissioned. The resulting loss of provincial tax revenues resulting from mine closure is considered adverse, long-term (continuous), provincial, high in magnitude, and significant. There are no opportunities for Shore to mitigate the loss of provincial government revenues once this Project ends.

6.4.1.8 Regional Employment and Income

Estimating the actual number of local and regional residents to be employed on Project construction and operations is challenging given the changing nature of the economy of north central Saskatchewan. The number of local and regional residents ultimately hired for Project construction and operation would depend on the availability of qualified workers, the demands of other projects for skilled workers, and the implementation of training programs.

Based on the 2006 census, the SRSA had an active labour force of 34,860 people. Of these, about 1,990 workers had experience in the construction industry and another 810 workers had experience in the mining and oil and gas industries. There were 5,380 people in the region working in occupations related to the trades and as transportation and equipment operators. The regional rate of unemployment was 8.3 %, which suggests 2,893 people were actively seeking work. These statistics suggest that the region appears to have sufficient capacity to fill all of the 730 long-term operating positions at the mine and processing plant.

Since 2006, the regional labour market has begun to tighten. According to Strategy Plus (2010), the labour force in the Prince Albert Census Agglomeration (CA), which accounts for about 60 % of the population of the SRSA, increased by 11.5 % between 2006 and 2008. During that period, the number of employed people in the Prince Albert CA increased by 2,575 and the number of unemployed people dropped from 1,750 to 1,500 people. While the unemployment rate in the CA decreased from 8.4 % in 2006 to 6.5 % in 2008, the regional unemployment rate is still above the provincial rate of 4.1 %.

However, labour market projections for the North Central Enterprise Region (NCER), which includes the Prince Albert CA, suggest that 1,014 new workers will be required in the NCER each year for the next 10 years (Strategy Plus 2010). These projections assume that the region maintains its share of new provincial employment (6.5 % of 10,000 jobs per year) plus 4.1 % of anticipated growth in employment in the provincial mining sector. In addition, based on the list of major projects in the SRSA that have been proposed or are in the planning or design phase (Enterprise Saskatchewan 2010c), the demand for construction workers in the next few years could increase by 20 times over current levels.

Thus, expectations are that labour demands in the region will exceed available labour supply over the next five years. Projections for the NCER suggest that demand for workers will exceed the available supply in the region by 430 workers in 2011, 962 by 2016 and 1,583 by 2021, or about 1,000 workers per year (Strategy Plus 2010). To address these shortages, the NCER has proposed three core strategies: higher participation of groups currently under-represented in the labour force (especially Aboriginal workers, which includes First Nations and Métis), increased in-migration of people currently living outside the NCER, and increased immigration (Strategy Plus 2010).

Construction Phase

As noted in Section 6.4.1-6, Project construction will require 3,345 person years of work over five years, of which Saskatchewan residents would provide 2,675 person-years. Although the number of people working on the Project at any one time could vary from 100 to 1,000 workers, construction would require an average of 669 workers per year.

Direct Employment

Given the specialized nature of some of the construction activities, some of the labour will have to be imported from other parts of Saskatchewan and from other parts of Canada. Expectations are that all of the professional workers (engineers, geologists, metallurgists and health and safety specialists), who account for 10 % of the workforce, as well as construction managers and some specialized trades people, will have to be imported to the region. Overall, it is expected that 40 % of the construction labour force will be brought into the region. Half of these will be residents of other parts of Saskatchewan while the other half will be from other parts of Canada.

Consequently, residents of the SRSA are expected to account for about 60 % of the Project's construction labour requirements. This translates into about 2,005 person-years of work over the five year period, or an average of 400 workers during each year of construction. Regional residents are anticipated to provide the balance of Project requirements for equipment operators and labourers as well as some trades people. Shore strives to have a workforce that is representative of the regional population and thus there is the potential that local First Nations and Métis people will account for 27 % of the regional residents employed to construct the Project.[1]

Data from the 2006 census suggest that employing 400 regional residents during construction should be achievable. This number represents 18 % of the regional labour force with construction experience and 7 % of the regional workforce with experience in the trades or as truck and heavy equipment operators. And, while there could be shortages of construction workers if all of the planned or proposed projects in the SRSA proceed, it should be noted that two projects (an ethanol plant and the proposed Pehonan hydroelectric dam on the Saskatchewan River) account for 88 % of projected construction spending in the SRSA. As neither of these projects has as yet submitted a firm project proposal to provincial or federal authorities, it appears unlikely that work on either of these projects will proceed until after work on the Project has commenced or been completed. Thus, project construction is expected to provide the equivalent of 400 full time jobs for regional residents during the five years of construction.

Project construction would also create direct employment through the purchases of goods and services from companies and contractors in the SRSA. As shown in Table 6.4.1-2, the total cost of construction will be $1,919 million of which 44 %, or $846.7 million, will be spent in Saskatchewan. Thirty-seven percent of this spending ($309.9 million) will occur in the SRSA with the balance ($537.0 million) being spent elsewhere in Saskatchewan. Table 6.4.1-10 shows the pattern of project spending within Saskatchewan. It shows that the majority of spending within the SRSA (68 %) relates to wages and salaries paid for the 2,005 person-years of direct on-site employment for regional residents. The remaining $99.7 million would be used to purchase goods and services from SRSA businesses. Based on the economic multipliers for Saskatchewan, these purchases would generate a total of 595 person-years of employment elsewhere in the construction industry. Thus, spending in the SRSA would generate a total of 2600 person-years of direct employment for regional residents.

[1] This percentage reflects the current percentage of Aboriginal people, both on and off reserve, in the SRSA workforce in 2006.

Table 6.4.1-10: Distribution of Construction Expenditures within Saskatchewan

Expenditure Categories	Total (millions)	SRSA	Other Saskatchewan
Direct labour (wages and salaries)	$280.3	$210.2	$70.1
Construction	$81.2	$16.2	$65.0
Professional, scientific and technical services	$46.3	$11.6	$34.7
Machinery	$215.6	$53.9	$161.7
Spare parts and maintenance.	$5.9	$1.5	$4.4
Fuel	$74.9	$0.0	$74.9
Utilities (electricity)	$72.4	$0.0	$72.4
Other goods	$44.6	$11.2	$33.5
Mining related services	$16.4	$2.7	$13.6
Other services	$9.4	$2.6	$6.8
TOTAL	$846.7	$309.9	$537.0
		36.6%	63.4%

Source: Adapted from information provided by Shore (2011).

Indirect Employment

Project construction would also create indirect employment in the SRSA, as regional companies increase their output of goods and services supplied to companies and contractors directly involved in construction. At a provincial scale there would be 0.58 indirect jobs for every direct job created (see Table 6.4.1-11). Within the SRSA, however, there are expected to be relatively fewer indirect jobs because the regional economy is less diverse than the provincial economy, so is less capable of providing the full range of goods and services required to support Project construction. It is expected that some of the companies and industries that would indirectly benefit from Project construction will be located in Saskatoon and, to a lesser extent, Regina. In 2006, these two cities respectively accounted for 37 % and 19 % of manufacturing jobs and 31 % and 27 % of jobs in business service industries in Saskatchewan. In contrast, the SRSA accounted for only 5 % of manufacturing jobs and 5 % of business service jobs in Saskatchewan. For purposes of analysis it is assumed that 50 % of indirect jobs associated with direct employment in the region will occur within the SRSA. Consequently, it is estimated that Project construction will generate about 755 person-years of indirect employment in the SRSA.

Total Regional Employment

In total, Project construction would provide 3,355 person-years of employment for residents of the SRSA over the five years of construction. This includes 2,005 person-years of direct on-site construction employment, 595 person-years of direct employment through purchases of goods and services needed for construction, and 755 person-years of indirect employment (Table 6.4.2-11).

Regional Income

As noted in Table 6.4.1-10, Project construction is expected to directly provide $280.3 million in labour income and benefits for Saskatchewan residents over five years of construction. Of this, residents of the SRSA who are directly employed on Project construction are expected to earn $210.2 million in wages and benefits. Regional residents who directly supply goods and services needed for project construction would earn $30.4 million. Indirect employment of regional residents would generate another $47.6 million in wages and benefits. Overall, project construction would directly and indirectly provide $288.2 million in wages and benefits for residents of the SRSA over the five years of construction (Table 6.4.1-10).

The average earnings (including benefits) for regional workers benefiting from project construction employment, either directly or indirectly, would be about $85,930. These earnings are much greater than the average incomes reported by residents of the region. For example, in 2005, the median earnings reported by residents of the SRSA were $35,948 for people who were employed full-time, year round. Thus, project related employment would provide incomes for regional residents that were 139% higher than median earnings in 2005. This difference is considerable, given that there was 8.9% inflation between 2005 and 2010 (Saskatchewan Bureau of Statistics 2011).

Summary of Effects

Construction employment and income effects are summarized in Table 6.4.1-11. Total regional employment effects are estimated to be 3,355 person-years over five years, or the equivalent of 669 full-time jobs lasting five years. This represents about 2 % of the labour force in the SRSA in 2006. While this percentage appears small, it is expected that employment associated with construction of the Project will prove to be very important in supporting economic growth in the SRSA. The regional labour force projections suggest that 2,730 new jobs will occur between 2011 and 2015 (Strategy Plus 2010) so Project construction would account for nearly 25 % of this increase. However, the labour force projections are likely optimistic[2]. Thus, Project construction could account for as much as 50 % of the new jobs that are predicted to occur in the NCER by 2015. Consequently, Project construction would represent a major overall beneficial effect on the economy of the SRSA; Project effects are characterized as positive, regional, short-term, and high in magnitude.

[2] The labour force projections assume that the region will maintain its share of new provincial employment (6.5 % of 10,000 jobs per year) and will attract 4.1 % of anticipated growth in employment in the provincial mining sector, resulting in 682 new jobs each year for the next 10 years. However, the 32 major projects in the SRSA with a combined value of $2.2 billion account for 5 % of all major projects in Saskatchewan. Furthermore, two of the projects in the SRSA that would account for more than $1.0 billion in new construction spending, are expected to occur after the Project is in operation. Thus, based on the list of major projects, labour demands may only increase at half the rates predicted by the NCER.

Table 6.4.1-11: Estimated Regional Employment and Income Effects Associated with Project Construction

Economic Indicator		Direct	Indirect	Total
Employment (person-years)	Project Expenditure	2,005	755	3,355
	Supplier Industry Effects	595		
Household Income ($M)	Project Expenditure	$210.2	$47.6	$288.2
	Supplier Industry Effects	$30.4		

Operations Phase

Effects on direct employment, indirect employment and regional income for the operations phase are described in this Section.

Direct Employment

As noted previously, operation of the Project would directly employ 730 people, with an estimated annual payroll of $87.2 million. While it is expected that all of the operational workforce will ultimately reside in the SRSA, some of the workforce will initially have to be imported into the region, for a number of reasons. First, the SRSA labour force currently does not have the complete mix of skills needed to manage and operate the Project. Shore estimates that 40 % of the operational workforce (or about 290 people) will be imported into the region and notes that these people will include much of the management and professional staff, as well as some of the trades people and equipment operators. Second, labour shortages are expected in the region in the absence of the Project. Labour projections for the NCER suggest that 1,014 new workers will be required in each year for the next 10 years (Strategy Plus 2010) and it is projected that these workers will consist of regional residents who are currently under-represented in the labour force (especially Aboriginal people, which include First Nations and Métis people), people currently living outside the NCER, and immigrants. It should be noted that while the labour force projections for the NCER include 4.1 % of anticipated growth in employment in the provincial mining sector, the operating workforce for the Project (730) would actually exceed the cumulative anticipated increase in mining jobs in the NCER between 2008 and 2017 (320 jobs). Thus, it is reasonable to assume that some of the Project work force will have to be imported into the SRSA.

Overall, it is expected that 438 existing residents of the SRSA would be employed to operate the Project. These would consist of some of the construction workforce who would carry over into the operations phase of the Project, other qualified members of the SRSA workforce, as well as First Nations, Métis people and other SRSA residents who participate in employment training programs sponsored or supported by Shore. It is expected that

some of the workforce would consist of regional residents attracted by the high wages and benefits being offered by the Project (averaging $119,500 per job) and whose departure from their existing employment would create new employment opportunities for other residents of the SRSA.

Project operations would also provide some new direct employment for SRSA companies that supply some of the goods and services needed for Project operations. As noted in Table 6.4.1-12, the average annual cost of operating the Project will be $215.2 million, with an additional $29.5 million of spending on capital replacement. Of this, it is expected that 96 % of operating expenditures ($207.4 million) and 20 % of spending on capital replacement ($5.9 million) will be spent in Saskatchewan. This amounts to about $213.3 million per year being spent in Saskatchewan and includes $87.2 million in wages and benefits. Table 6.4.1-12 shows how Project spending on goods and services will be distributed within Saskatchewan. It shows that about $120 million in operating expenses (including $87.2 million indirect labour costs) and $1.5 million in capital replacement will be spent in the SRSA each year. The other $94.9 million will be spent in other parts of Saskatchewan.

Table 6.4.1-12: Distribution of Operating Expenditures within Saskatchewan

Expenditure Categories	Total (millions)	SRSA	Other Saskatchewan
Direct labour (wages and salaries)	$87.2	$87.2	$0.0
Mining related services	$13.3	$6.6	$6.6
Professional, scientific and technical services	$22.5	$22.5	$0.0
Machinery	$8.1	$1.2	$6.9
Spare parts and maintenance.	$10.1	$1.4	$8.7
Construction	$1.0	$1.0	$0.0
Fuel	$18.1	$0.0	$18.1
Utilities (electricity)	$47.1	$0.0	$47.1
Subtotal	$207.4	$120.0	$87.4
Capital replacement	$5.9	$1.5	$4.4
TOTAL	$213.3	$121.5	$94.9
		56.9%	43.1%

Source: Adapted from information provided by Shore Gold (2011).

Note: Totals may not add due to rounding.

Table 6.4.1-12 indicates that the project will spend $34.3 million per year on goods and services in the SRSA (excludes direct labour). The majority of spending on goods and services (66 %) in the SRSA would be in the professional, scientific and technical services. Based on the economic multipliers for Saskatchewan, this pattern of spending would generate 370 jobs the SRSA, of which 360 jobs would relate to normal operating expenses

and 10 jobs would be related expenditures on capital replacement. These estimates include both full- and part-time jobs.

Thus, project operation is expected to create 1,100 new jobs in the SRSA, with the majority of these (730) relating to direct on-site employment at the mine and the balance (370) being in other industries that directly support mine operations.

Indirect Employment

Project operation would create some indirect employment in the SRSA as regional companies increase output of goods and services that they supply to companies and contractors who directly support Project operations. At a provincial scale there will be 0.63 indirect jobs for every direct job created (see Table 6.4.1-13). Relatively fewer indirect jobs are expected within the SRSA because, as noted previously, the regional economy is less diverse than the provincial economy so is less capable of providing the full range of goods and services required to support Project construction. It is expected that some of the support industries may be located in Saskatoon or Regina. For purposes of analysis, it is assumed that 25 % of indirect jobs associated with direct employment in the region will occur within the SRSA. Consequently, it is estimated that Project operations will generate about 170 indirect jobs in the SRSA.

Total Regional Employment

In total, project construction would provide 1,270 new jobs in the SRSA. This includes 730 jobs at the mine, 370 jobs resulting from purchases of goods and services needed for operations, and 170 indirect jobs.

Regional Income

Project operations are expected to annually generate just over $178.5 million in wages and benefits for residents of Saskatchewan (see Table 6.4.1-5). Of this, people working at the mine would directly earn $87.2 million, while SRSA residents who provide goods and services needed for mine operations (including capital replacement) would earn another $17.4 million. Indirect employment of regional residents would generate another $9.5 million in wages and benefits. Overall, Project operation would directly and indirectly provide an average of $114.1 million in wages and benefits for residents of the SRSA during each year of operation.

The average wages and benefits for regional workers directly or indirectly in mining operations would be about $89,800. However, this ranges from average wages and benefits of $119,500 for people employed at the mine to $54,900 for those indirectly employed by mine operations to $47,100 for people employed by businesses providing goods and services to the mine. These earnings are much greater than the average income reported by residents of the region. It is expected that the high wages at the mine would

attract regional residents from other jobs and thereby create new opportunities for other residents of the SRSA.

Summary of Effects

Operations employment and income effects are summarized in Table 6.4.1-13.

Table 6.4.1-13: Estimated Annual Regional Employment and Income Effects Associated with Project Operation

Economic Indicator		Direct	Indirect	Total
Employment (jobs)	Project Expenditure	730	170	1,270
	Capital Replacement	10		
	Supplier Industry Effects	360		
Household Income ($M)	Project Expenditure	$87.2	$9.5	$1144.1
	Capital Replacement	$0.4		
	Supplier Industry Effects	$17.7		

Overall, project operation will create an average of 1,270 long-term direct and indirect jobs in the region and $114.1 million in annual wages and benefits. This is equivalent to 3.7 % of the labour force of the SRSA in 2006 and 10 % of the estimated total income in the region in 2005. The operation of this single project will continue to account for much of the anticipated employment growth in the region. Labour force predictions for the NCER (NCER 2010) suggest that 682 new jobs will be created annually between 2011 and 2021. This growth is shown in Figure 6.4.1-8, which also shows employment generated by both Project construction and operation.

For the period from 2017 to 2021, the 1,270 jobs created by project operations would account for 37 % of the 3,410 new jobs predicted to be created during these five years. However, as noted previously, these labour force projections are likely optimistic when compared to the actual likelihood of development of other major projects in the region. Consequently, project operation could account for as much as 75 % of the new jobs predicted to occur in the NCER between 2016 and 2021.

Project effects for some segments of the population within the SRSA would be substantial. Shore Gold has indicated that local First Nations and Métis could account for 27 % of the operational workforce or approximately 200 jobs. Given that only 47 % of the adults on First Nations reserves in the SRSA were actively working or seeking work and that 301 of these were unemployed (an unemployment rate of 32 %), the addition of up to 200 jobs has the potential to drop Aboriginal unemployment rates.

In combination, the employment resulting from project construction and operation would account for 26 % of total new employment in the NCER between 2011 and 2021. This percentage could be much higher because current information on major projects in the SRSA suggests that regional employment estimates are optimistic. Consequently, project operation would represent a major overall beneficial effect on the economy of the SRSA; project effects are characterized as positive, regional, long-term, and high in magnitude.

Closure and Decommissioning Phase

Closure of the mine would result in the loss of all the operational employment and associated income. Some of these losses would be temporarily offset by the regional economic activity associated with decommissioning the mine. Decommissioning would occur over three years, at a cost of $84.8 million. This activity is expected to generate 580 person-years of direct employment in Saskatchewan and another 195 person-years of indirect employment. There is no information on the extent to which companies in the SRSA would be capable of supplying the full range of goods and services needed for closure and remediation. For purposes of analysis it is assumed that regional residents and companies would undertake 80 % of the work. This translates into about 465 direct person-years of employment for residents of the SRSA. Saskatchewan multipliers indicate that there will be 0.33 indirect jobs for every new direct job for the waste management and remediation industry in Saskatchewan. This suggests that there could be about 155 new indirect jobs in the region. As a result, it is estimated that mine closure would provide 620 person-years of employment for residents of the SRSA, with this employment lasting for three years, this suggests annual employment of 205 SRSA residents. As shown in Table 6.4.1-14, this employment would generate about $27.3 million in wages and benefits during closure and decommissioning activities, or $9.1 million per year. As a result, spending on Project decommissioning would represent a minor effect on employment and income in the SRSA; Project effects are characterized as positive, regional, short-term, and low in magnitude.

Table 6.4.1-14: Estimated Regional Employment and Income Effects Associated with Project Closure and Decommissioning

Economic Indicator		Direct	Indirect	Total
Employment (person-years)	Project Expenditure	465	135	620
Household Income ($M)	Project Expenditure	$21.4	$5.9	$27.3

Closure of the mine and the ultimate loss of 1,270 direct and indirect operating jobs would have an adverse effect on the SRSA. The magnitude of these losses is difficult to predict, however, and will depend on other economic development that occurs in the SRSA over the next 20 years, possible mitigation efforts to assist workers in finding alternate employment,

and the number of workers who may choose to retire when mine operations cease. As noted in Section 6.4.1-7, Shore appreciates the potential negative impact of mine closure on the regional economy and is committed to working with the affected communities and government agencies to develop (and regularly revise) a mine closure plan that includes a strategy for managing the effects of eventually losing 730 mining jobs. With the collaborative development and implementation of a mine closure plan it is expected that the residual effects of mine closure on regional employment would be minimized such that the resulting effects would be characterized as adverse, long-term, local and low-moderate in magnitude and therefore, not significant.

6.4.1.9 Regional Demographics

The following assessment of Project effects on regional demographics addresses only the population effects resulting from direct employment by the Project. While there may be some indirect population effects as a result of regional businesses hiring additional people in response to Project purchases of goods and services, Shore has no control over how this indirect labour will be sourced or the extent to which this may contribute to population change in the SRSA. However, based on the high rate of unemployment in the SRSA and the perception that Prince Albert has unused capacity in its service industries, it is believed that the indirect employment created by the Project will provide employment for existing residents of the SRSA.

Construction Phase

The assessment of the Project's effects on regional employment during construction noted that 40 % of the construction labour force would be brought into the region from other parts of Saskatchewan or other parts of Canada. The other 60 % of the workforce would consist of current residents of the SRSA. This means that non-residents of the region would account for 1,340 person-years of direct employment over the five years of construction, or the equivalent of about 270 people. The actual number of non-resident workers could be much higher, however, as large numbers of outside workers could be brought in for very short periods of time. Shore estimates that, at peak, there could be as many as 1,000 workers on the Project and this could translate into as many as 400 non-resident workers.

It is unlikely that large numbers of non-resident construction workers would choose to permanently relocate to the SRSA since much of the work is of relatively short duration, they will have temporary accommodations at a construction work camp, and some regional residents working in other locations (such as in Alberta) may return for these construction jobs. However, the exception may be some of the professional and management staff who would oversee construction and continue to play a role in Project operations. About 5 % of the construction workforce (165 person-years) will consist of professional, management and other administrative staff. This is equivalent to 30 people working throughout the five-year construction period. Assuming that half of these people would continue on into operation, it

is likely that Project construction would result in about 15 non-residents and their families moving into the SRSA. With an average of 2.5 persons per household according to the 2006 federal census, this suggests a population increase of about 35 people, starting in 2013. The small population increase resulting from Project construction would represent a minor overall beneficial effect on the regional population; Project effects are characterized as positive (it would support regional growth), regional, short-term, and low in magnitude.

Operations Phase

As noted earlier, Project operations would employ 730 people, with 438 of these being current residents of the SRSA. This means that 290 workers would be brought into the region, with 15 of these having moved into the region during Project construction. It is expected that the majority of the 275 other non-resident workers would move into the SRSA in order to minimize commuting time to and from the mine site (the construction work camp will be removed following the construction phase). Based on the current demographic characteristics of the SRSA, the addition of 275 workers and their families could result in an additional population increase of 690 people. It is expected that 75 of the workers would be single, 75 would be couples with children, 85 would be couples with no children, and the balance (40) would consist of lone-parent family households and other household types. The addition of this many new people would increase the population of the SRSA by about 1.0 %. Overall, the additional small population increase resulting from Project operation would represent a minor benefit for the regional population; Project effects are characterized as positive (it would support regional growth), regional, long-term, and low in magnitude.

For individual communities, the magnitude of the potential population increases could be much larger depending on where Project workers choose to reside. It is expected that most workers would choose to live in one of the larger communities (Prince Albert, Melfort, Nipawin) or in rural areas near these communities, and introduction of small numbers of workers would have a minor overall positive effect. If workers chose to live in some of the other small towns or villages in the SRSA which have populations of 900 people or less, there could be overall moderate positive population effects.

Closure and Decommissioning Phase

The effects of mine closure on the population of the SRSA would result in some families leaving, some households remaining but with the wage earners leaving the region to find work, and some workers and their families would continue to reside in the region in hopes of finding alternative employment. The number of workers and their families who choose to leave the SRSA or the region would ultimately depend on the other economic development that occurs in the region over the next 20 years and the availability of alternate employment, especially related to mining activities.

However, the closure of the mine is foreseeable and this should provide workers with sufficient lead time to determine an appropriate course of action. A sudden major population decrease is not expected. Instead, workers would likely gradually move their families to other locations and then follow once their labour was no longer required. As a worst case scenario, closure of the mine would result in the loss of 730 operating jobs with a population loss of 1,825 people. This assumes that all mine workers choose to leave the SRSA in search of other work. However, this is very unlikely. The more likely case is that those professional and management staff who are least likely to find equivalent mining-related jobs in the SRSA would move out of the region. This represents approximately 100 workers and their families, or about 250 people. The effects of such losses may be more pronounced for some of the smaller communities where workers may have chosen to reside. For this reason, Shore will commit to working with these local communities to develop a mine closure plan that will establish specific strategies and actions that can be used to minimize the potential adverse effects of mine closure on the population of these communities.

Within the SRSA, overall population losses would be small, such that Project effects on the regional population are considered adverse, long-term, low in magnitude, but not significant.

6.4.1.10 Transportation

This Section examines potential effects of the Project on transportation infrastructure. It analyzes the extent to which transportation infrastructure may experience changes in use and condition as a result of the Project. In the context of the SRSA, the discussion focuses on road and rail infrastructure. Potential effects are related to the movement of Project-related labour and materials/equipment on existing infrastructure, and the upgrading or new building of infrastructure to facilitate Project transportation needs. This section will discuss potential effects on traffic volumes; further discussion on safety implications of traffic are found in Section 6.4.7 Human Health Effects.

Construction Phase

Effects on road, rail and related infrastructure for the construction phase are described in this Section.

Road

During the construction phase, roads in the SRSA will be utilized to transport equipment and materials to the Project site, as well as for worker commuting. Figure 6.4.1-1 outlines the regional road network in relation to the Project site.

Primary road access to the site will be from Highway 55, which runs in an east-west direction to the north of the site. To facilitate access to the Project site from Highway 55, the

access road that was developed during the exploration phase will be upgraded and the connection of the access road to Highway 55 will be located one mile east of the current access section. This access road extends south approximately 31 km from Highway 55 near the hamlet of Shipman. Provincial secondary highway grade standards would be followed for the road upgrade. The upgraded access road and its maintenance will be under the jurisdiction of the RM of Torch River. Shore will discuss cost-sharing options with the RM to support the upfront development of the road upgrade. The cost of the road upgrade incurred by the RM of Torch River will ultimately be recouped through the industrial taxes that will be paid by Shore.

There is also access to the site from Division Road, a trail which connects from Highway 6 west to the access road north of the site. This road would not be used for main access as it would require an upgraded bridge crossing to accommodate heavy truck traffic which would be of considerable cost. Access to the site from Division Road will not be restricted for smaller vehicles (i.e., commuters) that wish to use it, but it will not be upgraded as a main site access point.

Some particularly large loads (such as heavy hauler parts, shovel modules, and process plant equipment) will be transported via rail to Choiceland and then trucked about 30 km west along Highway 55 from Choiceland to the turn off to the new access road.

The daily commuter vehicles associated with the Project represent the estimated 60 % of the construction labour force (or 400 workers) that will be current residents of the SRSA and thus living in SRSA communities and commuting daily to the site. The remaining 40 % of the construction workforce (or 268 workers) will be brought in from outside the SRSA and will be housed at an on-site construction work camp; thus, they will not be commuting daily.

Table 6.4.1-15 outlines the current estimated average daily vehicle traffic from both equipment/materials delivery and worker commuting.

Table 6.4.1-15: Estimated Average Daily Vehicle Traffic During Construction Phase

	Total Vehicles	Heavy Truck; B-Train	Buses	Other (Commuters)	Hazardous Loads
Highway 11	14.3	14	--	--	0.3
Highway 55	418.4	17	--	400	1.4
Highway 6 (north of river)	4.4	3.4	--	--	1
Highway 6 (south of river)	4.4	3.4	--	--	1

	Total Vehicles	Heavy Truck; B-Train	Buses	Other (Commuters)	Hazardous Loads
Secondary Highway 355	--	--	--	--	--
Highway 41	--	--	--	--	--
Other	--	--	--	--	--

Source: Shore Gold.

For the purposes of analysis, the following assumptions are made in relation to the above traffic data:

- These numbers are averaged over the five years of construction. The commuter-related traffic will be higher than average during the busier years of construction, notably Year 2 and Year 3;
- The heavy trucks and hazardous load vehicles travelling only on Highway 55 are assumed to be coming from the Prince Albert area. As such, they are assumed to be traveling on the portion of Highway 55 to the west of the access road turn-off;
- Half of the total commuter traffic will be by carpool; thus, 400 workers will make 400 commuter trips per day;
- Daily commuter vehicles will be coming primarily from Prince Albert, Melfort and Nipawin (or surrounding areas), thus approaching the access road from both an east and west direction along Highway 55. It is assumed that daily commuters will reside primarily in Prince Albert (67% or 268 workers or 268 vehicle trips per day), with the remainder commuting from Nipawin, and Melfort (33 % or 132 workers and 132 vehicle trips per day)). Thus, it is assumed that 67 % of daily commuting vehicles will travel on the portion of Highway 55 west of the Shipman access road intersection (toward Prince Albert). It is assumed that the remaining 33 % of vehicles will travel on the east portion of Highway 55 from the Shipman access road intersection until the intersection with Highway 6. At Highway 6, it is assumed that half of those commuters (66 workers or 66 vehicle trips per day) will divert south toward Melfort, and the other half of westbound commuters (the remaining 66 workers or 66 vehicle trips per day) will continue west toward Nipawin. These assumptions are made to allow for analysis of how Project-related traffic compared to current volumes at certain road points. Actual commuting traffic patterns will, of course, depend on where precisely in the SRSA workers choose to reside;
- Commuters are not currently using Highways in the SRSA to travel to and from current employment (i.e., are all currently unemployed) and therefore represent new traffic on

these highways that is not factored into the most recent AADT counts. The heavy trucks and hazardous load vehicles also travelling on Highway 6 are assumed to be coming from the Regina area; and

- The heavy trucks and hazardous load vehicles travelling daily on Highway 11 are assumed to be travelling to and from the Saskatoon area. It is assumed that these vehicles would connect from Highway 11 to Highway 2 just south of Prince Albert and then be amalgamated into the Prince Albert traffic travelling on the portion of Highway 55 west of the access road turn off.

On average, communities located on Highways 55, 6, and 11 will experience increases in daily traffic volumes during construction associated with the commuting and equipment/material delivery traffic. Table 6.4.1-16 outlines some key points within the SRSA (with Average Annual Daily Traffic, or AADT, counts) that Project-related traffic will travel through en route to and from the site. It examines how the anticipated incremental Project-related traffic volumes compare to most recent AADT using the assumptions above. The proportional increases in daily traffic volumes over current AADT would vary at different road points, from a low of 0.2 % increase on Highway 2 just north of the junction with Highway 11, to a high of a 26.7 % increase on Highway 6 just north of Gronlid.

Table 6.4.1-16: Daily Project-Related Traffic at Select Points in SRSA – Construction Phase

Road Point	AADT	Daily Heavy/Hazardous Load Traffic	Daily Commuter Traffic	Daily Total of Project-Related Traffic	% increase in daily traffic
Highway 55, south of Meath Park	2090	18.4	268	288.4	13.8
Highway 55, Weirdale	1110	18.4	268	288.4	26.0
Highway 55, west of Smeaton	1050	18.4	132	150.4	14.3
Highway 55, east of Smeaton	820		132	132	16.1
Highway 55, north of Nipawin	1740		66	66	3.4
Highway 2, just north of junction with Highway 11	6020	14	0	14	0.2
Highway 6, north of Melfort	940	3.4	66	69.4	7.4
Highway 6, north of Gronlid	260	3.4	66	69.4	26.7
Highway 6, south of Choiceland	380	3.4	66	69.4	18.3

Source: Saskatchewan Ministry of Highways and Infrastructure 2007; Shore 2011.

These increases in traffic are anticipated to be fairly minor in the context of low current traffic volumes on most roads in the Project area. RCMP officials in the Nipawin Detachment, in whose jurisdiction the Project site falls, anticipate no congestion issues on the road arteries surrounding the site. There are no current congestion issues or problematic intersections on surrounding highways which may be exacerbated by construction-related increases in traffic (RCMP 2010).

Representatives of the Saskatchewan Rivers School Division and the Northeast School Division indicated that since much of the school bus traffic is on grid roads, and that school buses for the Northeast School Division start running at 8:30 a.m. after the shift changes at the mine site are completed, they do not anticipate effects to school bus routes or safety (Saskatchewan Rivers School Division and Northeast School Division, 2011).

Rural highways, such as Highways 55, 11 and 6, do not have current level of service issues associated with traffic volumes and can accommodate additional traffic without affecting level of service (Saskatchewan Ministry of Highways and Infrastructure 2010). The typical volume capacity for a two-lane, paved highway (with two to three metre shoulders) such as Highway 55 is 4,000 vehicles per day (AECOM 2010). As such, the roads are anticipated to be able to easily absorb the incremental Project-related volumes without triggering the need for road upgrades (with the exception of the turn off from Highway 55 onto the Shipman Trail access road) or unusual safety or maintenance concerns. Further, discussion in interest workshops specific to the Project indicated that some degree of increased traffic in the region would be welcomed, as it could stimulate business in communities along travelled highways (such as Highway 55) (Appendix 4-F). There may be some issues with traffic volumes and level of service capacities closer to Prince Albert, where current volumes are higher and could increase if the Prince Albert Pulp Mill is re-opened. The City of Prince Albert does not have a dangerous goods route through the city, so any hazardous loads passing through Prince Albert would integrate with regular traffic (Saskatchewan Ministry of Highways and Infrastructure 2010).

The effect of these increased traffic volumes will be mitigated to some degree by Shore's plans to stagger shift and camp rotation start times to reduce traffic bottle-necks on site and incremental traffic volumes on surrounding highways. As such, the anticipated volumes of daily traffic will be travelling on SRSA roads at different times during the day, rather an all at the same times during the day. This will reduce the noise/safety effect that may be experienced by residents in communities along Highway 55 that are experiencing both commuter and equipment-related traffic, and along Highway 6 that are experiencing commuter-related traffic.

The impact on other vehicle traffic on SRSA roads due to a general increase in population associated with the relocation of non-resident workers' families is expected to be negligible. As discussed in Section 6.4.1.10, it is unlikely that many non-resident workers would choose

to permanently relocate to the SRSA (and thus relocate their families), with the exception being some of the professional and management staff who would oversee construction and continue to play a role in Project operations. It is estimated that the construction phase would result in about 15 non-residents and their families moving into the SRSA. Assuming an average of 1.4 vehicles per family in Saskatchewan (Natural Resources Canada 1996), this would result in an increase of 21 vehicles on local roads within the SRSA. However assuming one vehicle per in-migrant household is already counted in the commuting traffic described above, the net incremental traffic associated with the relocation of worker's families during construction is six vehicles. This incremental traffic associated with general population increase is anticipated to remain focused within and around the communities of residence and not be travelling on a daily basis along highways in the SRSA.

Although the Project-related traffic volumes are manageable in the context of low current volumes and sufficient highway design capacities, and increased traffic may be welcomed from a local business perspective, Shore will monitor any traffic-related issues that may emerge. Shore will maintain communication with the Nipawin RCMP detachment during all Project phases to discuss any emerging traffic-related issues (particularly along Highway 55) and will work collaboratively with RCMP officials to find mutually agreeable solutions if concerns arise. Shore will work with the RCMP and local municipal officials to develop an appropriate communications strategy by which Shore will advise the RCMP and municipalities of their anticipated equipment/material delivery schedules at appropriate time intervals. Further, Shore will encourage carpooling among its workers and develop policies around adhering to speed limits and general road safety principles. Shore will also engage in discussions with the Ministry of Highways and Infrastructure, the City of Prince Albert and the RM of Torch River, as required, about any emerging road condition or maintenance issues, or perceived issues, associated with Project-related traffic, particularly as they relate to hazardous loads and heavy loads moving through the City of Prince Albert.

In summary, Project effects on roads during construction occur on two levels: a) effects on road traffic, and b) effects on physical road infrastructure. Project effects on traffic are characterised as predominantly adverse (increased traffic), local, short-term, of moderate magnitude and consequently not significant. Although characterized as a net adverse impact, Project-related traffic increases will be perceived as positive by certain local stakeholders as they may cause increased business opportunities for services along key transportation routes. As there will be an upgrade of road infrastructure during the construction phase in the context of the Shipman Trail access road, effects on physical road infrastructure are characterized as positive (some improvement of infrastructure), local (focused in a specific part of the SRSA), long-term (a permanent improvement), and low. The overall beneficial effect on road infrastructure is characterized as minor.

Rail

As mentioned, certain large loads of materials and equipment (i.e., heavy hauler parts, shovel modules, process plant equipment) will be delivered to the study area via rail. Rail deliveries will be heavily weighted to the second year of construction, with some occurring in year three. It is estimated that two rail cars per week will be delivered via rail during year two of construction and one rail car per week during year three of construction. Rail deliveries will be to the Choiceland loading facility on the Torch River Rail line that runs between Nipawin and Choiceland after transfer from a mainline at Nipawin. From Choiceland, these materials will be delivered to the site on a low-bed truck, using Highway 55 to the intersection with the site access road. These truck deliveries will take place at night to minimize traffic disruption. The use of rail for delivery for certain major loads in general will reduce construction-related traffic on the road.

The Choiceland spur on the Torch River Rail line does not currently have the capacity to handle the Project modules requiring movement, unload, and transfer. In the absence of the Shore activities in the region, the Choiceland spur likely would have been decommissioned due to lack of demand at the time (Shore 2009). Shore is in communication with Torch River Rail, which now owns the spur line, about their desire to use the Choiceland spur for the Project and opportunities to support the upgrade of the Choiceland spur so it meets the capacity needs of the Project. The potential improvement of capacity would support movement of other commercial goods and materials in and out of the SRSA and may play a role in facilitating trade and continued economic growth in the area.

As there may be an upgrade in capacity of the regional rail infrastructure to support the Project's transportation needs, the Project effects on rail transportation infrastructure during construction after mitigation are characterized as positive (infrastructure upgrade), local (in a specific part of the SRSA), long-term (a permanent, continuous change) and moderate. The overall beneficial effect rating is minor.

Operations Phase

Effects on road, rail and related infrastructure for the operations phase are described in this Section.

Road

During the operations phase of the Project, deliveries will continue to be made to the site via truck and there will continue to be road traffic associated with workers commuting. There will be no work camp on on-site during the operations phase, so all workers will commute from resident communities within the SRSA on a daily basis. Workers will be responsible for transporting themselves to the site.

Table 6.4.1-17 outlines the estimated average daily Project-related traffic related to both equipment/deliveries and worker commuting.

Table 6.4.1-17: Estimated Average Daily Vehicle Traffic During Operations Phase

	Total Vehicles	Heavy Trucks	Buses	Other (Commuters)	Hazardous Loads
Highway 3	--	--	--	--	--
Highway 6 (north of river)	0.28	0.14	--	--	0.14
Highway 6 (south of river)	0.28	0.14	--	--	0.14
Highway 55	730.34	0.34	--	730[1]	0.14
Highway 41	--	--	--	--	--
Other	--	--	--	--	--

Source: ShoreNotes: [1]: 730 is the average operational workforce. The workforce actually varies from 488 to 984, depending on the year of operation. Please note that these numbers include 128 General and Administration personnel which are working and 5 day, 40-hour week. This traffic analysis does not examine the transportation patterns for workers with 12-hour shifts and those with 8-hour shifts. The impact estimates therefore represent a worst case (high volume) scenario.

For the purposes of analysis, the following assumptions are made in relation to the above data:

- Half of the commuters will carpool;
- As during the construction phase, heavy trucks and hazardous load vehicles travelling on Highway 55 are assumed to be coming from the Prince Albert area. As such, they are assumed to be traveling on the portion of Highway 55 to the west of the access road turn-off;
- Consistent with the assumptions made in the housing analysis (See Section 5.14-12), based on commuting distances it is assumed that operations workers will primarily reside in Prince Albert, Melfort, Nipawin, and smaller villages and hamlets located between these larger centres along Highway 55 (including Meath Park, Wierdale, Smeaton, Choiceland, Love and White Fox). Thus, it is assumed that 75 % of workers (or 548 workers) will reside in Prince Albert, Nipawin or Melfort (with 67 % of those in Prince Albert (367 workers) and the remaining 33 % (181 workers) distributed equally between Melfort and Nipawin), and the remaining 25% of workers (183 workers) will be evenly split between the six smaller communities along Highway 55 (30 workers each);
- The heavy trucks and hazardous load vehicles also travelling on Highway 6 are assumed to be coming from the Regina area;

- Daily commuter vehicles will be coming primarily from Prince Albert, Melfort and Nipawin (or surrounding areas), thus approaching the access road from both an easterly and westerly direction along Highway 55. Based on the residency assumption above, 427 workers or 427 daily commuting vehicles per day will travel on the portion of Highway 55 west of the Shipman Trail access road intersection (toward Prince Albert). It is assumed that the remaining 300 workers or 300 commuting vehicles per day will travel eastbound on Highway 55 from the Shipman access road intersection; 30 vehicles per day entering/exiting at Smeaton and another 30 vehicles per day entering/exiting at Choiceland. At the intersection of Highway 55 with Highway 6, it is assumed that 90 workers (or 90 commuting vehicles per day) will divert south toward Melfort, and 150 workers (or 150 commuting vehicles per day) will continue west toward Nipawin (with 30 vehicles per day entering/exiting at Love and another 30 vehicles per day entering/exiting at White Fox). These assumptions are made to allow for analysis of how Project-related traffic compared to current volumes at certain road points. Actual commuting traffic patterns will, of course, depend on where precisely in the SRSA workers choose to reside; and
- Commuters are not currently using Highways in the SRSA to travel to and from current employment and therefore represent new traffic on these highways that is not factored into the most recent AADT counts.

During operations, it is anticipated the incremental traffic volumes related to the Project will continue to be experienced only in a focused part of the SRSA, and be staggered throughout the three daily shift changes. On average during operations, communities located on Highways 55 and 6 will continue to experience higher daily traffic volumes compared to the present day. Table 6.4.1-18 outlines some key points within the SRSA with AADT, counts that Project-related traffic will travel through en route to and from the site, and examines how the anticipated incremental Project-related traffic volumes compared to most recent AADT. The proportional increases in daily traffic volumes over current AADT would vary at different road points, from a low of a 5.1 % increase on Highway 55 north of Nipawin, to a high of a 35.8 % increase on Highway 55 at Weirdale. As during the construction phase, these increases must be understood in the context of low current traffic volumes on most roads in the Project area.

Table 6.4.1-18: Daily Project-Related Traffic at Select Points in SRSA – Operations Phase

Road Point	AADT	Daily Heavy/Hazardous Load Traffic	Daily Commuter Traffic	Daily Total of Project-Related Traffic	% increase in daily traffic
Highway 55, south of Meath Park	2090	--	367	367	17.6
Highway 55, Weirdale	1110	--	397	397	35.8
Highway 55, west of Smeaton	1050	--	300	300	28.6
Highway 55, east of Smeaton	820	--	270	270	32.9
Highway 55, north of Nipawin	1750	--	90	90	5.1
Highway 6, north of Melfort	940	0.28	90	90.28	9.6
Highway 6, north of Gronlid	260	0.28	90	90.28	34.7
Highway 6, south of Choiceland	380	0.28	90	90.28	23.8

Source: Saskatchewan Ministry of Highways and Transportation 2007; Shore.

Note: Assumptions: Workers originate as follows: Prince Albert (367 workers or 367 commuter vehicles per day); Melfort (90 workers or 90 commuter vehicles per day); Nipawin (90 workers or 90 commuter vehicles per day); 30 workers each in the 6 villages on Hwy 55 – Meath Park, Wierdale, Smeaton, Choiceland, Love, White Fox. (or 30 commuter vehicles from each per day).

These volumes are anticipated to be within the level of service capacities of the highways and do not raise concern with the local RCMP (RCMP 2010a).

During operations Shore intends to continue its practice of staggering shift starts. There will be a minimum of three shift times per day with the workforce shifting throughout a 2 – 3 hour timeframe (e.g., 5 – 8 a.m,; 2 – 4 p.m.; and 5 – 8 p.m.). This will reduce traffic bottle-necks on site and incremental traffic volumes on surrounding highways at any given time. This will reduce the noise/safety effect that may be experienced by residents in communities along Highway 55 that are experiencing both commuter and equipment-related traffic, and along Highway 6 that are experiencing incremental commuter-related traffic.

There will be some further incremental traffic in the SRSA during operations associated with the general population of workers' families moving to the region. Based on the demographic analysis in Section 6.4.1-10, it is expected that about 275 non-resident workers would move permanently into the SRSA during Project operations. Assuming 1.4 vehicles per family, this equates to a general increase of vehicles in the SRSA across the entire population of 385 vehicles. So not to double count the cars already being used for commuting, the net

increase in general use vehicles associated with relocated families is 77 (based on a factor of 0.4 incremental vehicles per household over and above the commuting vehicle). The incremental traffic associated with this general population increase is anticipated to remain focused within and around the communities of residence and not to be travelling on a daily basis on highways within the SRSA.

There may be additional traffic in the SRSA (particularly on the arteries key to site access such as Highway 55) during the operations phase related to tourists interested in seeing the Project. Shore will have an interpretive centre, as the Project will be one of the largest open pit diamond mines in the world and more accessible than other diamond mines in Canada..

Shore will continue the monitoring measures associate with traffic volumes as described for the construction phase (i.e., regular discussion with local RCMP about emerging traffic issues, regular communications to advise RCMP and municipalities of unusual heavy load vehicle deliveries, encouragement of carpooling amongst workers, and policies around adhering to speed limits and general road safety principles). Shore will further consider the viability of park and ride sites that would facilitate car pooling into the mine site (or other worker shuttle services). This would respond to concerns shared by regional stakeholders about increased traffic emissions, possible wildlife-vehicle collisions within the FalC forest and may decrease worker absenteeism for those workers without personal vehicles. Shore will also continue to engage in regular discussions with the Ministry of Highways and Infrastructure or the municipalities with jurisdiction over other access roads about any emerging road condition or maintenance issues, or perceived issues, associated with Project-related traffic volumes. Shore will explore the possibility of bus services into the mine site for tourists from designated places within the SRSA in order to reduce tourist-related traffic on key SRSA arteries and in the FalC.

In summary, residual Project effects on roads during operations are focused on traffic volumes associated with equipment/materials deliveries and worker commuting. Operations phase Project effects on traffic are characterised as adverse (increased traffic), local, long-term, moderate, and consequently are not significant. Although characterized as a net adverse impact, Project-related traffic increases will be perceived as positive by certain local stakeholders as they may cause increased business opportunities for services along key transportation routes.

Rail

It is anticipated that rail infrastructure would be used only occasionally during the operations phase for major equipment replacement related to maintenance. Rail infrastructure may have been upgraded during the construction phase to a capacity to where these needs can be met. As such, no incremental effects on rail infrastructure during operations are anticipated.

Closure and Decommissioning Phase

Effects on road, rail and related infrastructure for the closure and decommissioning phase are described in this Section.

Road

During the closure and decommissioning phase of the Project, the regional road network will be used to remove material and equipment from the site as the mine is decommissioned. There will also continue to be commuter-related traffic, though it will be reduced from the operations phase as the number of workers required during the decommissioning phase will decrease.

Most materials and equipment would be removed from the site via truck. As is the case during construction, some particularly large loads would be transported out of the region via rail using the station at Choiceland. This large equipment would be transported via truck east along Highway 55 from the site entry turn-off to Choiceland; movement of these large loads would be done at night to minimize traffic interruptions.

Current projections for average daily vehicle traffic related to equipment/materials vehicles and worker commuting during closure and decommissioning are provided in Table 6.4.1-19.

Table 6.4.1-19: Estimated Average Daily Vehicle Traffic During Closure and Decommissioning Phase

	Decommissioning Phase				
	Total Vehicles	Heavy Trucks; B-Train	Buses	Other (Commuters)	Hazardous Loads
Highway 11	5	4	--	--	1
Highway 55	205	10	--	195	2

Source: Shore Gold.

Key assumptions associated with the above data are as follows:

- Half of the commuters will carpool;
- The 10 heavy trucks and two hazardous loads per day on Highway 55 are assumed to be travelling to the Prince Albert area, thus traveling only on the portion of Highway 55 to the west of the access road turn-off;
- The 5 heavy trucks and hazardous loads per day on Highway 11 are assumed to be travelling to the Saskatoon area. It is assumed that these vehicles would connect to

Highway 11 from Highway 2 just south of Prince Albert and thus would be amalgamated into the traffic coming to and from Prince Albert from the site west along Highway 55. These are the vehicles that would continue through Prince Albert south toward the Regina area; and

- As during operations, it is assumed that workers during decommissioning will primarily reside in Prince Albert, Melfort, Nipawin, and smaller villages and hamlets located between these larger centres along Highway 55 (including: Meath Park, Wierdale, Smeaton, Choiceland, Love and White Fox). For the purposes of analysis, it is assumed that 75 % of decommissioning phase workers (146 workers or 146 commuting vehicles per day) will reside in Prince Albert, Nipawin or Melfort (distributed 67% to Prince Albert (98 workers or 98 commuting vehicles per day) and the remaining 33 % equally distributed in Melfort and Nipawin24 workers in each or 24 commuting vehicles per day), and the remaining 25 % of workers (49 workers) will be evenly split between the six smaller communities along Highway 55 (or 8 workers each, generating 8 vehicle trips per day from each town).

On average, during operations communities located on Highways 55 and 6 will continue to experience increase daily traffic volumes compared to the present day. Table 6.4.1-20 outlines some key points within the SRSA with AADT counts that Project-related traffic will travel through en route to and from the site, and examines how the anticipated incremental Project-related traffic volumes compare to most recent AADT. The proportional increases in daily traffic volumes over current AADT would vary at different road points, from a low of a 0.1 % increase on Highway 2 just north of the junction with Highway 11, to a high of a 10.6 % increase on Highway 55 at Weirdale. These increases are well within the design capacities of the effected roads.

The volumes during decommissioning would be decreased on certain arteries compared to the operations phase and increased on others. Total Project-related volumes on Highway 55 would decrease from the operations phase, mostly related to a decrease of Project-related commuting traffic. Project-related equipment/delivery traffic on Highway 6 would decline to zero, though it still may experience some commuter-related traffic depending on where workers reside. Project-related traffic volumes on Highway 11 would increase from zero during operations to 5 vehicles per day during decommissioning. This is due to the increased movement of heavy load vehicles moving deconstructed materials away from the site.

Table 6.4.1-20: Daily Project-Related Traffic at Select Points in the SRSA – Decommissioning and Closure Phase

Road Point	AADT	Daily Heavy/Hazardous Load Traffic	Daily Commuter Traffic	Daily Total of Project-Related Traffic	% increase in daily traffic
Highway 55, south of Meath Park	2090	12	98	110	5.3
Highway 55, Weirdale	1110	12	106	118	10.6
Highway 55, west of Smeaton	1050	12	88	100	9.5
Highway 55, east of Smeaton	820		80	80	9.8
Highway 55, north of Nipawin	1750		24	24	1.4
Highway 2,just north of junction with Highway 11	6020	5	0	5	0.1

Source: Saskatchewan Ministry of Highways and Transportation 2007; Shore.

Note: Assumptions: Traffic originates from the following: Prince Albert (98 commuting vehicle trips per day); Melfort and Nipawin (24 commuting vehicle trips per day), and the six smaller communities along Highway 55 (8 vehicle trips from each town).

As in the operations phase, there will be no on-site camp during decommissioning to accommodate workers; all workers will commute to the site daily from resident communities in the SRSA. There will be no staggering of shifts during decommissioning. All 195 workers are estimated to be on-site for a 12-hour shift (7:00 a.m. to 7:00 p.m.) seven days a week. Thus, the highest volumes of Project-related traffic will occur around the 7:00 a.m. shift start and 7:00 p.m. shift end every day. At the point of mine closure, Project-related traffic will cease altogether.

In sum, decommissioning/closure phase Project effects on traffic are characterised as positive (decreased traffic compared to operations), local, long-term, and moderate. The overall beneficial effect rating is minor.

Rail

Regional rail infrastructure will be used during the decommissioning and closure phase of the Project for transporting certain large loads of equipment and modules out of the region. It is anticipated that during the 12 months of decommissioning there will be one to two rail

loads per week from the station at Choiceland. Such loads will be transported by truck from the site along the access road and east on Highway 55 to Choiceland, where they will be transferred to the Torch River Rail line for export from the region. Truck transport of large rail cargo to Choiceland will take place at night to avoid interruption of regular daily traffic. There will be an increased use of rail infrastructure as compared to the operations phase, and a similar level of use as anticipated in the construction phase. As the rail capacity may be upgraded during construction with the support of Shore specifically to meet the Shore's transportation needs, it is anticipated that it will continue to be well equipped to deal with Shore's transport needs during decommissioning and closure. As such, the Project effects on rail transportation during mine decommissioning and closure are characterized as neutral.

6.4.1.11 Housing

This Section examines potential effects of the Project on housing. It analyzes the extent to which the Project may have some direct or indirect influence on growth (a positive effect) or decline (an adverse effect) in the regional housing market. In most contexts, economic growth in a region typically stimulates the housing market. Indicators of housing market growth include increased home sales, increased housing starts, and upward-moving house and rental prices. In examining Project effects on housing, it is also important to assess the possibility for housing growth to be of such an extent that housing demand may outstrip (or out-pace) supply, causing issues associated with housing availability and affordability. In the context of this assessment, housing effects will be driven by anticipated population growth associated with the influx of workers from outside the SRSA, and Project-related decisions about providing or supporting certain accommodation options for non-resident workers at different stages of the Project.

Construction Phase

As discussed in Section 6.4.1-10, the number of workers required for the Project will vary through the five years of construction from 100 to 1000 workers. It is estimated that 60 % of the workers at any given time will be current residents of the SRSA commuting daily to and from the site (and thus with no need for incremental housing), and 40 % of the workers will be brought in from outside the SRSA (and thus will have a need for housing and potentially affect housing demand). On average, newcomers to the region would account for 1,340 person-years of direct employment over the five years of construction, or the equivalent of about 270 people.

Shore will have a work camp on site throughout the construction phase to provide accommodation for most of these non-SRSA resident workers. The work camp will be built in a modular fashion to allow for expansion and contraction to meet the changing size of the labour force during construction. Depending on the point during construction, the work

camp will have the ability to house from 200 to 600 workers. As previously discussed, it is unlikely that many non-resident workers would choose to permanently relocate to the SRSA during construction since much of the work is of a relatively short duration. The exception is expected to be the 15 professional and management staff who would oversee construction and who are anticipated to relocate to the SRSA and thus require housing outside the work camp.

Given that all but 15 non-resident workers will be provided on-site accommodation in the work-camp, minimal effects are anticipated on the housing market in the SRSA during construction. The effect of 15 families requiring housing in the SRSA during construction is within normal growth and varying population trends and will have little discernable impact on the housing market. As such, the Project effect on housing during the construction phase is characterized as positive (growth in the housing market), regional, short-term, and low. The overall beneficial effect rating is minor.

Operations Phase

As discussed in Section 6.4.1-10, it is estimated that Project operations will employ 730 people. Of these, 440 workers are estimated to be current residents of the SRSA and 290 would be non-residents brought into the region. It is assumed that 15 of the non-resident workers would have come during construction and would stay on through operations. Thus, the total non-resident workers (the incremental number requiring housing) during operations are estimated to be 275. There will be no work camp on-site during operations, and, as such, all 275 non-resident workers (including any that stayed on from the construction phase) will have to find accommodation in the regional housing market. While it is assumed that workers will come with their families and fit a range of demographic profiles (single, married, children etc.) as discussed in Section 5.14.10.2, for the purposes of analysis it assumed that each worker (with or without a family) will seek his or her own residence within the SRSA (as opposed to sharing residences).

Decisions about where people will choose to live in the SRSA are made on an individual level and may be affected by numerous personal preferences (i.e., price, distance from work and schools, access to amenities, aesthetics). Thus, residency decisions cannot be precisely predicted. However, some assumptions can be made to assist in analyzing how residency patterns and thus housing market effects may evolve in the context of this Project.

There is no large community located in close proximity to the mine site which would be the obvious choice for newcomers employed on the Project looking for residence. For the purposes of analysis, three assumptions are made:

- most workers will choose to reside in larger centres where they have access to a full suite of community and retail services;

- the longest distance that a worker would typically be willing to drive to work on a daily basis is 100 km in one direction; and
- any Aboriginal people moving back to the SRSA for employment would choose to move to one of the three larger SRSA communities (Prince Albert, Melfort and Nipawin) rather than move onto a reserve given apparent housing shortages on reserves in the SRSA.

The larger communities that are within approximately a 100 km drive of the mine site are: the City of Prince Albert (population of 34,148 and a 100 km drive to the site, based on 70 km distance to Shipman plus 30 km on the site access road); the Town of Nipawin (population 4,061, and a 96 km drive to the site); and City of Melfort (population 5,192, and a 103 km drive to the site). However, given that these cities/towns are all about 100 km away from the site, for the purposes of analysis this commuting distance is assumed to cause some workers to choose not to reside in these larger communities. This may also be supported by lower house prices in smaller communities. The Average Value of Dwellings in the SRSA 2001 and 2006 (See Section 5.4.1, Socio-Economic baseline) in 2006 was $121,816 in Prince Albert and $101,364 in Melfort, compared to $75,650 in SRSA Towns and $52,769 in SRSA Villages. Based on commuting distances and dwelling prices, it is assumed that some portion of the new residents may choose to reside in smaller villages and hamlets located between these larger centres and the site, primarily along Highway 55. These communities may include: Meath Park, Wierdale, Smeaton, Choiceland, Love and White Fox.[3] Thus, the pattern of residency associated with in-migrant workers is assumed to focus along the Highway 55 corridor between and including Prince Albert and Nipawin, with some choosing to reside in Melfort south from Highway 55 on Highway 6.

For the purposes of analysis, it is assumed that 75 % of the new or non-resident workers (206 workers) will choose to live in the larger centers of Prince Albert, Nipawin, or Melfort (with 67 % of those in Prince Albert (138 workers) and the remaining 33 % (68 workers) distributed equally between Melfort and Nipawin), and the remaining 25 % of workers (69 workers) will be evenly split between the six smaller communities located along Highway 55 (11 workers each). These are assumptions that will not be duplicated by actual behaviour, but they allow for the examination of level of effect that certain residency decisions could have on housing markets.

Table 6.4.1-21 examines how this pattern of residency by in-migrating operations workers would affect the housing markets in these communities. Based on the above assumptions, Prince Albert would attract 138 new households, Melfort and Nipawin would each attract 34 new households, each requiring housing. Based on available data, Prince Albert, Melfort

[3] The hamlets of Shipman (on Highway 55) and Gronlid (on Highway 6) are other communities located between the three larger centers and the mine site. However, no housing or population data is available on these communities that would assist in the assessing potential impacts on their housing markets. As such, they are not included in the analysis.

and Nipwain have the housing capacity to absorb this increased demand. In Prince Albert, a demand increase of this size represents 0.9 % of the current housing stock (based on most recent data) and 81% of the available private residences for sale on MLS listings (as of February 2012). Prince Albert's private rental market has a vacancy rate of 2.4 % based on 2,174 units, so could absorb part of the new housing demand (see Section 5.4.1). According to the MLS listings, Melfort and Nipawin also have capacity to absorb increased housing demand of 34 families, though, as smaller markets, this level of demand growth would stimulate proportionally greater growth in these housing markets. In Melfort, this level of demand growth would absorb over 43 % of resale housing supply based on current MLS listings. In Nipawin, this level of demand growth would absorb 89 % of resale housing supply. Melfort currently has a rental vacancy rate of zero, so there would be minimal rental options. The rental vacancy rate in Nipawin is unknown.

Thus to the degree that in-migrant workers choose to live in Prince Albert, Melfort and Nipawin, the operations phase will have a positive effect on these housing markets, increasing home sales and increasing housing values, and potentially influencing new home development. To the extent that more people choose to live in the significantly larger centre of Prince Albert over Melfort and Nipawin, the housing markets in Melfort and Nipawin would experience less growth. It is important to note that increasing housing values may not be perceived as a positive effect by lower or fixed income individuals/families, particularly those relying on rental accommodation. To the extent that rental housing prices may increase as a result of increased demand related to the Project, certain vulnerable populations may experience negative effects in terms of reduced housing accessibility or lack of financial means to cover the cost of housing.

Workers' decisions to reside in smaller communities along Highway 55 in order to reduce commuting time to the mine site would have a larger effect on the considerably smaller housing markets in these communities. As shown in Table 6.4.1-21, under the above residency assumptions, new housing demand as a percentage of MLS listings is very high in these smaller communities. Assuming 11 workers and their families seek housing in each of these communities, all of the available housing supply on the resale market would be absorbed and demand would outstrip supply. In these communities, new demand of 11 families as a percentage of available resale supply ranges from 157 % in Choiceland to 1100 % in Smeaton. Demand would outstrip supply very quickly, and very strong upward movement of prices would be anticipated. New housing starts or multi-family developments may be stimulated. According to the DDAC, the communities of Choiceland, White Fox, Meath Park, and Smeaton have new housing developments planned or underway; for example, Smeaton has a 12 lot sub-division to be opened in 2010 (DDAC, 2009). Such new housing developments would help meet the growing demand that may come during the operations phase of the Project. Feedback from stakeholders during Project workshops indicated that any new families would be welcomed in smaller communities, as many

smaller areas are looking to attract newcomers (Shore, 2010). Any inability for supply to meet demand in these smaller communities will likely push more workers to live in the larger centres, until these smaller housing markets grow and supply develops.

Table 6.4.1-21: Potential Operations-Related Housing Demand in Key SRSA Communities

Community	Potential new Residency, no. of families	Total Population (2011)	Number of dwellings (2011)	New housing demand as % of current dwellings	MLS listings (Feb 2012)	New housing demand as % of MLS listings	Driving distance from site (km)
Prince Albert	138	35129	14779	0.9	171	80.7	100
Melfort	34	5576	2464	1.4	78	43.6	96
Nipawin	34	4265	2014	1.7	38	89.5	103
Meath Park	11	205	87	12.6	5	220	56
Weirdale	11	75	36	30.5	na	na	48
Smeaton	11	181	82	13.4	1	1100	41
Choiceland	11	381	210	5.2	7	157.1	63
Love	11	65	35	31.4	2	550	84
White Fox	11	364	183	6.0	6	183.3	90

Source: Statistics Canada 2012; MLS 2012.

To the extent certain employees find a nearly 100 km commute to work untenable, there may be housing shortage issues associated with the small nature of the communities located nearer to the site along Highway 55. This may also lead to workers using temporary accommodation options in areas along Highway 55, such as motels and campgrounds. For example, Choiceland has an eight room motel as well as a bread and breakfast outside of town; White Fox has a two unit bed and breakfast and an eight unit campground; Weirdale has a three unit bed and breakfast and a four unit campground, plus an unserviced area to park twenty or more large rigs; Meath Park has a two unit motel that can accommodate up to six people; and Smeaton has a 12 unit hotel, as well as two nearby campgrounds and a bed and breakfast (DDAC 2009). An increased demand for temporary accommodations will likely be perceived as a positive economic effect for their operators and managers, as was indicated during the interest workshop (Shore 2010).

Also, the demand for housing in Prince Albert, Nipawin, Melfort and the smaller communities along Highway 55 may experience further increases (beyond that associated specifically with in-migrant workers) due to residents currently living in other parts of the SRSA that are at a driving distance untenable for daily commuting to the mine, who choose to relocate. There are many other communities in the SRSA that, because of the configuration of the

regional road network and the main point of entry to the mine site from Highway 55, would likely find daily commutes to the mine site prohibitively long. Moving to one of the above-mentioned communities would make mine employment opportunities accessible. To the extent that this happens, the growth in housing markets in the Highway 55 corridor communities and Melfort area may increase.

In summary, strong growth in housing markets is anticipated in a focused area within the SRSA during operations. Given commuting distances to other parts of the SRSA, in-migrant workers are anticipated to take residency in communities along the Highway 55 corridor between and including Prince Albert and Nipawin, with some also choosing to reside in Melfort south on Highway 6. Growth in the housing markets in these communities may be further stimulated by current residents of the SRSA moving to these communities to reduce their own commuting times. Nipawin, Melfort and particularly Prince Albert have housing supplies to absorb most of the demand brought by new workers. Smaller communities along Highway 55 do not. To the extent that some employees do not want to commute about 100 km daily to the larger centres with available housing supply, in the absence of mitigation this may lead to short to medium term lack of housing capacity in smaller communities along Highway 55 until the housing market responds. Also, growth in housing markets in some communities due to increased demand may lead to price pressure for vulnerable populations, such as those with fixed or lower incomes.

To address potential issues with housing, Shore will monitor regional housing supply, particularly in the Prince Albert, Melfort, and Nipawin markets and along the Highway 55 corridor, during the planning and construction phase of the Project and in advance of operations employment. Shore will engage in regular discussions with municipal land use and planning officials in these communities to understand the anticipated evolution of their resale and new-home markets, and the extent to which a given community desires growth or does not. Shore will research and provide local housing market information to workers as part of their hiring and pre-employment process, to ensure that workers are aware of housing options open to them. Shore will develop suitable policies and initiatives to encourage car-pooling amongst employees, with the aim of reducing commuter-related traffic and reducing the individual burden of commuting. To the extent that housing supply and commuting distances emerge as an issue during the planning, recruitment and hiring process for operations, Shore will explore alternate accommodation strategies to support its employees.

Assuming the successful implementation of such mitigation measures, and considering the potential for adverse housing price effects on vulnerable populations, the operations phase Project effects on housing are characterized as positive (growth in housing market), regional, long-term and moderate. The overall beneficial effect rating is moderate.

Closure and Decommissioning Phase

During closure and decommissioning the number of employees working on site would decline from 730 to 195 per year over the three-year decommissioning period. These workers would be employed for a 12-month period. As discussed in Section 6.4.1.10 (Transportation), the effects of mine decommissioning and closure would result in some of the families leaving the region, some households remaining but with the wage earners leaving the region to find work, and some workers and their families continuing to reside in the region and finding alternate employment. The number of families that leave or stay will ultimately depend on other economic development that occurs in the region over the next 20 years. The effects on the housing market will depend on such individual decisions about whether to stay in or leave the region, and as such cannot be precisely predicted. To the extent some proportion of workers leave the region, the housing demand would decline and an adverse effect on the housing markets would be anticipated. To the extent that adverse population effects are effectively managed through a mine closure plan, the effects on housing during this phase are characterized as adverse, long-term, regional, of low magnitude and consequently not significant.

6.4.1.12 Regional Services

This Section examines potential Project effects on regional government services, such as education, health care, social services and emergency services. Potential effects on services are driven by several factors: population effects and residency decisions, and the extent to which direct or indirect population growth in certain communities may place pressure on services; direct Project needs in relation to emergency response and medical services for workers; and the potential for increased employment income and the presence of work camps to increase the propensity for alcohol and drug use and crime in communities around the Project site (and thereby increases in the occurrence of issues and cases that require a service response). Increased pressure on services is generally understood to be an adverse or undesirable effect, while reducing pressure on services is seen as a positive effect.

Construction Phase

As discussed in Section 6.4.1-10, the number of workers required for the Project will vary through the five years of construction from 100 to 1000 workers. It is estimated that 60 % of the workers at any given time will be current residents of the SRSA commuting daily to and from the site (and thus are part of the population already accessing services), and 40 % of the workers will be brought in from outside the SRSA (and thus could influence demand for regional services). On average, newcomers to the region would account for 1,340 person-years of direct employment over the five years of construction, or the equivalent of about 270 people.

As discussed previously, Shore will have a work camp on site throughout construction to provide accommodation for most non-SRSA resident workers. The construction camp will include recreation facilities, such as a games room and exercise equipment, and 24-hour emergency medical services will be available on site. It is unlikely that many non-resident workers would choose to permanently relocate to the SRSA during construction, the exception being the 15 professional/management staff who would oversee construction and who are anticipated to relocate to the SRSA and become part of the demand base for regional services. Accordingly, minimal effects are anticipated on the government services market in the SRSA during construction. The effect of 15 families relocating in the SRSA during construction will equate with a population effect of an additional 35 people residing in the region. As with the housing analysis, this is considered within normal growth and varying population trends.

There is some potential for increased demand on health care and emergency services to the extent these services are not provided directly in the work-camps for construction employees. However, Shore will provide on-site emergency response equipment and a nurse at all times to deal with worker injuries or illness, in accordance with regulations. In the unusual scenario of worker injury or illness which extends beyond on-site medical capability, the injured person would be transported to a health centre in the region, likely in Choiceland or Prince Albert. As outlined in Section 7.0, Shore will work collaboratively with local emergency response officials to update its Emergency Response Plan.

Cash injections to the regional economy due to Project-related direct and indirect employment can have both positive and negative effects, and depend on choices made at the individual level. People with newly-acquired disposable income may make spending choices that improve their quality of life and standard of living, or they may make spending choices that have negative consequences. There is a common correlation between cash injections in a local economy and short-term increased use of drugs and alcohol and crimes and/or violence, particularly in areas that experience a large or unprecedented economic boom. To the extent that this may happen in the SRSA during construction, there may be increased access to and use of drugs and alcohol and a higher incidence of drug and alcohol-related crimes, violence and traffic violations. This type of behaviour may increase the burden on certain health and social services that deal with drug and alcohol-related issues (i.e. addictions services and outpatient rehabilitation) as well as the RCMP and child and family services that may deal with the social issues associated with drug and alcohol-related family dysfunction (i.e. violent crime, children in care referrals).

At the time of exploration, during which 100-150 workers were residing in an on-site work camp, a person at the Nipawin office of the Ministry of Social Services indicated anecdotally that the office experienced a noticeable increase in referrals for child protection and that this was likely due to more income leading to alcohol abuse in the region. Most involved a

referral for addictions services (Saskatchewan Ministry of Social Services 2010). Note that socio-economic changes were occurring in the SRSA at that time, including the closure of the Weyerhaeuser pulp mill, which may have contributed to this perception.

Potential effects on services associated with lifestyle choices are uncertain and will depend on individual choices. While they cannot be managed by Shore, Shore will take active steps to influence worker behaviour, monitor the occurrence of social issues in the SRSA that may be attributed in some degree to the Project (or the perception of such issues), and work collaboratively with local service providers on indentifying and supporting appropriate government-led solutions. Shore will encourage participation in recreational programs for its work-camp residents. This will include an on-site gym, games room, and other organized leisure pursuits. For example, Shore may also work with local recreation groups to provide workers with other recreational opportunities at local facilities and outdoor destinations in the SRSA. Shore will also work to develop a range of policies and programs for employees aimed at influencing workers' behaviour, which may include financial management and work-life balance seminars, behaviour protocols for employees as part of site orientation (including policies respecting off-duty illicit drug use, zero-tolerance for impaired driving, and interacting with the local community). Should effect concerns or perceptions arise, Shore will initiate discussions with local service providers (local RCMP detachments, the Kelsey Trail and Prince Albert Parkland Regional Health Authorities, and the local offices of the Ministry of Social Services), aimed at gathering information about social issues that may emerge or be exacerbated in the SRSA during the timeframe of the Project; this could involve collaborative selection of indicators that could be used to track such issues.

To the extent that these mitigation measures are successfully implemented, the construction-phase Project effects on regional services are characterized as adverse, regional, short term, low and consequently are not significant.

Operations Phase

As previously discussed, it is anticipated that the operations phase of the Project will result in 290 workers and their families moving to the SRSA. Based on the current demographic breakdown of the SRSA (and assuming it would remain relatively the same) a total population increase to the SRSA of 725 people is expected. This would increase the population of the SRSA by about 1 %, a low population growth impact across the SRSA as a whole. As previously discussed, there will be no camp during operations and all newcomers to the region will be responsible for finding their own housing in SRSA communities. It is assumed that newcomers will choose to live in either the three larger centres within a 100 km drive of the site (Prince Albert, Nipawin, Melfort) or the smaller towns or villages located within a closer daily commute to the site along Highway 55 (Meath Park, Wierdale, Smeaton, Choiceland, Love, or White Fox). To the extent that a majority of workers choose to live in the larger centres, effects on government services will be smaller as the larger

centres have greater general capacity and availability of resources. Discussions with officials in the education system have indicated that many of schools in the SRSA are under capacity and could absorb extra students. Local representatives have indicated that many communities are eager to expand services required to accommodate additional demands (Appendix 4-B, 4-C and 4-F). Both health authorities active in the SRSA (Kelsey Trail Regional Health Authority and Prince Albert Parkland Regional Health Authority have indicated that recruitment and retention of doctors and support staff has been an on-going issue in their respective service areas (Kelsey Trail Regional Health Authority 2010a; Prince Albert Parkland Regional Health Authority 2010). Retention of doctors was noted as a particular issue for Nipawin; however recent recruitment efforts have been successful (Shore 2010).

Potential issues discussed in the context of the construction phase related to income-related drug and alcohol use/crime and effects on RCMP, addictions services, child and family services could continue into operations and may increase, as a greater population influx into the SRSA is anticipated during operations. However, these effects tend to attenuate as people adjust to higher incomes. Further, discussions with a local service agency has indicated that that the influx of workers' spouses to the area anticipated during the operations phase may increase the pool of potential employees available to them and to help address staff retention issues faced by certain government service organizations (Saskatchewan Ministry of Social Services 2010).

During the operations phase, Shore will continue the previously-discussed efforts at working with local service agencies to gather information about social issues or service capacity issues in a collaborative manner. Shore will also continue its policies and procedures related to worker behaviour.

To the extent that mitigation is effectively implemented, the operations phase Project effects on regional services are characterized as: adverse (increased pressure), regional, long-term, low and consequently are not significant.

Closure and Decommissioning Phase

During the closure and decommissioning phase, effects on regional services will depend on decisions made by workers about whether to stay or leave the area. To the extent that some proportion of workers leaves the region, demand on regional services would decline. However, to the extent that spouses of mine workers have become part of the labour pool, this could result in staffing issues for certain service providers. Overall, and assuming mitigation of out-migration issues through the Mine Closure Plan, the Project effects on regional services during closure and decommissioning are characterized as positive (reduced pressure), regional, long-term, and low. The overall effect rating is minor.

6.4.1.13 Regional Infrastructure

This Section examines potential Project effects on physical regional infrastructure, such as power and gas utilities, water/sewerage/waste infrastructure, and telecommunications. Project effects on this infrastructure are driven by direct Project needs in terms of power, water, and waste management. They are also driven by population effects and the extent to which existing infrastructure can meet the general needs of population growth in key communities in the SRSA that may be associated with the Project.

Construction Phase

New power and gas supply infrastructure is required during construction to meet the needs of the Project. Shore estimates the Project will require nominal loads of 97 megawatts (MW) during construction and pre-stripping and up to and 106 MW for production. . During the exploration phase, electricity to the site and work camp were provided by two diesel generators, however, a new transmission line to connect the site to the provincial grid will be developed during construction. The transmission line, and associated distribution lines, to the Shore site is considered an ancillary project from a regulatory perspective and subject to its own assessment and approval process. With the development of the new transmission/distribution lines, there will be an improvement in power infrastructure in the local area around the site as the result of the construction of the Project.

A new gas pipeline will be built during construction. The new pipeline will be developed by TransGas, a Crown corporation. A new 10 cm (four inch) branch line will be constructed from a TransGas trunk link that parallels Highway 55 near Shipman and routed south the Project via the access corridor. As such, there will be an improvement in gas supply infrastructure in the SRSA as a result of the construction of the Project.

Site telecommunications will be provided to the site via a high speed fibre optic link from Highway 55 near Shipman. This will result in an improvement to the telecommunications infrastructure in the SRSA as a result of the construction of the Project.

All water and wastewater requirements will be met on-site and not rely on any municipal water supply or infrastructure within the SRSA. Potable water requirements for the construction phase and the on-site work camp will be sourced from shallow dewatering wells and treated prior to distribution and use. Sewage will be managed through a sewage lagoon on-site, and discharged to the environment according to applicable environmental guidelines. As such, no impact is anticipated on local or regional water supply/facilities or waste water facilities as a result of the construction of the Project.

Waste from construction activities would include brush from land clearing and general inert and industrial wastes associated with heavy industrial construction. Inert industrial wastes such as usable scrap metal, wood and other construction debris would be shipped off-site

for recycling or to a waste handling facility. Hazardous waste will be disposed of appropriately off-site. Shore will continue the waste removal practices as established during the exploration phase for the construction phase, whereby most inert waste will be delivered to the landfill in Prince Albert. The Prince Albert landfill appears to have the capacity to accommodate wastes associated with the Project, as it has the capacity to take the projected municipal waste and 50 % of regional waste for a period of 100 years (Clifton Associates 2002). Shore will communicate regularly with the operators of any waste facilities within the SRSA to monitor any emerging service constraints.

Given the previously-discussed low general population growth scenario anticipated for the construction phase of the Project (i.e. only 15 families relocating to the SRSA), there are no effects anticipated on the general capacity of regional services to meet the needs of their customer base.

Overall, the construction phase Project effects on regional services are characterized as neutral/positive, local (focused on the Project site), long-term (some permanent improvements), and low. The overall effect rating is minor.

Operations Phase

No additional power, gas or telecommunications infrastructure will be added to the site during the operations phase, thus no further impacts are anticipated on this type of infrastructure.

Municipal water supplies will not be used for mine processes during operation. Process water requirements for mine operations will be from pit dewatering or from surface run-off collection. Potable water requirements for the operations phase will be sourced from shallow dewatering wells and treated prior to distribution, as during construction. No other water withdrawals will be required.

General inert industrial wastes from the mining process may include small quantities of scrap metal, cardboard, paper, glass, metal, plastic and Styrofoam containers, and scrap wood. All combustible wastes generated in the secure areas will be incinerated. Other, non combustible wastes generated within the secure area will be stockpiled on site and removed periodically. A certain amount of hazardous wastes would also be produced including oil filters, batteries, and contaminated soil from industrial spills. While hazardous wastes will be recycled to the extent possible, all remaining waste will be collected in a contained area and then shipped of-site to an approved location. During operations, Shore will continue to communicate regularly with the operators of waste management facilities within the SRSA to monitor any emerging service constraints.

The incremental general population increase anticipated during operations related to non-resident workers and their families relocating to Prince Albert, Nipawin, Melfort or smaller Highway 55 corridor communities is not anticipated to have a noticeable effect on the capacity of regional infrastructure. No existing constraints related to the provision of utilities, water/wastewater, or solid waste management services have been identified within the SRSA.

Overall, the operations-phase Project effects on regional services are characterized as adverse (some increase in demand), regional, long-term, low and consequently is not significant.

Closure and Decommissioning Phase

During the decommissioning and closure phase, all water requirements will continue to be sourced on site and no use of municipal water infrastructure is anticipated.

The decommissioning phase will see an increase in the amount of wastes and tear-down material requiring removal from the site. All industrial wastes that cannot be returned to suppliers will be removed from site for disposal. Shore will continue to work collaboratively with operators of waste facilities within the SRSA to determine any regional options for waste disposal. If there are any constraints with accepting select mine waste streams at facilities within the SRSA, Shore will identify appropriate disposal facilities outside the SRSA to which waste will be transported.

To the extent there is some degree of population decline during the decommissioning and closure phase related to reduction and ultimately absence of mine-related employment, a general reduction on the pressure of certain regional infrastructure is anticipated.

Overall, the Project effects on regional infrastructure during this phase of the Project are positive (declining pressure on services), regional, long-term, and low. The overall effect rating is minor.

6.4.1.14 Family and Community Well-Being

This Section examines potential Project effects on overall family and community well-being and quality of life in the SRSA. Such effects are mostly indirect, difficult to predict, and can only be examined in a qualitative manner. Potential effects are also inherently personal; different people within the same community may experience and perceive Project-related dynamics differently. However, this discussion attempts to identify some broad potential pathways related to the Project that could make a difference in how current residents of the SRSA live and perceive the quality of their lives, many of which have been touched upon in previous Sections. This Section should be read in concert with Section 6.4.5, Human Health.

Overall, through the various stages of the Project, the potential effects on the sense of well-being and quality of life will be dynamic, affected by various factors, and will vary from person to person and community to community. Due to this, effect characterizations will not be described in this Section. However, an awareness of how the Project may directly or indirectly effect communities and their experiences and perceptions of quality of life and sense of well-being is important. Such issues will be monitored and managed through the measures described in previous Sections and summarized again in Section 6.4.1.15, Mitigation and Monitoring.

Construction Phase

Project dynamics during construction that could affect the overall sense of community and family well-being include employment income, traffic, and access to health, education and public services.

Increased levels of local employment through direct and indirect Project opportunities, and associated increases in employment income, will likely have a positive effect on the perception of well-being for SRSA residents. New employment opportunities and associated income will result in increased spending power for employed individuals and allow people to make purchasing decisions that will enhance their quality of life. Income and employment conditions are commonly understood to be important determinants of health and well-being.

There may be some indirect effects associated with increased employment income, as described above within the context of the provision of regional services, which could have coincident adverse effects for some people. Access to greater income may, for some individuals, result in an increased use of alcohol and drugs and a corresponding increase in certain crimes often associated with alcohol and drugs (i.e. violent crime, impaired driving, sexual assaults). It may also play a role in some degree of family breakdown in certain situations. This may occur for current residents of the SRSA in their home communities who are travelling to the site daily for work. It may also be exacerbated by in-migrant workers living in the on-site work camp, who choose to spend time during their off-shift rotations in local communities rather than returning to their home communities outside the SRSA. If this occurs, there also may be general nuisance and disturbance issues.

Increased traffic volumes on certain roads in the SRSA are anticipated during the construction period. As discussed, traffic volumes are related to daily equipment/material-related deliveries to the site as well as local workers commuting to and from the site. During construction, effects on traffic, while short-term, are expected to be moderate and not significant. While RCMP have indicated that the current low traffic volumes on local roads would result in no anticipated traffic congestion or management issues, increased traffic volumes of even a moderate degree may result in concerns around noise, road safety, and

general disturbance issues for certain smaller communities in the SRSA particularly along Highway 55.

As previously discussed, there are no anticipated issues associated with changing access to health, education or public services in the context of the construction of this Project; therefore effects on quality of life associated changing level of services are not anticipated.

Operations Phase

Incremental population growth anticipated during the operations phase (as compared to the construction phase) and all workers having to find housing within SRSA communities, is anticipated to drive growth in the housing markets of SRSA communities located within about 100 km of the Project site. Communities that are anticipated to experience growth in housing markets include Prince Albert, Nipawin, Melfort and the smaller towns/villages along Highway 55 between Prince Albert and Nipawin. Such growth will drive increased housing values, which will likely be perceived as positive for current residents as it will result in increased home equity for current homeowners.

To the extent that certain workers will not want to commute about 100 km to work daily (and thus may not want to reside in Prince Albert, Nipawin or Melfort), the housing markets of the smaller communities along Highway 55 may be stressed by demand. These communities may experience issues if transient workers choose to reside in local temporary accommodations (i.e. motels, campgrounds, parking their personal trailers). Transient populations are not necessarily negative as they support local businesses, but may be perceived as such to current residents, particularly if there are issues associated with drug and alcohol use or other disruptive behavior. These smaller communities will also experience increases in traffic during operations, which in combination could exacerbate concerns about noise and unwanted changes to their existing way of life. However, during the interest workshop, stakeholders indicated that increased traffic may be perceived as a positive effect, as it could stimulate business in communities along travelled highways (such as Highway 55) (Shore 2010).

Closure and Decommissioning Phase

As discussed, the decision to remain in or leave the SRSA upon mine closure and decommissioning is a personal one and will be driven by the range and pace of other economic developments that occur in the region over the next twenty years. However, decommissioning and closure of the Project will result in a loss of jobs for the region and may bring some degree of population decline to the region as a result. Overall quality of life may be affected for those who lose their jobs as a result of mine closure and there may be stress and emotional health issues for some people related to worries about job loss. While socio-economic issues associated with decommissioning and closure will be dealt with

through the Mine Closure Plan, to the extent there is population decline there may be contraction in the housing market as demand lessens, which may result in declining house values. However, mine decommissioning and closure will reduce quality of life concerns associated with Project-related traffic and associated noise/road safety concerns.

6.4.1.15 Mitigation and Monitoring

This Section summarizes the socio-economic mitigation and enhancement measures that have both been built into the design and planning decisions of the Project and that will also be applied as management measures to further respond to potential socio-economic effects.

Construction Phase

Mitigations and enhancement measures for the construction phase are described below.

Economy and Employment

General measures that will be used by Shore to enhance the potential beneficial economic effects during construction include:

- working with local training institutions to identify training that can be provided locally, as well as targeting specific areas outside of the FalC area for recruitment for positions which require specialized technical skills;
- developing a workforce representative of the geographic areas in which Shore operates, including communities and cultural groups, such as First Nations and Métis, surrounding the Project. It is Shore's intention to optimize local employment where practical;
- building relationships with local suppliers and businesses to obtain quality, competitively priced goods and services in a timely fashion;
- working with training institutions in the FalC area to determine what training programs would best meet the needs of the Project, with a focus on training local workers and members of local First Nations and Métis groups;
- operating a dedicated training department responsible for all on-site training required to assist employees in safely and efficiently performing their roles;
- continuing to participate as a board member to the Northern Career Quest, Aboriginal Skills and Employment Program; and
- continuing to honour responsibilities associated with being a signatory to the FalC Employment Partnership whereby the parties agree that Aboriginal persons are significantly under-represented in the provincial workforce and that efforts on the part of all of the partners are needed to facilitate a representative workforce, where Aboriginal people are employed in all classifications in proportion to their representation in the working age population.

Transportation

Shore's mitigation and management measures for transportation effects during construction include:

- operating a work-camp on site during construction to house non-resident workers; this will also reduce traffic volumes on the road associated with commuting. Camp workers will rotate on a two-week-in and two-week-out basis;
- implementing staggered daily shifts and bi-weekly camp rotations to prevent bottlenecks on site and on Highway 55 during shift changes. Shift changes and camp rotations will be staggered into four movement times per day. This will reduce daily commuting vehicles on the road by 75 % at any given point of the day;
- participating in discussions with the Ministry of Highways and Infrastructure about potential need for right and left turning lanes from Highway 55 onto the Shipman access road to decrease potential for vehicle collisions during peak commuting hours;
- transporting large loads by rail to avoid large load trucks interfering with traffic on regional highways;
- delivering rail cargo to an unloading station in Choiceland and then to the site via truck. Rail cargo truck transfers will be done at night to avoid interfering with regular daily traffic;
- participating in the possible upgrade of the rail station at Choiceland, so that its capacity is enhanced to deal with large load cargo, storage, and transfers;
- encouraging carpooling among its workers and develop policies around adhering to speed limits and general road safety principles;
- maintaining regular communication with the Nipawin RCMP detachment during all Project phases to discuss any emerging traffic-related issues, particularly along Highway 55. Shore will work collaboratively with RCMP officials to find mutually agreeable solutions if concerns arise;
- working with the RCMP and local municipal officials to develop an appropriate communications strategy by which Shore will advise the RCMP and municipalities of their anticipated equipment/material delivery schedules at appropriate time intervals including anticipated volumes of truck traffic; and
- engaging in discussions with the Ministry of Highways and Infrastructure, as required, about any emerging road condition or maintenance issues, or perceived issues, associated with Project-related traffic volumes, particularly as they relate to hazardous loads and heavy loads moving through the City of Prince Albert.

Housing

Shore's mitigation and management measures for housing effects during construction include:

- providing a work camp on-site during construction to accommodate non-resident workers. Camp workers will rotate on a two-week-in and two-week-out basis.

Regional Services

Shore's mitigation and management measures for regional services effects during construction include:

- working collaboratively with local emergency response officials to update its Emergency Response Plan;
- providing on-site dedicated health and medical services, commensurate with the size and needs of the population living in the work camp and workers on-site, equipped to deal with all reasonably-anticipated and routine worker injuries or illness;
- working with the Prince Albert Parkland Regional Health Authority to develop a suitable worker transfer arrangement with the Victoria Hospital in the unlikely event of a worker illness/injury beyond their on-site capacity;
- endeavouring to develop a range of recreational programs for its work-camp residents, both on and off-site. This will include on-site gym, games rooms, and other organized leisure pursuits. Shore may also work with local recreation groups to provide workers with other recreational opportunities at local facilities and outdoor destinations in the SRSA;
- working to develop a range of policies and programs for employees aimed at influencing workers' behaviour, which may include: financial management, and work-life balance seminars, behaviour protocols for employees as part of site orientation (including policies respecting off-duty illicit drug use, zero-tolerance for impaired driving, and interacting with the local community); and
- initiating discussions with local service providers (local RCMP detachments, the Kelsey Trail and Prince Albert Parkland Health Authorities, and the local offices of the Ministry of Social Services), aimed at gathering information about social issues that may emerge or be exacerbated in the SRSA during the timeframe of the Project; this could involve collaborative selection of indicators that could be used to track such issues. Such local service providers may include: local RCMP detachments, the Kelsey Trail and Prince Albert Parkland Health Authorities, and the local offices of the Ministry of Social Services. Social indicators that may be monitored could include: concerns about traffic safety and road conditions, concerns about local service provision and quality of life, including health and social conditions such as traffic violations, drug/alcohol and violent

crimes, injuries, infectious disease, addiction services caseloads, children-in-care caseloads, and service provider perceptions of social issues.

Regional Infrastructure

Shore's mitigation and management measures for regional infrastructure effects during construction include:

- communicating regularly with the operators of any waste facilities within the SRSA to monitor any emerging service constraints.

Operations Phase

Mitigations and enhancement measures for the operations phase are described below.

Economy and Employment

During operations, Shore will continue to implement the same mitigation and management measures pertaining to economic and employment effects as during construction as described above.

Transportation

Shore's mitigation and management measures for transportation effects during operations include:

- developing suitable policies and initiatives to encourage car-pooling amongst employees, with the aim of reducing commuter-related traffic and reducing the individual burden of commuting; and
- exploring the possibility of bus services into the mine site for tourists from designated places within the SRSA in order to reduce tourist-related traffic on key SRSA arteries and in the FalC.

Housing

Shore's mitigation and management measures for housing effects during operations include:

- monitoring regional housing supply, particularly in the Prince Albert, Melfort, and Nipawin markets and along the Highway 55 corridor, during the planning and construction phase of the Project and in advance of operations employment;
- engaging in regular discussions with municipal land use and planning officials in these communities to understand the anticipated evolution of their resale and new-home markets, and the extent to which a given community desires growth or does not;

- researching and providing local housing market information to workers as part of their hiring and pre-employment process, to ensure that workers are aware of housing options open to them; and
- developing alternate accommodation strategies to support its employees, if housing supply and commuting distances emerge as an issue during the planning, recruitment and hiring process for operations.

Regional Services

Shore's mitigation and management measures for regional services effects during operations include:

- continuing the previously-discussed efforts at working with local service agencies to gather information about social issues or service capacity issues in a collaborative manner. Shore will also continue; and
- continuing implementation of its policies and procedures related to worker behaviour.

Regional Infrastructure

Shore's mitigation and management measures for regional infrastructure effects during operations include:

- continuing to communicate regularly with the operators of waste management facilities within the SRSA to monitor any emerging service constraints.

Closure and Decommissioning Phase

Mitigation of a range of potential socio-economic effects associated with mine closure and decommissioning (workforce adjustment, population decline, contraction in housing markets) would be dealt with in an integrated manner and in conjunction with other parties such as governments, due to the interconnectedness of many issues and the interplay with more macro-level and future economic forces that are beyond Shore's control. Although mine closure is inevitable, this is expected to occur more than 20 years in the future, which allows plenty of time for Shore to develop and implement various strategies that would optimize the effects of closure. Shore will take a "planning for closure" approach to its operations, and will follow the principles inherent in this approach such as:

- communication and engagement with stakeholders and First Nations and Métis to ensure that the interests of all potentially-affected parties are considered in mine closure plans;
- establishment of a set of indicators that can be used to assess the successful completion of the closure process; and

- regular and critical review of closure planning to ensure that the plan reflects changing circumstances.

While it is not possible at this time to establish a list of specific mitigation and management actions that would ultimately prove to be effective 20 years or more in the future, Shore is committed to working with the affected communities and government agencies to develop (and regularly revise) a Mine Closure Plan that includes a strategy for managing the effects on the Project workforce. Elements of the plan could include such things as the continuation of skills upgrading to workers to provide them with the capacity to find other non-mining jobs after mine closure, assisting in the development of new economic development/ diversification plans within the SRSA, working with other regional employers to help find new jobs for mine employees, and surveying workers to better understand whether they intend to stay in, or would like to leave the SRSA.

One of the initial steps in developing the Mine Closure Plan will be to work with the communities to identify their desired post closure outcomes and to establish a set of indicators that will be used to guide the evolution of the plan.

6.4.1.16 Residual Effects

This Section summarizes the anticipated social and economic effects of the Project through its different phases, assuming the successful implementation of the outlined mitigation and monitoring measures.

Construction Phase

Table 6.4.1-22 summarizes the residual socio-economic effects anticipated during the construction phase of the Project.

Table 6.4.1-22: Summary of Residual Socio-Economic Effects during Construction

		All Effects			Positive Effects	Adverse Effects
Effect Overview	**Direction**	**Geographic Extent**	**Duration**	**Magnitude**	**Overall Effect Rating**	**Significance**
Provincial Economy- Capital spending leading to provincial economic growth	Positive	Provincial	Short-term	High	Major	n/a
Saskatchewan Government Revenues -	Positive	Provincial	Short-term	High	Major	n/a

		All Effects			Positive Effects	Adverse Effects
Effect Overview	**Direction**	**Geographic Extent**	**Duration**	**Magnitude**	**Overall Effect Rating**	**Significance**
Generation of provincial tax revenues (through taxes on earnings, products, production)						
Regional Employment and Income- Through direct and indirect employment	Positive	Regional	Short-term	High	Major	n/a
Regional Demographics- Growth in population through in-migration for employment	Positive	Regional	Short-term	Low	Minor	n/a
Transportation – Road Traffic- Increased road traffic due to equipment/material delivery, commuter traffic, and small general population increase	Adverse	Local	Short-term	Moderate	n/a	Not significant
Transportation – Road Infrastructure- Improved road infrastructure through development of access road	Positive	Local	Long-term	Low	Minor	n/a
Transportation – Rail- Improved capacity of Choiceland Rail station	Positive	Local	Long-term	Moderate	Minor	n/a
Housing- Growth of housing	Positive	Regional	Short-term	Low	Minor	n/a

		All Effects			Positive Effects	Adverse Effects
Effect Overview	**Direction**	**Geographic Extent**	**Duration**	**Magnitude**	**Overall Effect Rating**	**Significance**
market due to increased demand						
Regional Services – increased pressure on services due to direct Project requirements and population growth	Adverse	Regional	Short-term	Low	n/a	Not significant
Regional Infrastructure- New infrastructure developed to support Project requirements	Neutral to positive	Local	Long-term	Low	Minor	n/a

Operations Phase

Table 6.4.1-23 summaries the residual socio-economic effects anticipated during the operations phase of the Project.

Table 6.4.1-23: Summary of Residual Socio-Economic Effects during Operations

		Positive and Adverse Effects			Positive Effects	Adverse Effect
Effect	**Direction**	**Geographic Extent**	**Duration**	**Magnitude**	**Overall Effect Rating**	**Significance**
Provincial Economy- Capital spending leading to provincial economic growth (GDP growth, jobs, and income)	Positive	Provincial	Long-term	Moderate	Major	n/a
Saskatchewan Government Revenues- Generation of provincial tax	Positive	Provincial	Long-term	High	Major	n/a

		Positive and Adverse Effects			Positive Effects	Adverse Effect
Effect	**Direction**	**Geographic Extent**	**Duration**	**Magnitude**	**Overall Effect Rating**	**Significance**
revenues (through taxes on earnings, products, production)						
Regional Employment and Income- Generation of direct and indirect employment	Positive	Regional	Long-term	High	Major	n/a
Regional Demographics- Growth in population through in-migration for employment	Positive	Regional	Long-term	Low	Minor	n/a
Transportation – Road Traffic- Increased road traffic due to equipment/material delivery, commuter traffic, and general population increase	Adverse	Local	Long-term	Moderate	n/a	Not significant
Housing- Growth of housing market due to increased demand	Positive	Regional	Long-term	Moderate	Moderate	n/a
Regional Services – increased pressure on services due to direct Project requirements and population growth	Adverse	Regional	Long-term	Low	n/a	Not significant
Regional Infrastructure- Increased use of/pressure on	Adverse	Regional	Long-term	Low	n/a	Not significant

		Positive and Adverse Effects			Positive Effects	Adverse Effect
Effect	**Direction**	**Geographic Extent**	**Duration**	**Magnitude**	**Overall Effect Rating**	**Significance**
regional services for Project needs and/or due to growing regional population						

Closure and Decommissioning Phase

Table 6.4.1-24 summaries the residual socio-economic effects anticipated during the closure and decommissioning phase of the Project.

Table 6.4.1-24: Summary of Residual Socio-Economic Effects During Decommissioning and Closure

		Positive and Adverse Effects			Positive Effects	If Adverse Effect
Effect	**Direction**	**Geographic Extent**	**Duration**	**Magnitude**	**Overall Effects Rating**	**Significance**
Provincial Economy during decommissioning - Capital spending leading to provincial growth (GDP growth, jobs, and income)	Positive	Provincial	Short-term	Low	Minor	n/a
Provincial Economy during closure- Ceasing of capital spending, loss of jobs.	Adverse	Local	Long-term	Low to moderate	n/a	Not significant
Saskatchewan Government Revenues during decommissioning- Generation of provincial tax revenues (through taxes on earnings,	Positive	Provincial	Short-term	Low	Minor	n/a

		Positive and Adverse Effects			Positive Effects	If Adverse Effect
Effect	**Direction**	**Geographic Extent**	**Duration**	**Magnitude**	**Overall Effects Rating**	**Significance**
products, production)						
Saskatchewan Government Revenues during closure- Loss of tax revenues.	Adverse	Provincial	Long-term	High	n/a	Significant
Regional Employment and Income during decommissioning- Through direct and indirect employment	Positive	Regional	Short-term	Low	Minor	n/a
Regional Employment and Income during closure- Loss of employment and income as mine closes.	Adverse	Local	Long-term	Low to moderate	n/a	Not significant
Regional Demographics - Population decline resulting from loss of jobs.	Adverse	Regional	Long-term	Low	n/a	Not significant
Transportation – Road Traffic- Decreased road traffic associated with equipment/material delivery, commuter traffic, and general population use	Positive	Local	Long-term	Moderate	Minor	n/a
Housing- Contraction of housing market due to decreased population thus decreased demand	Adverse	Regional	Long-term	Low	n/a	Not significant

		Positive and Adverse Effects			Positive Effects	If Adverse Effect
Effect	**Direction**	**Geographic Extent**	**Duration**	**Magnitude**	**Overall Effects Rating**	**Significance**
Regional Services – Decreased pressure on services due to decline in Project requirements and possible population contraction	Positive	Regional	Long-term	Low	Minor	n/a
Regional Infrastructure- Decreased use of/pressure on regional services for Project needs and/or due to growing regional decline	Positive	Regional	Long-term	Low	Minor	n/a

6.4.2 Traditional Land Use

This section provides an assessment of potential effects on Traditional Land Use (TLU) expected to result from Project-related disturbances.

6.4.2.1 Introduction

The Project is within the asserted traditional territory of the James Smith Cree Nation (JSCN), Muskoday First Nation, Sturgeon Lake First Nation, Red Earth First Nation and the Wahpetan Dakota Nation. The Métis Nation - Saskatchewan, Eastern Region II and Métis Nation - Saskatchewan, Western Region II (ERII and WRII) also have used the region to exercise their Aboriginal rights (International Bioresources Research Group (IBRG); 2010). The Traditional Land Use baseline (Section 5.4.2, Traditional Land Use) has further information about these communities; the Public and Aboriginal Engagement section (Section 4.0, Public and Aboriginal Engagement) provides more details about methods used to engage Aboriginal groups in issues scoping, effects identification and determination of appropriate mitigation measures.

Shore has signed Information Gathering Agreements governing provision and use of TLU and other cultural information with the following communities:

- February 12, 2010, Star-Orion South Diamond Project IGA reached with Sturgeon Lake First Nation;
- March 31, 2010, Star-Orion South Diamond Project IGA reached with Métis Nation – Saskatchewan Eastern Region II and Métis Nation – Saskatchewan Western Region II;
- May 12, 2010, Star-Orion South Diamond Project IGA reached with Red Earth Cree Nation;
- August 18, 2010, Star-Orion South Diamond Project IGA reached with James Smith Cree Nation, Chakastaypasin Band of the Cree and Peter Chapman First Nation;
- April 19, 2011, Star-Orion South Diamond Project IGA reached with Muskoday First Nation; and
- June 9, 2011, Mutual Cooperation Agreement reached with Wahpeton Dakota Nation (which included the terms of the IGA).

Building on the trust relationships reached through the Information Sharing Agreements, Memoranda of Understanding (MOU) have also been signed with potentially affected Aboriginal groups that commit both the company and the Aboriginal group to a process of discussions intended to arrive at arrangements concerning ways to involve Aboriginal people in training, employment and contracts. MOUs that have been signed are as follows:

- May 17, 2010, Star-Orion South Diamond Project MOU signed with Sturgeon Lake First Nation;
- June 16, 2010, Star-Orion South Diamond Project MOU signed With Metis Nation - Saskatchewan Eastern Region II;
- June 17, 2010, Star-Orion South Diamond Project MOU signed with Métis Nation - Saskatchewan Western Region II; and
- January 19, 2011 Star-Orion South Diamond Project MOU signed with Wahpeton Dakota Nation.

Shore's Mutual Cooperation Agreements in place to date include:

- June 9, 2011, Mutual Cooperation Agreement signed with Wahpeton Dakota Nation.

Following the MOU agreement negotiations and if the Project receives regulatory and Board approval to proceed, it is also hoped that, ultimately, Impact Benefit Agreements (IBAs) will be arrived at on commercially reasonable terms to address Aboriginal interests such as training, employment and contracts for First Nations and Métis people.

Consequent to these agreements, six TLU studies have been completed (James Smith Cree Nation, Métis Nation, Muskoday First Nation, Red Earth Cree Nation, Sturgeon Lake First

Nation and Wahpeton Dakota Nation). They were supported financially by Shore to facilitate the gathering and documentation of TLU relating to the FalC area.

Any further TLU information supplied at a later date will be used by Shore in their detailed project planning and implementation, facilitated by continued dialogue about mitigation of possible effects on TLU. The final reports and/or other documentation will be submitted to the regulators as supplemental information, subject to the terms contained in Information Gathering Agreements. This section is based solely on the currently available information. The following provides an overview of the information provided and status of the TLU studies by Aboriginal group.

James Smith Cree Nation, Chakastaypasin Band of the Cree and Peter Chapman First Nation: The James Smith Cree Nation contracted the Calliou Group to conduct a TLU study in early in 2011. The study included 17 interviews and focussed on collecting traditional land use information. The final report was completed in March 2011.

Sturgeon Lake First Nation: A contractor for the Sturgeon Lake First Nation produced and submitted a draft report *Ancestral Territory of the Sturgeon Lake First Nation: A Preliminary Survey*. Although the focus of the report is genealogical, some land use information was included. A methods section is not included in the draft. It is not known when a final report will be received.

Métis Nation – Saskatchewan Eastern Region II and Métis Nation – Saskatchewan Western Region II: ERII and WRII contracted IBRG to conduct a Traditional Land Use and Occupancy Study. A summary of results including a list of harvested species and an overview of project methods has been submitted to Shore (IBRG 2010). The contractors developed a questionnaire, which was used as a guide in a number of workshops, where narrative and map-based traditional land use data was gathered.

Red Earth Cree Nation: The Red Earth Cree Nation contracted Hobbs and Associates to conduct a Traditional Use and Occupancy Study. They have gathered map biographies and interviewed participants, and have provided a final report detailing project methodology and included a mention of hunting activity (geese, ducks and grouse). The project included interviews with six respondents.

Muskoday First Nation: The Muskoday First Nation contracted SLR Consulting (Canada) Ltd and Dillon Consulting to conduct a Traditional Knowledge Study. The study included a workshop and validation meeting. A final report was provided in August 2011.

Wahpeton Dakota Nation: The Wahpeton Dakota Nation contracted the Integral Ecology Group to conduct a TLU study. The study included 12 interviews and a ground-truthing session. The final report focussed on past, current, and future traditional land use recorded

as general values such as subsistence values, habitation values, transportation values, cultural/spiritual values, trapping and commercial values, and indigenous landscape values.

The Project has the potential to affect traditional land uses such as hunting wildlife and waterfowl, fishing, trapping, logging, and harvesting medicinal, spiritual and edible plants. Additionally, use of trails and water navigation routes, camps and cabins, and other culturally important areas (such as named places, view points, or celebratory sites) may be affected. There may also be effects on visual and aesthetic resources, such as from noise. Assessing the potential effects of the Project on TLU may be important to the understanding of potential effects on Aboriginal rights related to traditional use and to identification of possible accommodation, which may include mitigation such as avoidance of certain areas or conducting some project activities during certain seasons. Shore will continue to provide opportunities for open dialogue with Aboriginal groups throughout the life of the Project to discuss any potential effects on TLU and appropriate mitigation measures. Shore will develop a program to monitor potential effects on TLU to evaluate EIS predictions and the effectiveness of mitigation measures. For the purposes of this assessment, the three phases of construction, operations, and closure are considered together and the most conservative case (i.e., most potential impact) is used. As access to the project area is the main direct effect on traditional use, the largest effect will be during the operations phase when up to 5380.87 ha will not be accessible for traditional use.

The spatial boundaries for the study area, both local and regional, parallel those of the terrestrial disciplines. Two study boundaries were established from the terrestrial disciplines and include the following:

- a local study area (LSA), including a Project footprint plus buffer zone (Figure 5.3.1-1); and
- a regional study area (RSA) including the Project and surrounding area determined to be a zone of influence (Figure 5.3.1-2).

The LSA is consistent with the one defined for the terrestrial disciplines, and is located within the FalC forest immediately north of the Saskatchewan River, and downstream of the convergence of the North and South Saskatchewan Rivers within townships 48, 49 and 50, range 19-20, and west of the second meridian. The LSA encompasses a total area of 12,217 ha.

As with the LSA, the RSA used for the assessment is analogous to the one used by the terrestrial disciplines, and follows the boundaries of the FalC Forest (132,768 ha).

As project disturbance does not extend outside the terrestrial RSA into the socio-economic regional study area (SRSA), inclusion of the latter study area was determined not to be relevant.

6.4.2.2 Effects Assessments

The effects assessment for Traditional Land Use is divided into five separate assessments. Four aboriginal groups (James Smith Cree Nation, Métis Nation, Muskoday First Nation, and Wahpeton Dakota Nation) provided reports which contained comprehensive enough traditional use information to conduct a separate effects assessment. Two other reports (from Red Earth Cree Nation and Sturgeon Lake First Nation) provided TLU information in summary or overview format only. Information from these reports is assessed together.

Key TLU issues (project effects on traditional land use) include physical disturbances such as clearing, berming, construction, and others; effects to species of wildlife and plants harvested by Aboriginal communities for food and medicine; increase and decrease of access; changing socio-economic conditions for Aboriginal individuals; and, changes to the experience of conducting traditional land use activities. Effects on TLU may include changed and/or impeded access and exclusion from traditional use areas. Exclusion will be based on health, safety or security limitations, and in some cases, a physical brush barrier to be constructed around Project facilities, and for hunting, will also include a 500m buffer from all occupied areas. The following table (Table 6.4.2-1) identifies areas that will be inaccessible for hunting and other TLU activities during each phase. The exclusion area for non-hunting TLU such as berry picking may be slightly smaller as berry picking is allowed within 500m of occupied areas.

Table 6.4.2-1: Exclusion areas for TLU from Local Study Area

Phase	Exclusion area
Construction Phase:	4640.83 ha
Operations phase – Star:	5380.87 ha
Operations phase – Orion South:	4781.13 ha

These areas comprise around 40-45% of the Local Study Area, as shown in Figure 6.4.2-1.

The following attributes are used to assess the significance of effects (Table 6.4.2-2, below).

Table 6.4.2-2: Effects attributes for TLU

Attribute	Ranking	Ranking Definition
Direction	Adverse	Effect is worsening or is not desirable
	Neutral	Effect is not changing compared with baseline conditions and trends

Attribute	Ranking	Ranking Definition
	Positive	Effect is improving or is desirable
Magnitude[4]	Negligible	Does not have a measurable effect on the VC
	Low	Low level effects; individuals are affected. Effect occurs but may or may not be detectable, and is within the normal range of variability
	Moderate	Effect is clearly distinguishable but is unlikely to pose a serious risk to the VC or represent a management challenge
	High	Effect is likely to pose a serious risk to the VC and represents a management challenge
Duration	Short-term	Effect is expected to last during the construction period(s).
	Long-term	Effect extends throughout operations phase or longer.
Geographic Extent	Local	Effect is limited to the local study area.
	Regional	Effect extends throughout the regional study area.
	Beyond regional	Effect extends beyond the regional study area.
Frequency	Rare	Effect occurs infrequently and is difficult to predict.
	Intermittent	Effect occurs infrequently but when it will occur can be predicted.
	Continuous	Effect occurs continuously.

As noted in Section 6.1.5.6:

> In general, to be considered to have potential for a significant effect, the residual effect on the VC being assessed must meet one of the following criteria:
>
> • have a moderate magnitude at a regional spatial extent and have a long term or permanent duration;
>
> • have a high magnitude at a local spatial extent and be long term or permanent in duration;
>
> • have a high magnitude at a sub-regional spatial extent and be medium term, long term or permanent in duration; or
>
> • have a high magnitude of any duration at a regional extent.

[4] As quantitative ratings of magnitude are not always applicable to socio-economic VCs, the magnitude ratings from table 6.1-3 Definition of Magnitude for Socio-Economic Effects from the draft EIS are used here.

Effects Assessment: James Smith Cree Nation

Shore's representatives and JSCN TLU contractors met in August 2011 to discuss the methodology to be used to assess effects on James Smith Cree traditional land use (TLU) from the proposed Star-Orion South Diamond Project. There was general agreement in the meeting on two key aspects of TLU EA: 1) The valued components were agreed upon for this specific project (hunting, gathering, fishing, sites, and conditions for use); and 2) A tripartite assessment tool was agreed upon, which includes three dimensions to each identified valued component (biophysical, economic, and socio-cultural) for assessing the residual effect attributes of magnitude, context and direction (AMEC 2011).

As described in Section 5.4.1.10, some information on the number of Aboriginal people living on reserve who participated in traditional harvesting activities was collected as part of the 2001 census but not in more recent censuses (Statistics Canada 2001). The 2001 census indicated that 31% of adults on the James Smith 100 reserve hunted for food during the previous 12 months. Also, 19% of adults fished, with 89% of these fishing for food. Thirty-six percent of adults reported gathering wild plants. These activities do not necessarily occur within the FalC area.

The JSCN TLU report indicates that the FalC area is of great importance for traditional use. It is used frequently for hunting, most often for elk, and generally in the autumn although the area is used throughout the year. "Participants reported big game hunting for moose, elk and deer as well as small game hunting for animals such as squirrels, rabbits and chickens" (Calliou Group 2011: 38). The area is also used for trapping "beaver, coyote, squirrel, otter, marten, muskrat, lynx, mink, and rabbit" although no trappers who use the area were interviewed (Calliou Group 2011: 45). Fishing, in particular in the Saskatchewan River for walleye or pickerel, jackfish and goldeye, was also reported. The area is used extensively by berry pickers who harvest "blueberries, low bush cranberries, high bush cranberries, raspberries, saskatoons and strawberries" and medicinal plants (Calliou Group 2011: 50). JSCN members also use travel routes through the area, and recorded camps and other TLU and sacred sites. All the interviewees of the Calliou Group study used the FalC area for traditional harvesting. The JSCN's activities resemble a 'mixed' or dual economy "in which the harvesting of country food for primarily domestic consumption plays a significant role in their economies and cultures" (Usher, Duhaime and Searles 2003: 175).

The following valued components (VCs) have been used to assess possible effects to JSCN TLU: Hunting, Gathering, Fishing, Sites, and Conditions for Use. Valued components were selected based on the information in the TLU Report (Calliou Group 2011) and agreed upon in discussion with JSCN representatives. Trapping was not included as a VC due to lack of specific information on trapping gathered during the TLU study, although the 'conditions for use' VC is used to assess potential impacts on the ability to use the area and the quality of traditional use, which would include trapping use in general.

Hunting

Hunting is an important traditional activity for the JSCN in FalC. JSCN hunters use the local study area and regional study area to hunt "moose, elk and deer as well as small game hunting for animals such as squirrels, rabbits and chickens" (Calliou Group 2011: 38). People hunt throughout the year, but most often in the fall. Current hunting occurs across the local and regional study areas, with concentrations along many roads and along the Saskatchewan River; and in three concentration zones: 1. south of the Saskatchewan River around the Where the Horse Died Road, 2. at the southern reach of Jail Camp Road, and 3. in the triangle created by Highway 6, Wapiti Road, and Division Road. In the local study area, there is a concentration of hunting along the Saskatchewan River, and the road east of Lars Road. The Lars Road area shows slightly less concentrated hunting use. Hunting within the exclusion zones will be displaced for the life of the project to other concentration zones or perhaps new areas, and will only resume when remediation has reached a stage where preferred game returns and if preferred hunting habitat is re-established. Only one current hunting polygon out of a total of 194 (<1%) from the TLU baseline (Calliou Group 2011) is wholly within the exclusion zones created by the windrows, indicating most hunting areas which cross into the exclusion zone also have a component outside where hunting can continue. Currently, to access the hunting concentration near Lars Road (i.e., within the LSA), it would take a 75km trip by road. Other hunting concentrations are closer by road. The TLU baseline indicates accessing hunting areas may also happen by boat and occasionally by skidoo. Areas accessed by boat from the JSCN within the LSA likely include areas immediately north of the Saskatchewan River, which will not be displaced by the Project. It is unclear which areas are accessed by skidoo, although the focus on hunting in the fall rather than winter likely indicates that only occasional skidoo hunting occurs in the exclusion zone. Effects on hunting are categorized in Table 6.4.2-3 below.

Biophysical Aspect: The ungulate Valued Component from the Wildlife Effects Assessment (Section 6.3.3) is used to assess effects on the biophysical aspect of hunting, as according to Calliou (2011) the majority of large game hunting is for elk. The wildlife effects assessment concludes that "Project effects on ungulate populations within the RSA are small, reversible, and can be easily mitigated" – mitigation suggestions are detailed in the wildlife effects assessment chapter (Section 6.3.3) and include suggesting changes to the hunting season draw quotas, season timing and bag limits within the ungulate population management units, and regional planning (likely to include closure of certain access trails). These mitigations may affect JSCN hunters positively by ensuring ungulate populations remain at a level adequate for hunting by regulating non-traditional hunting in the RSA. JSCN hunters may also be adversely affected if they regularly use access trails designated for closure to protect the ungulate populations. To mitigate this possible adverse effect, Shore will encourage JSCN participation in regional planning processes.

The wildlife effects assessment also indicates that the "effects assessment on terrestrial, aquatic and semi-aquatic fur-bearer populations within the RSA in general is also considered minimal during the construction and operations phases." Rabbit and grouse habitat would not be limited at the large (FalC) scale and Project effects would not be measureable/detectable at that scale. Effects on rabbit and grouse habitat and populations would be small and local. Additionally, the Country Food Assessment (Section 6.4.5) indicates that there will likely be negligible exposure to chemicals of potential concern through the consumption of fish, plants and berries, and game.

Economic Aspect: JSCN interviewees indicated they share meat with other members of their families and community (Calliou Group 2011). Impacts on hunting may trickle down to sharing of meat, which will have caloric, economic, social, and cultural effects. Although 31% of residents on the James Smith 100 reserve hunted at least once in the 12 months leading up to the 2001 census, it is not known how often JSCN members hunt now nor is the caloric contribution of game to their diet known. It is not clear how often meat is shared or what contribution to the community's economic well-being the practice of sharing meat may provide. If hunting declines due to increased employment (see below) then it is possible that sharing of meat will decline. If hunting increases due to increased employment, then it is possible that the sharing of meat will increase.

As noted in section 6.4.1.8, "Shore Gold has indicated that local First Nations and Métis could account for 27 % of the operational workforce or approximately 200 jobs. Given that only 47 % of the adults on First Nations reserves in the SRSA were actively working or seeking work and that 301 of these were unemployed (an unemployment rate of 32 %), the addition of up to 200 jobs has the potential to drop Aboriginal unemployment rates." The economic effect of the project on JSCN members may be both positive (potential for gaining high-paying employment, having disposable income to pay for hunting necessities) and adverse (removing opportunity due to time spent at the place of employment and potential employment-related quality of life issues). JSCN members employed by the project may successfully resolve the scheduling issues and continue to hunt:

> The successful harvesting household is often also the successful wage-earning household, as this cash income is used for purchasing harvesting equipment, and especially fast means of transport. This is the key means of resolving the time allocation problem, mainly for men, between wage work and harvesting. There has also been increasing specialization among households, so that some harvest far more than their own needs and share or exchange the surplus. ... So long as harvest disruption does not occur, wage employment does not normally displace harvesting, and people have greater

> choice about their activities and their diet (Usher, Duhaime and Searles 2003:178).

Although 'fast means of transport' may not be required in this context, it is possible that increased employment opportunities will allow more hunters to purchase all terrain vehicles, which can allow hunters access to areas where normal vehicular traffic has been blocked. Lack of vehicular access due to road closures was noted as an issue in the TLU study.

Hunting will be displaced from the exclusion zones of the Project area although it appears that other hunting areas that JSCN hunters often use will be closer by road. For this reason, the displacement will likely not cost more in gas consumption or time and should not result in lost production. Mitigations described in the 'Biophysical Aspect' will also mitigate economic costs and maintain hunting opportunities by ensuring ungulate populations are available for JSCN hunters.

Socio-Cultural Aspect: Many JSCN members who hunt also share meat, a traditional practice (Calliou Group 2011). As the wildlife effects assessment and the information on hunting area concentrations indicate, most hunting can continue with minimal effect from displacement to nearby hunting areas. However, time for hunting may be curtailed if paid employment is obtained by a previously unemployed individual. This effect may be mitigated by the newly employed individual's increased ability to finance hunting activities (gas, quads, shells, etc.). Effects on opportunities for the transfer of TK and to the ability to preserve and enhance cultural values through on-the-land activities are described in the 'Conditions for Use' VC, below.

The Project is removing an area used for hunting from future use. There are hunting concentrations closer to the JSCN by road and hunting will likely increase in these and possibly new areas. Boat-accessed areas even within the LSA will generally not be fenced off and will largely continue to be accessible (the Star Pit boundary and Project facilities will limit use of a section of river-accessed hunting area about two kilometers long).

Table 6.4.2-3: Hunting VC Effect Attributes for JSCN

VC Assessed	Magnitude	Direction	Duration	Geographic Extent	Frequency	Significance Rating
Hunting: Biophysical aspect (RSA)	Low	Adverse	Long-term	Local	Continuous	Not significant
Hunting: Biophysical aspect (LSA)	High	Adverse	Long-term	Local	Continuous	Significant

VC Assessed	Magnitude	Direction	Duration	Geographic Extent	Frequency	Significance Rating
Hunting: Economic aspect	Low to Moderate	Adverse and Positive	Long-term	n/a	Continuous	Not significant
Hunting: Socio-cultural aspect	Low to Moderate	Adverse and Positive	Long-term	n/a	Continuous	Not significant
Hunting VC combined	**Low**	**Adverse and Positive**	**Long-term**	**Local**	**Continuous**	**Not significant**

Although effects within the LSA are assessed to be significant, the overall effect at the regional level is more important in determining the combined (economic, socio-cultural and bio-physical) effect on JSCN hunting activity and results. Overall, the effects on JSCN hunting is determined to be not significant.

Gathering

JSCN members harvest berries and medicinal plants in the FalC area. Calliou Group (2011) reported picking blueberries, low bush cranberries, high bush cranberries, raspberries, Saskatoon berries, and strawberries throughout the RSA. Berries are harvested seasonally as they ripen, although cranberries can be picked frozen throughout the winter. Berry harvesters often use 'favourite places' (Calliou Group 2011). The largest concentration of current berry harvesting occurs south of the Saskatchewan River, southeast of the LSA, which will not be physically disturbed by the mine. Berry harvesters in the portion of this area of concentration closest to the river (around 1/10th of the area) may be able to hear the mine on a quiet day (see Section 6.2.3 Noise Impact Assessment). The mine may be audible on a quiet day to berry harvesters within 2-3 km of the exclusion zone. Berry harvesting is also concentrated along Division Road, and Lars Road. Other roadways are also used to a lesser extent, in particular a diffuse zone around Wapiti Road. Ten berry harvesting areas out of 56 recorded berry and medicinal plant harvest areas identified in the TLU study cross into the exclusion zone (see Table 6.4.2-1). Of these, only one is wholly within the exclusion zone and will be removed from traditional production for the life of the Project. The other nine berry harvest areas will remain in production although will have portions that are no longer accessible. Two of the ten areas are large and are mainly outside of the LSA so will likely continue to be used with only minor modifications. However, the remaining eight areas (or 6% of total current berry harvest area) are small and focussed in and around the LSA so may be abandoned completely in favour of more easily accessed

or larger areas within the RSA. Berry harvest will be displaced from the exclusion zones for the life of the project to either existing berry areas throughout the RSA, or to new areas.

Biophysical Aspect: As noted above, berry and medicinal plant harvesting areas in the exclusion zone, which represents between 40-45% of the LSA depending on phase, will be inaccessible during the life of the project. Harvest will be displaced from the exclusion zone into other, or new harvest areas. It is likely that about six percent of berry harvest areas will be removed from traditional production. Section 6.3.2 Vegetation and Plant Communities includes an assessment of potential impacts on 'traditional use plant potential' which refers to the capability for any vegetation type to support plant species used for traditional production rather than known traditional use. The assessment concludes that vegetation areas ranked medium to high for traditional use plant potential (see Appendix 6.3.2-A) is about 16% of the LSA (2,006 ha out of 12,218 ha) and 31% of the RSA (42,256 ha out of 132,768 ha). The total amount of areas of vegetation ranked as high and medium for traditional plant use potential will decrease by 13% in the LSA and <1% in the RSA as a result of project clearing.

At closure, according to this assessment, "Jack pine and trembling aspen dominated forests are expected to be the predominant vegetation type in the reclaimed landscape, and since these two forest types are responsible for a large proportion of the high and medium rankings of vegetation for traditional use plant potential, residual effects are expected to be reduced to low at project closure for both the LSA and RSA." Shore will work with JSCN to ensure traditional production of plants and berries is a consideration in reclamation and closure planning as appropriate. The Project is removing an area used for gathering from future use. There are gathering concentrations closer to the JSCN by road in particular south of the Saskatchewan River but also around Wapiti Road and gathering will likely be displaced to these and possibly new areas. The Country Food Assessment (Section 6.4.5) indicates that there will likely be negligible exposure to chemicals of potential concern through the consumption of fish, plants and berries, and game.

Economic Aspect: Impacts on gathering may have economic effects through changes to the contribution of plants and berries to the diet of JSCN members, and through the increased cost of accessing gathering areas due to displacement, and through scheduling concerns due to increased employment. These costs may trickle down to other community members through the sharing of plants and berries. The TLU study report does not indicate if berries and/or other plants are shared in the same way that meat is shared (Calliou Group 2011). Assuming that berries are shared, it is anticipated that any economic effect would be small and related to the lower use of this traditional resource. As noted above, the majority of berry harvesting areas will still be accessible to JSCN members during all Project phases and displacement of berry harvest to other known or new berry areas will likely not entail a longer drive. Therefore, the cost of harvesting berries is not likely to increase.

Usher, Duhaime and Searles indicate that gathering, along with hunting, does not suffer from an increase in wage employment. "Apparently most households effectively integrate hunting and gathering (or "harvesting") with wage labour and commercial production" (2003: 177). The potential increase in employment opportunities therefore will not likely have an adverse effect on gathering. Mitigation through reclamation will also address potential economic affects by ensuring vegetation is available to JSCN gatherers.

Socio-Cultural Aspect: Based on JSCN TLU data, it appears that hunting is undertaken more often than gathering by JSCN members. As gathering will not be affected by the Project facilities other than a displacement of a small amount of harvest, the ability of JSCN member to share and consume berries and plants will not be affected. Increased employment from the mine will likely not have an adverse effect on gathering but on a personal level may introduce scheduling conflicts.

See Table 6.4.2-4 below for an assessment on gathering.

Table 6.4.2-4: Gathering VC Effect Attributes for JSCN

VC Assessed	Magnitude	Direction	Duration	Geographic Extent	Frequency	Significance Rating
Gathering: Biophysical aspect (RSA)	Low	Adverse	Long-term	Local	Continuous	Not significant
Gathering: Biophysical aspect (LSA)	Moderate	Adverse	Long-term	Local	Continuous	Not significant
Gathering: Economic aspect	Low	Adverse and Positive	Long-term	n/a	Continuous	Not significant
Gathering: Socio-cultural aspect	Low	Adverse and Positive	Long-term	n/a	Continuous	Not significant
Gathering VC Combined	**Low**	**Adverse and Positive**	**Long-term**	**Local**	**Continuous**	**Not significant**

Fishing

In the vicinity of the Project, JSCN members fish mainly in the Saskatchewan River, but also in English Creek near Division Road, in Poplar Creek, around Highway 6, and in creeks near

Chamberlain Road. Species harvested include walleye (pickerel), jackfish, goldeye, brook trout, rainbow trout, and perch. According to the JSCN TLU report,

> While some interviewees said they eat the fish from the river, most said they no longer eat the fish as they have been warned about health risks related to consuming them because of high levels of mercury or other contaminants … Some participants continue to fish from the river even if they do not eat the fish (Calliou Group 2011: 48).

Access to fishing locations will not be affected by the Project – i.e., those areas on Chamberlain Road and the Saskatchewan River, and the English Creek fishing areas are outside of the LSA. The possible exception is access by Lars Road to the Saskatchewan River, as Lars Road will be re-routed. Shore will engage with JSCN to ensure that access disruptions from the re-routing of Lars Road will not unnecessarily affect JSCN fishing. Other effects to fishing may include changes in water quality and quantity and changes to the aquatic ecosystem.

A Fish Habitat Compensation Plan will be developed for the areas of fish habitat that the Project affects. Although options for the plan are still open, Shore has proposed three preferred options which are local to the Project, will have a positive impact on local Aboriginal groups and communities, and provide direct improvements to fish habitat. The primary and secondary compensation plans suggested by Shore will be of direct benefit to JSCN:

- Improve habitat quality in areas of Peonan Creek that are currently impacted by agricultural practices. This initiative was identified by DFO as being desirable and is moved forward as the primary compensation plan. ...
- Upgrade crossing structures where Caution Creek and English Creek cross Division Road in the Project RSA. This initiative is very local to the Project, has been identified as necessary, and would act to improve fish passage, fish habitat, and public safety. This project is proposed as the secondary compensation plan if additional offset measures are required (Section 6.3.1).

The third option would be located on the South Saskatchewan River:

- Reconnect the side channel located southwest of the bridge at MFN to the main channel in the South Saskatchewan River. Improving connectivity would prevent the issue of fish becoming trapped in the side channel when water levels subside.

As noted above, other options are still under consideration (Section 6.3.1).

Biophysical Aspect: Two of the four VCs in the Fisheries and Aquatic Resources Effects Assessment (Section 6.3.1) are of use in understanding potential biophysical effects on JSCN fishing: the walleye VC, and the spawning and rearing habitat VC. Of the species noted as harvested by JSCN, only walleye (which were included as a VC in the effects assessment) were captured within tributaries to the Saskatchewan River within the LSA. Brook trout were historically stocked in English Creek, however no brook trout were found during baseline surveys, and the presence of this population is uncertain. Northern pike, yellow perch, and goldeye were captured in the Saskatchewan River and were not found to reside in the tributaries within the LSA. All potential Project-related impacts on fish species in the Saskatchewan River were rated as not significant as impacts are anticipated to be minimal and mitigable (refer to Section 6.3.1). The Fisheries and Aquatic Resources Effects Assessment section describes potential Project effects by water body, including the Saskatchewan River and English Creek, both used by the JSCN for fishing. For English Creek, the effects assessment concluded:

> English Creek is one of the larger and more productive systems in the LSA and contains juvenile white sucker and walleye, as well as white sucker and walleye spawning and rearing habitat. Flow reductions in English Creek caused by groundwater drawdown are predicted to be minor and will be mitigated with flow supplementation. Water quality modelling illustrated that predicted parameter concentrations in English Creek are within the range of natural variability measured during the baseline surveys… Thus residual effects on the aquatic environment in English Creek are rated as not significant.

The Saskatchewan River may experience changes to water quantity, changes in water quality near the diffuser site, and changes to fish habitat at the diffuser site. Changes in the flow of the Saskatchewan River were modelled and found to be not significant for fish and fish habitat. Toxicity testing for water quality and water modelling at the diffuser found that the effect on fish near the diffuser will be not significant. Shore will continue to monitor water quality at the diffuser to ensure “parameter concentrations in the vicinity of the diffuser are not exceeding concentrations that are considered acceptable” (Section 6.3.1). Fish habitat loss due to the actual diffuser is included in the Fish Habitat Compensation Plan (see section 6.3.1.9).

The Country Food Assessment (Section 6.4.5) indicates that there will likely be negligible exposure to chemicals of potential concern through the consumption of fish, plants and berries, and game.

Section 6.2.7 Surface Water Quality, describes potential Project effects on surface water quality and sediment quality. The assessment of water quality included several components: predictions about the effects of the Saskatchewan River diffuser, as well as effects on site tributaries, the Codette Reservoir, potable water supply, and closure water

quality of the streams and end pit lakes. Water immediately downstream (40 m) of the Saskatchewan River diffuser is modelled to have acceptable levels of all water quality parameters. Modelling of water quality changes in streams predicted that water quality will remain generally within natural variations and close to baseline levels during Project activities and after closure. The pit lakes water quality models are also presented in Section 6.2.7, but are of less relevance to assessing effects on TLU due to the long time scale (i.e., it will take 350 years for the Star pit lake to fill and 2500 years for Orion South pit lake to fill). To summarize, "residual effects on water quality after mitigation [are] forecasted to be not significant… All federal and provincial guidelines [are] forecasted to be met or are expected to fall within the natural variability of the Saskatchewan River and streams potentially affected by the project" (Section 6.2.7). Mine access road construction and maintenance are not predicted to affect water quality. Mitigation measures to maintain water quality are described in Section 2.0 and include recycling of water, diversion of fresh water from potential contamination, and use of natural wetlands for treatment.

The 'Beaver' and 'Waterfowl' VCs from the Wildlife Effects Assessment (Section 6.3.3) also relate in part to changes in the quality of water systems. Effects on beaver are described as not significant, "the Project is unlikely to have a significant effect on the beaver population in the RSA and may have a limited local effect in the LSA." The 'Loss / alteration of habitat from project footprint' residual effect for waterfowl is also considered not significant.

Economic Aspect: The Project may have economic effects on JSCN fishing through changes to the contribution of fish to the diet of JSCN members, and through the increased cost of accessing fishing areas due to displacement or through scheduling concerns due to increased employment. These costs may trickle down to other community members through changes in the sharing of fish. The TLU study report does not indicate if fish are shared in the same way that meat is shared (Calliou Group 2011). However, the TLU study indicates that JSCN members hunt more often than they fish, possibly due (at least in part) to concerns of mercury levels in fish. Access to fishing areas will not be changed by the project with the exception of Lars Road, which will be re-routed around the Project. This may affect how JSCN members access certain fishing areas on the Saskatchewan River. It is anticipated that the cost of fishing is not likely to increase. Scheduling conflicts from an increase in paid employment from the mine may decrease fishing levels by JSCN members. This may be offset by an increase in wages which might allow for the purchase of equipment used to fish, such as water craft.

Socio-Cultural: Fishing appears to be a traditional activity more strongly cultural than economic. Project impacts on fish may alter the ease of fish harvest and effectively change the traditional sharing of fish, fish consumption, and fishing itself. As the project is not predicted to change fish populations or water quality in English Creek or the Saskatchewan River, nor creeks outside of the LSA, it is unlikely that the activity of fishing will change. As

noted in the TLU study, fish consumption is currently constrained for non-Project reasons (warnings about health risks). As access to fish resources will not change noticeably, and fish and fish habitat used by JSCN will not change, the main pathway for changes to JSCN fishing socio-culturally is through scheduling conflicts from an increase in employment. This may be offset by an increase in wages which could allow for the purchase of required equipment.

See Table 6.4.2-5 below for an assessment on fishing.

Table 6.4.2-5: Fishing VC Effect Attributes for JSCN

VC Assessed	Magnitude	Direction	Duration	Geographic Extent	Frequency	Significance Rating
Fishing: Biophysical aspect	Low	Adverse	Long-term	Local to regional	Continuous	Not significant
Fishing: Economic aspect	Low	Adverse and Positive	Long-term	n/a	Continuous	Not significant
Fishing: Socio-cultural aspect	Low	Adverse and Positive	Long-term	n/a	Continuous	Not significant
Fishing VC Combined	**Low**	**Adverse**	**Long-term**	**Local**	**Continuous**	**Not significant**

Sites

The *Sites* valued component includes sites such as spiritual sites, camping sites, or other important locations on the landscape. It does not include archaeological sites, which are assessed in Section 6.4.6 Archaeology and Heritage Resources.

JSCN members indicated that many cabins in the FalC area used by JSCN for traditional use were burned down by the Government of Saskatchewan 20-25 years ago.

There is a current camping area and sacred site located between the overburden pile and the Star Pit which will be partly inaccessible during the project due to the brush barrier and other Project activities. The area was identified by JSCN members as a proposed conservation site. A large camping 'zone' that follows the Saskatchewan River will also have a small area removed from potential use by Project facilities. Additionally, Bingo Hill (or 'Spy Hill' as it is alternatively known) will be likely removed as it is within the boundary of the Star Pit. As stated in the TLU study, "JSCN15 explained that Bingo Hill (located within

the Project Area) is a sacred site for JSCN as it has been used for ceremonies and is the highest peak in the area and JSCN members used to always travel through Bingo Hill" (Calliou Group 2011: 55). Access to Bingo Hill has been restricted recently at the request of the JSCN.

Additionally, a cabin is located in the JSCN reserve on the north side of the Saskatchewan River. It is not within the project area but is widely used by JSCN members and is accessed by Lars Road.

Camping sites and other sites near the mine may be impacted by visual and noise effects (see sections 6.4.4 Visual Assessment and 6.2.3 Noise Impact Assessment).

Biophysical aspect: Physical disturbance will impact Bingo Hill (Spy Hill) by its complete removal. Spy Hill lies within the feasibility study pit plans, which are based on maximizing the extraction of the kimberlite and on conservative slopes within the overburden. Spy Hill did not lie within the preliminary feasibility study pit plans. Due to the location of Spy Hill on the edge of the proposed pit, it may be possible to avoid removal by refinements of the pit slopes, steepening of the slopes by engineered methods, or by sterilization of ore. As the potential to avoid this feature depends on interactions between cultural, traditional, environmental, and economic factors, Shore proposes to discuss this potential impact with JSCN, Provincial and Federal Regulators and other Aboriginal groups as appropriate to determine the best mitigation. The post-closure landscape context for the site will also be discussed with JSCN.

For the purposes of this assessment, it is assumed that Spy Hill will be removed. If avoidance is possible, the hill will be unavailable for JSCN use for a period of time although it could be preserved as a sacred site for use post-closure. Alternate or additional mitigation of this effect may be available through discussion/planning as described above. For example, it might be possible to provide temporary/special access for JSCN use.

A large burial area was noted north of the Saskatchewan River at the end of the Melfort Ferry Road. This burial area interacts with the current pipeline route to the diffuser. Shore commits to having the pipeline area surveyed by an archaeologist (see Addendum 6.4.6-A) pre-construction. The archaeologist will liaise with JSCN to identify any burials in this location. Should any burial sites be identified on the pipeline route, the pipeline will be redesigned to completely avoid direct impacts to the sites.

A ceremonial site is located 165 m from of the proposed right-of-way of the improved access road. Shore will work with JSCN to ensure that this site is not directly impacted and to identify if access to this site will be affected during construction. No effects on this area are otherwise anticipated.

The cabin located in the JSCN reserve on the north side of the Saskatchewan River accessed by Lars Road will remain accessible to JSCN members. Although Lars Road will be re-aligned, it will be re-routed to maintain previously existing access to areas outside of the Project footprint. Shore will work with the JSCN to ensure the re-alignment of Lars Road does not impede access to the cabin unnecessarily.

No other known JSCN cultural sites will be physically impacted.

Economic aspect: JSCN use of cultural sites may be affected by employment opportunities which could create scheduling conflicts. As access to Bingo Hill is circuitous, it is not anticipated that use of other ceremonial sites within FalC would include an increase in transportation costs.

Socio-cultural aspect: JSCN indicated that cultural sites are important. They are likely used in the practise of JSCN culture. Continued use of cultural sites can occur in areas outside of the project boundary, although a primary cultural site (Bingo Hill) will likely be removed, and, at best would be inaccessible for the duration of the project.

See Table 6.4.2-6 below for an assessment on cultural sites.

Table 6.4.2-6: Cultural Sites VC Effect Attributes for JSCN

VC Assessed	Magnitude	Direction	Duration	Geographic Extent	Frequency	Significance Rating
Cultural sites: Biophysical aspect (RSA)	Low	Adverse	Long-term	Local	Continuous	Not significant
Cultural sites: Biophysical aspect (LSA)	High	Adverse	Long-term	Local	Continuous	Significant
Cultural sites: Economic aspect	Low	Neutral	Long-term	n/a	Continuous	Not significant
Cultural sites: Socio-cultural aspect	Low or Moderate*	Adverse	Long-term	n/a	Continuous	Not significant

Note: * There is insufficient data to rate the magnitude of this effect with confidence. Although Bingo Hill/Spy Hill will be removed, it is not known how many other sacred sites and look-out locations exist in the RSA but will not be affected.

Conditions for Use

The 'conditions for use' VC relates to the ability of JSCN members to carry out traditional activities, and to the quality of their experience while conducting these activities. This VC assesses any potential Project effects on the conditions for use.

Biophysical aspect: The ecological integrity of the RSA is assessed using the assessments of wildlife and vegetation, noise effects, visual effects, and non-traditional land and resource use.

Blasting and continuous noise will not be perceptible from the JSCN reserve (see section 6.2.3 Noise Impact Assessment). The mine may be audible on a quiet day within 2-3 km of the fence line. Noise effects on wildlife are not significant.

The visual assessment (Section 6.4.4) concludes that the visual effects of the project from the James Smith Cree reserve will be low. The Project will be visible, the sensitivity will be low, and the magnitude will be moderate. The project will be most visible during construction. Within the forest where much TLU takes place, the visibility of the project depends on the forest cover and topography, "The FalC forest has a variation in forest types … ranging from mature, dense, closed canopy forest to open regenerating forest. In general, the view in the FalC is constrained by the proximity of trees. However, in some of the open regenerating areas, especially where there is significant topography, views can be extensive" (Section 6.4.4 Visual Assessment).

As noted in Section 6.4.3 Non-Traditional Land and Resource Use, disturbance in the LSA and RSA will increase during the Project. Disturbance "refers to the replacement of natural land cover with a human-modified landscape that may or may not be covered by infrastructure." In the LSA, disturbance will increase from a base case of 29.6 % to a Project case of 61.4 % of the LSA. There will also be disturbance outside of the LSA as a Right-of-Way corridor from the Project will extend north through the FalC Forest. The RSA disturbance will be less than 1 % of the RSA. The disturbed areas of the LSA will be within the reduced access zone and therefore inaccessible for traditional production during the life of the Project, and the increase in disturbance of the areas outside the reduced access zone are considered to be low in magnitude and adverse in direction but not significant.

Access will change in the FalC Forest due to the project. A lack of access to areas of traditional production was noted as a concern for JSCN. Roads used to access these areas have been closed over the last several decades and by Project activities (Calliou Group 2011). As noted in Section 6.4.3 Non-Traditional Land and Resource Use, the following access upgrades will be made in and around FalC:

- Highway 55 to provide turning lanes from the highway on to the Shipman Trail access road,
- the Shipman Trail access road, and
- the White Fox River Bridge.

These upgrades will increase ease of access to FalC in general, in particular the all-weather Shipman Trail access road. As noted above, Lars Road will be re-routed around the overburden pile. As Lars Road is used to access a general-use cabin, for accessing traditional use areas, and used to drop off skidoos in fall for winter hunting, the relocation (and any road-side turn outs or other services) will be planned in cooperation with JSCN. The increase in ease of access will be both positive and adverse for traditional users. Ease of access to conduct traditional harvest activities will be positive, but the increase in ease of access of non-Aboriginal harvesters and recreational users may be adverse. Shore will work with JSCN and other stakeholders to develop suitable access management strategies and participate in regional awareness or education initiatives that are intended to encourage appropriate use of the FalC Forest. Increase in non-Aboriginal hunting may be mitigated through changes in hunting regulations to limit non-Aboriginal hunting as described in the Wildlife Effects Assessment (Section 6.3.3).

Economic Aspect: The ability of JSCN hunters and other traditional land users to continue conducting traditional activities will relate to the availability of acceptable TLU areas and the time and resources to conduct these activities. Successful hunting and gathering activities may result in sharing of resources as JSCN interviewees indicated they share meat with other members of their families and community (Calliou Group 2011). An increase in employment may have the effect of increasing traditional activities through the sharing of total economic and social resources (solidarity) (Usher, Duhaime and Searles 2003), although effects of employment on quality of living will be variable and personal.

Hunting will be displaced from the exclusion zones of the Project area although it appears that other hunting areas that JSCN hunters often use will be closer by road. For this reason, the displacement will likely not cost more in gas consumption or time. Gathering will also be displaced from the Project area to other existing or new areas.

Socio-Cultural Aspect: The transmission or teaching of skills required to carry out traditional activities is generally considered to require time ‘on the land’ – in other words, multi-generational ‘practice’ of traditional skills. Interruptions to hunting and harvesting may have an adverse effect on learning traditional skills for a younger generation.

Hunting and gathering activities will be displaced but not otherwise impacted. However, the possibility of an effect from changes to household activities due to employment will be bi-directional; i.e., positive due to more money to fund the harvest and adverse due to less

time available for the harvest by those who work. If requested, Shore will work with the JSCN to ensure opportunities exist to teach and learn traditional skills in an appropriate setting (for example, support for an Elder-led traditional science camp, perhaps even offering school credit). See Table 6.4.2-7 below for an assessment on conditions for use.

Table 6.4.2-7: Conditions for use VC Effect Attributes for JSCN

VC Assessed	Magnitude	Direction	Duration	Geographic Extent	Frequency	Significance Rating
Conditions for use: Biophysical aspect	Moderate	Adverse	Long-term	Local	Continuous	Not significant
Conditions for use: Economic aspect	Low	Adverse and positive*	Long-term	n/a	Continuous	Not significant
Conditions for use: Socio-cultural aspect	Low	Adverse and positive	Long-term	n/a	Continuous	Not significant

Note: * Confidence in Economic aspect is low due to variable and personal nature of potential effect

Effects Assessment: Métis

The Métis TLU report indicated that about a third of study participants or their families hunt in the general area for deer, elk, moose, bear, grouse, rabbit, duck, and geese, with use of the area increasing. Current trapping activities within the FalC area were not recorded although it was used in the past. About a fifth of study participants fish in the area or have family who fish in the area for walleye, perch, jack, sucker, goldeye, whitefish, and sturgeon. People also reported harvesting medicinal plants ("sage, sweet grass, Seneca root, birch bark, red willow, muskeg tea, Labrador tea and mushrooms") and berries and edible plants ("blueberry, chokecherry, Saskatoon berry, cranberry, pincherry, strawberry, and mushrooms") in the area (IBRG 2010: 8-9). Some cabins and other sites were noted but it was not clear if they are within the local or regional study area (IBRG 2010).

For the effects assessment of Métis traditional use, the following valued components will be used to indicate key issues of concern: hunting (as 35% of respondents currently hunt), fishing (20%), sites such as cabins, burials, sacred places, etc. (8-16%), and gathering edible and medicinal plants (12-35%). Trapping was not included as only 2% of respondents currently trap. The valued components were selected based on traditional use information provided in their TLU report (IBRG 2010). The TLU report also indicates that

"Métis logging activities should be protected. This is an activity that goes as far back nearly four generations and is currently ongoing throughout the forest." (IBRG 2010: 10). Further information on logging practises were not included in the report but Shore will continue to discuss the Project's potential effect on opportunities for, and continuation of, Métis logging.

Hunting

According to the Métis TLU study report, "35 percent of the survey participants or someone in the participant's family currently hunts in the area… Animals currently hunted in the Fort à la Corne Provincial Forest include deer, elk, moose, bear, grouse, rabbit, duck, and geese." (IBRG 2010: 4). Spatial locations of hunting in the RSA are gleaned from a map included in the Métis TLU study report. Hunting locations were recorded mainly in two clusters: south of the Saskatchewan River to the southeast of the Project, and around Lars Road in the LSA. A third cluster is close to the west border of the RSA along the Saskatchewan River. Hunting areas south of the Saskatchewan River and west of the Project will not interact with the Project. Of the 20 point hunting locations around Lars Road (including the area around the intersection of Lars and Division roads), nine are within the project exclusion zone (see Table 6.4.2-1) and will be removed from traditional production for at least the life of the project. It is anticipated that hunting will shift from this area to adjacent areas in the FalC, such as the two other hunting clusters; or to areas currently not utilized by Métis hunters. Three large hunting polygons were also mapped and include the LSA, a buffer around the length of Division Road, and a region to the north of the LSA. It is unclear if the point locations refer to a single hunting episode or if they are commonly used. It is not known if the mapped data refers to current or historic use. Current use is assumed.

Several Valued Components from the Wildlife Effects Assessment (Section 6.3.3) are useful for assessing effects on the Métis hunting: ungulate VCs such as deer, elk, and moose, are hunted, the black bear VC since they are also hunted, and the waterfowl VC since geese are hunted.

The wildlife effects assessment concludes that "Project effects on ungulate populations within the RSA are small, reversible, and can be easily mitigated" – mitigation suggestions are detailed in the wildlife effects assessment chapter (Section 6.3.3) and include suggesting changes to the hunting season draw quotas, season timing and bag limits within the ungulate population management units, and regional planning (likely to include closure of certain access trails). These mitigations may affect Métis hunters positively by ensuring ungulate populations remain at a level adequate for hunting by regulating non-traditional hunting in the RSA. Métis hunters may also be adversely affected if they regularly use access trails designated for closure to protect the ungulate populations. To mitigate this possible adverse effect, Shore will encourage Métis participation in regional planning processes.

The Wildlife Effects Assessment (Section 6.3.3) indicates that bear habitat will likely be reduced by around 3.1 % during construction and operations of the project. "A substantial portion of the habitat reduction is in coniferous cover types which have a lower suitability than deciduous and mixedwood." As a result, bear populations are likely to be reduced by around 2.6 %. The majority of the bear population is likely to be restored at decommissioning. The small reduction in bear population indicates that Métis hunting should continue without effect.

The Wildlife Effects Assessment includes a qualitative assessment of changes in habitat availability for breeding waterfowl, and concludes that wetlands and adjacent upland cover in the LSA will be minimally affected by the Project development as project design is intended to avoid wetlands and riparian areas (with the exception of those associated with the Star pit footprint). Overall, potential waterfowl habitat in the RSA is predicted to decrease by 0.2 % during the operations phase. Upon Project decommissioning, up to 780.9 ha of new aquatic waterfowl habitat is expected to be created in the LSA.

The wildlife effects assessment also indicates that the "effects assessment on terrestrial, aquatic and semi-aquatic fur-bearer populations within the RSA in general is also considered minimal during the construction and operations phases." Additionally, the Country Food Assessment (Section 6.4.5) indicates that there will likely be negligible exposure to chemicals of potential concern through the consumption of fish, plants and berries, and game.

As noted in section 6.4.1.8, "Shore Gold has indicated that local First Nations and Métis could account for 27 % of the operational workforce or approximately 200 jobs." If employment is gained due to the Project, the effect on Métis may be both positive (potential for gaining high-paying employment, having disposable income to pay for hunting necessities) and adverse (removing opportunity due to time spent at the place of employment and potential employment-related quality of life issues).

Rabbit and grouse habitat would not be limited at the large (FalC) scale and Project effects would not be measureable/detectable at that scale. Effects on rabbit and grouse habitat and populations would be small and local.

The mine may be audible on a quiet day within 2-3 km of the reduced access zone. Noise effects on wildlife are not significant (see section 6.2.3 Noise Impact Assessment).

As noted in Section 6.4.3 Non-Traditional Land and Resource Use, disturbance in the LSA and RSA will increase during the Project. Disturbance "refers to the replacement of natural land cover with a human-modified landscape that may or may not be covered by infrastructure." In the LSA, disturbance will increase from a base case of 29.6 % to a Project case of 61.4 % of the LSA. There will also be disturbance outside of the LSA as a Right-of-

Way corridor from the Project will extend north through the FalC Forest. The RSA disturbance will be less than 1 % of the RSA. The disturbed areas of the LSA will be within the brush barrier or other project facilities and therefore inaccessible for traditional production during the life of the Project, and the increase in disturbance of the areas outside the reduced access zone are considered to be low in magnitude and adverse in direction but not significant.

Access will change in the FalC Forest due to the project. Shore will continue to engage with the Métis about changes in access, in particular about the re-route of Lars Road which may change access to fishing and hunting locations. Increased and improved access to the FalC from Project road upgrades may have both a positive and adverse effect on Métis hunting. Hunting areas will be easier to access, but the ease of movement may also attract more hunters to the area, which could have an adverse effect.

Fishing

According to the Métis TLU study report, 20 % of respondents fish or have family who fish within FalC (IBRG 2010). Fishing was identified exclusively in the Saskatchewan River (although a fishing point on the map is located on land at the end of Lars Road, perhaps indicating Lars Road is an access route). Species identified include walleye, perch, jackfish, sucker, goldeye, whitefish, and sturgeon. Of the species harvested by Métis, only walleye (which were included as a VC in the effects assessment) were captured within tributaries to the Saskatchewan River within the LSA. Northern pike, yellow perch, and goldeye were captured in the Saskatchewan River but were not found to reside in the tributaries within the LSA. All potential Project-related impacts on fish species, including sturgeon, in the Saskatchewan River were rated as not significant as impacts are anticipated to be minimal and mitigable (refer to Section 6.3.1). The Saskatchewan River may experience changes to water quantity, changes in water quality near the diffuser site, and changes to fish habitat at the diffuser site. Changes in the flow of the Saskatchewan River were modelled and found to be not significant for fish and fish habitat. Toxicity testing for water quality and water modelling at the diffuser found that the effect on fish near the diffuser will be not significant. Shore will continue to monitor water quality at the diffuser to ensure “parameter concentrations in the vicinity of the diffuser are not exceeding concentrations that are considered acceptable” (Section 6.3.1). Fish habitat loss due to the actual diffuser is included in the Fish Habitat Compensation Plan (see section 6.3.1.9).

Sites

The Métis TLU study report indicates that there may be Métis sites in the general Project area. These sites may include “cabins, a fire tower, saw mills, an old school house and a church” and a burial. Sites may also include “a sweat lodge, a church and an area for celebrating the solstice” (IBRG 2010: 6, 7). Not all sites were mapped. A burial site along the Saskatchewan River in proximity to the LSA will be avoided by the Project. Other sites

recorded in the Métis TLU study report do not interact with the Project, and no sites were recorded within the LSA. Shore will continue to engage with the Métis about other sites of importance which were not included on the map. However, from the information provided, it appears that the Project will not affect Métis sites.

Gathering

The Métis TLU study report indicates that about 12 % of respondents gather medicinal plants, about half of these people indicating they harvest in the RSA north of the Saskatchewan River and likely in the vicinity of the project. Thirty five percent of respondents pick berries or harvest edible plants, a third of these respondents mapped areas in the RSA. Medicinal plants include "sage, sweet grass, Seneca root, birch bark, red willow, muskeg tea, Labrador tea and mushrooms" and berries and edible plants harvested include "blueberry, chokecherry, Saskatoon berry, cranberry, pincherry, strawberry, and mushrooms" (IBRG 2010: 8, 9).

Many berry harvest areas are south of the Saskatchewan River, outside of the RSA. There is a cluster of five berry harvest point locations around the end of Lars Road. Of these, a single point is within the reduced access zone. Berry harvest in this area will be displaced to other areas. Shore will continue to engage with the Métis about the re-route of Lars Road to ensure that access to berry harvest locations is not unnecessarily interrupted. A large berry harvest polygon is north of the project, and east of the current Shipman Trail. The new project right-of-way will bisect this polygon, allowing easier access, but causing some disturbance through road construction and clearing.

Effects attributes for Métis traditional use VCs are shown in Table 6.4.2-8, below.

Table 6.4.2-8: VC Effect Attributes for Métis

VC Assessed	Magnitude	Direction	Duration	Geographic Extent	Frequency	Significance Rating
Hunting Valued Component	Low	Adverse	Long-term	Local	Continuous	Not significant
Fishing Valued Component	Negligible	Adverse	Long-term	Local	Continuous	Not significant
Sites Valued Component	Negligible*	Adverse	Long-term	Local	Continuous	Not significant
Gathering Valued Component	Low	Adverse	Long-term	Regional	Continuous	Not significant

Note: * Confidence in magnitude of effects on the Sites VC is low due to need for confirmation of specific locations of sites.

Effects Assessment: Muskoday First Nation

The Muskoday First Nation TLU report indicates that Muskoday members hunt white-tailed deer, elk and moose; they reported that historically there was trapping for black bear, coyote, rabbit, red fox, gopher, squirrel, beaver, lynx, marten, mink, muskrat, otter, skunk, weasel, and wolf; fishing for whitefish, goldeye, jackfish, pickerel, sucker, sturgeon, and burbot; and harvesting of numerous berries and other edible plants. The report does not indicate where specific TLU activities took place. They reported traditional use of numerous birds including waterfowl, partridge, pheasant, and eagles, although it was not clear if that practice continues to modern times. It is assumed that waterfowl are still hunted for this assessment. A map included shows hunting, historical trapping, fishing, and harvesting areas in the FalC area (SLR Consulting (Canada) Ltd. and Dillon Consulting Limited 2011, pers. comm. Dean Bear Wed, 23 Nov 2011 in email to Ethan Richardson).

For the effects assessment of Muskoday traditional use, the following valued components will be used to indicate key issues of concern: hunting, fishing, and gathering plants. The valued components were selected based on traditional use information provided in their TLU report (SLR Consulting (Canada) Ltd. and Dillon Consulting Limited 2011). Although trapping was described in the report, and a trapping polygon and trail were recorded, it is unclear if trapping in the FalC by Muskoday members is currently underway (see Section 6.4.2 for more information on trapping in FalC). The only historic or cultural site recorded within the RSA is a sacred trail. The sacred trail does not intersect with the Project facilities or the reduced access zone. For this reason, a sites VC was not used. The Muskoday TLU study report indicates that more sites of cultural importance to the Muskoday may exist. Shore will continue to engage with Muskoday about sites of cultural importance.

Hunting

The Muskoday First Nation TLU report indicates that Muskoday members hunt white-tailed deer, elk and moose in FalC. It is unclear if waterfowl hunting is currently conducted in FalC by members of the Muskoday First Nation. Several traditional trails were recorded from Muskoday to FalC. The map included in the Muskoday TLU study report shows that hunting occurs across the RSA and LSA. It is assumed that hunting occurs equally throughout the area. The reduced access zone around the Project will be the largest effect from the Project on Muskoday hunting. The exclusion area does not overlap with the traditional hunting trails (although it is unclear if the trails are still used, and it is assumed that roadways provide access for hunting). It is anticipated that hunting will shift from the exclusion area to adjacent areas in the FalC.

The ungulate VC from the Wildlife Effects Assessment (Section 6.3.3) is useful for assessing effects on the Muskoday hunting. The wildlife effects assessment concludes that “Project effects on ungulate populations within the RSA are small, reversible, and can be easily mitigated” – mitigation suggestions are detailed in the wildlife effects assessment chapter

(Section 6.3.3) and include suggesting changes to the hunting season draw quotas, season timing and bag limits within the ungulate population management units, and regional planning (likely to include closure of certain access trails). These mitigations may affect Muskoday hunters positively by ensuring ungulate populations remain at a level adequate for hunting by regulating non-traditional hunting in the RSA. Muskoday hunters may also be adversely affected if they regularly use access trails designated for closure to protect the ungulate populations. To mitigate this possible adverse effect, Shore will encourage Muskoday participation in regional planning processes.

The Wildlife Effects Assessment includes a qualitative assessment of changes in habitat availability for breeding waterfowl, and concludes that wetlands and adjacent upland cover in the LSA will be minimally affected by the Project development as project design is intended to avoid wetlands and riparian areas (with the exception of those associated with the Star pit footprint and possibly the upper reaches of creeks associated with the overburden pile and Process Kimberlite Containment Facility). Overall, potential waterfowl habitat in the RSA is predicted to decrease by 0.2 % during the operations phase. Upon Project decommissioning, up to 780.9 ha of new aquatic waterfowl habitat is expected to be created in the LSA.

The Country Food Assessment (Section 6.4.5) indicates that there will likely be negligible exposure to chemicals of potential concern through the consumption of fish, plants and berries, and game.

As noted in section 6.4.1.8, “Shore Gold has indicated that local First Nations and Métis could account for 27 % of the operational workforce or approximately 200 jobs.” If employment is gained due to the Project, the effect on Muskoday may be both positive (potential for gaining high-paying employment, having disposable income to pay for hunting necessities) and adverse (removing opportunity due to time spent at the place of employment and potential employment-related quality of life issues).

The mine may be audible on a quiet day within 2-3 km of the reduced access zone. Noise effects on wildlife are not significant (see section 6.2.3 Noise Impact Assessment).

As noted in Section 6.4.3 Non-Traditional Land and Resource Use, disturbance in the LSA and RSA will increase during the Project. Disturbance “refers to the replacement of natural land cover with a human-modified landscape that may or may not be covered by infrastructure.” In the LSA, disturbance will increase from a base case of 29.6 % to a Project case of 61.4 % of the LSA. There also will be disturbance outside of the LSA as a Right-of-Way corridor from the Project will extend north through the FalC Forest. The RSA disturbance will be less than 1 % of the RSA. The disturbed areas of the LSA will be within the reduced access zone and therefore inaccessible for traditional production during the life

of the Project, and the increase in disturbance of the areas outside the reduced access zone are considered to be low in magnitude and adverse in direction but not significant.

Access will change in the FalC Forest due to the project. Shore will continue to engage with the Muskoday about changes in access, in particular about the re-route of Lars Road which may change access to fishing and hunting locations. Increased and improved access to the FalC from Project road upgrades may have both a positive and adverse effect on Muskoday hunting. Hunting areas will be easier to access, but the ease of movement may also attract more hunters to the area, which could have an adverse effect.

Fishing

The map provided in the Muskoday TLU study report shows fishing occurring only in the Saskatchewan River. It is unclear if fishing is on-going or largely historic, but it is assumed for the purposes of this assessment that fishing is current. Species harvested include: whitefish, goldeye, jackfish, pickerel, sucker, sturgeon, and burbot. Specific concerns noted by Muskoday include motorboats and their impacts on fish, and mercury contamination. All potential Project-related impacts on fish species in the Saskatchewan River were rated as not significant as impacts are anticipated to be minimal and mitigable (refer to Section 6.3.1). The Country Food Assessment (Section 6.4.5) indicates that there will likely be negligible exposure through the consumption of fish to chemicals of potential concern relating to the proposed Project.

Gathering

The Muskoday TLU study report indicates that highbush cranberry, blueberry, cranberry, gooseberry, raspberry, Saskatoon, strawberry, chokecherry, mushroom, and sugar maple were or are harvested for food. Red willow (red osier dogwood) and cord grass were used (perhaps historically) for weaving. Medicinal plants (perhaps mainly gathered historically) included cranberry, blueberry, Seneca root, wild peppermint, puffballs, chokecherry, wikase (ratroot or sweet flag, the only species noted as still being harvested), rose, red willow (red osier dogwood), white poplar, sweet grass, cattail, colt's foot, and maple. The map included in the Muskoday TLU study report shows food plant harvest across much of the RSA, medicinal plant harvest in a buffer zone along the Saskatchewan River. The medicinal plant area is mostly outside of the reduced access zone. It is assumed that Muskoday gathering of food plants occurs evenly across the RSA. As such, the reduced access zone represents only a small portion of berry harvest (less than 5%) area will be removed from traditional production. Plant harvest will be displaced to other areas currently in use or new areas.

Section 6.3.2 Vegetation and Plant Communities includes an assessment of potential impacts on 'traditional use plant potential' which refers to the capability for any vegetation type to support plant species used for traditional production rather than known traditional use. The assessment concludes that vegetation areas ranked medium to high for traditional

use plant potential (see Appendix 6.3.2-A) is about 16% of the LSA (2,006 ha out of 12,218 ha) and 31% of the RSA (42,256 ha out of 132,768 ha). The total amount of areas of vegetation ranked as high and medium for traditional plant use potential will decrease by 13% in the LSA and <1% in the RSA as a result of project clearing.

The report notes, "[m]any of the [medicinal plant] species are difficult to find today and creation of habitat for them would be a positive effect" (SLR Consulting (Canada) Ltd. and Dillon Consulting Limited 2011: 16). Shore will continue to engage with Muskoday about closure and reclamation planning. Effects attributes for Muskoday traditional use VCs are shown in Table 6.4.2-9, below.

Table 6.4.2-9: VC Effect Attributes for Muskoday First Nation

VC Assessed	Magnitude	Direction	Duration	Geographic Extent	Frequency	Significance Rating
Hunting Valued Component	Low	Adverse	Long-term	Local	Continuous	Not significant
Fishing Valued Component	Negligible	Adverse	Long-term	Local	Continuous	Not significant
Gathering Valued Component	Low	Adverse	Long-term	Local	Continuous	Not significant

Other concerns and recommendations

The Muskoday TLU study report outlines seven key items needing clarification in the Environmental Impact Statement (SLR Consulting (Canada) Ltd. and Dillon Consulting Limited 2011: 3):

1. *The effect of habitat loss to fish, big game, fur bearers, birds, and plants;*

Habitat loss for big game, fur bearers, and birds is described in the Wildlife effects assessment (Section 6.3.3). Habitat loss for fish is described in the Fisheries and Aquatic Resources effects assessment (Section 6.3.1). Vegetation effects are described in Section 6.3.2.

2. *The effect of barriers to landscape connectivity posed by the scale, duration and intensity of the mine proposal;*

The effect of barriers is considered in the wildlife effects assessment section (Section 6.3.3) and also in the biodiversity effects section (Section 6.3.4)..

3. *The effect of the groundwater drawdown effects that extend beyond the local study area;*

Groundwater drawdown is described in the Hydrogeology effects section (6.2.4).

4. *Methods to investigate historic and sacred sites during mine development;*

Archaeology and Heritage Resources, and potential impacts on them, are described in sections 5.4.5, 6.4.6, and 9.4.17. Sacred sites as described in TLU reports are included in TLU baseline section 5.4.2 and effects assessment section 6.4.2. Additionally, Shore will continue to engage with Muskoday First Nation about confidential sites as appropriate.

5. *Identification of a mitigation and rehabilitation plan that is meaningful to the Muskoday First Nation and their descendants.*

Shore will continue to engage Muskoday First Nation throughout detailed project planning and during construction, operation, and closure about mitigation and project effects. The mitigation strategy is discussed in the alternatives section (Section 3) and the rehabilitation plan is discussed in the closure sections (Section 7).

6. *Potential effects of water quality changes on fish and wildlife directly, and potential effects to humans from animal consumption; and*

Water quality effects are described in section 6.2.7 Surface Water Quality. Effects on humans from consumption of animals are described in Section 6.4.5, the Human Health assessment.

7. *Vegetation mapping should be re-interpreted from the viewpoint that each of these vegetation types provide habitat for support of the resources identified by Muskoday First Nation.*

Section 6.3.2 Vegetation and Plant Communities includes an assessment of potential impacts to 'traditional use plant potential' which refers to the capability for any vegetation type to support plant species used for traditional production.

Effects Assessment: Wahpeton Dakota Nation

The Wahpeton Dakota TLU report summarizes potential Wahpeton Dakota traditional use of the FalC area.[5] Although the study methodology indicated that specific Wahpeton Dakota

[5] The WDN TLU study used the term "Local Study Area" to refer to the FalC area in general, known as the "Regional Study Area" in this assessment. See Figure 2 in Integral Ecology and Wahpeton Dakota Nation (2011: 4). The terms Regional Study Area and Local Study Area will be used consistently with other chapters for the purposes of this assessment.

use of the area was recorded, the report did not distinguish between past (prior to 10 years) use, current use, and planned future use (Integral Ecology and Wahpeton Dakota Nation 2011)[6]. Wahpeton Dakota potential use of the area is described in the report in terms of values, including: subsistence values (such as potential hunting, gathering, and fishing locations); habitation values (such as camp sites), transportation values (such as trails), cultural/spiritual values, trapping and commercial values, and indigenous landscape values (such as place names). These values will be used as Valued Components to assess potential Project impacts on WDN TLU to the extent TLU information allows. Therefore, 'trapping and commercial values' will not be used due to lack of information.

The Wahpeton Dakota Nation identified ten habitation values or cabin and camp sites (according to the report, these are existing or past; not proposed or future). Ability to access camp sites is an existing concern. Access is constrained by flooding and road closures.

Wahpeton Dakota members indicated that the FalC area is "particularly valued for elk and deer hunting" and the area is also used to hunt for moose, bear, and ducks (Integral Ecology and Wahpeton Dakota Nation 2011: 30). They also likely undertake "fishing, harvesting wood, picking berries (Saskatoon berry, cranberry, raspberry, blueberry), and gathering medicinal plants" (Integral Ecology and Wahpeton Dakota Nation 2011: 29). Thirty-eight subsistence values were recorded as both points and polygons. Information on current use is not included separately although the report states, "most of the subsistence areas mapped as polygons represent decades of an individual or group subsistence activity carried out in a resource rich area" implying past and current use. The TLU map shows past, present and future 'subsistence values' across much of the RSA and all of the LSA and project footprint. For the purposes of this assessment, it is assumed that hunting, gathering vegetation, and fishing activities are currently conducted by Wahpeton Dakota members equally across the Wahpeton Dakota Nation TLU study area. Information on traditional harvesting activities was not collected as part of the 2001 census from the Wahpeton Dakota Nation (Statistics Canada 2001). Effect assessment attributes are included in Table 6.4.2-10, below.

Subsistence Valued Component

Hunting, gathering, and fishing locations may exist across much of the RSA, which was noted to be highly valued as wildlife habitat for WDN members. The area is particularly valued as an ungulate hunting area. The wildlife effects assessment concludes that "Project effects on ungulate populations within the RSA are small, reversible, and can be easily mitigated" – mitigation suggestions are detailed in the wildlife effects assessment chapter (Section 6.3.3) and include suggesting changes to the hunting season draw quotas, season timing and bag limits within the ungulate population management units, and regional

[6] As such, the quantitative extent of current traditional use of the FalC area in general and the project area in particular are not known.

planning (likely to include closure of certain access trails). These mitigations may affect WDN hunters positively by ensuring ungulate populations remain at a level adequate for hunting by regulating non-traditional hunting in the RSA. WDN hunters may also be adversely affected if they regularly use access trails designated for closure to protect the ungulate populations. To mitigate this possible adverse effect, Shore will encourage WDN participation in regional planning processes.

The wildlife effects assessment also indicates that the "effects assessment on terrestrial, aquatic and semi-aquatic fur-bearer populations within the RSA in general is also considered minimal during the construction and operations phases." Additionally, the Country Food Assessment (Section 6.4.5) indicates that there likely will be negligible exposure to chemicals of potential concern through the consumption of fish, plants and berries, and game.

WDN hunting in the RSA includes bear and ducks. The wildlife effects assessment (Section 6.3.3) indicates that bear populations will be adversely impacted slightly during operations (estimated to go down less than 3%) but will recover after closure. Waterfowl habitat will decrease slightly during the Project but will increase over the base case after decommissioning.

Berry harvest will be displaced from the exclusion zone for the life of the project to either existing berry areas throughout the RSA, or to new areas. As noted in Table 6.4.2-1 above, the exclusion zone will vary from about 40-45% of the LSA. Berry harvest will continue in areas outside of the exclusion zone. Section 6.3.2 Vegetation and Plant Communities includes an assessment of potential impacts on 'traditional use plant potential' which refers to the capability for any vegetation type to support plant species used for traditional production rather than known traditional use. The assessment concludes that vegetation areas ranked medium to high for traditional use plant potential (see Appendix 6.3.2-A) is about 16% of the LSA (2,006 ha out of 12,218 ha) and 31% of the RSA (42,256 ha out of 132,768 ha). The total amount of areas of vegetation ranked as high and medium for traditional plant use potential will decrease by 13% in the LSA and <1% in the RSA as a result of project clearing. According to this assessment, "Jack pine and trembling aspen dominated forests are expected to be the predominant vegetation type in the reclaimed landscape, and since these two forest types are responsible for a large proportion of the high and medium rankings of vegetation for traditional use plant potential, residual effects are expected to be reduced to low at project closure for both the LSA and RSA." Shore will work with WDN to ensure traditional production of plants and berries is a consideration in reclamation and closure planning as appropriate. The Project is removing an area used for gathering from future use. Therefore, gathering will likely be displaced to other existing and possibly new areas.

The Country Food Assessment (Section 6.4.5) indicates that there likely will be negligible exposure to chemicals of potential concern through the consumption of fish, plants and berries, and game. WDN members hunting, trapping, and harvesting near the mine may be able to hear the mine on a quiet day (see Section 6.2.3 Noise Impact Assessment). The mine may be audible on a quiet day within 2-3 km of the reduced access zone. It is likely that access constraints from the reduced access zone will play the greatest role in any changes to hunting, trapping, and harvesting plants and trees.

As noted in section 6.4.1.8, "Shore Gold has indicated that local First Nations and Métis could account for 27 % of the operational workforce or approximately 200 jobs. Given that only 47 % of the adults on First Nations reserves in the SRSA were actively working or seeking work and that 301 of these were unemployed (an unemployment rate of 32 %), the addition of up to 200 jobs has the potential to drop Aboriginal unemployment rates." The economic effect of the project on WDN members may be both positive (potential for gaining high-paying employment, having disposable income for hunting, fishing, and other subsistence activity necessities) and adverse (removing opportunity due to time spent at the place of employment and potential employment-related quality of life issues).

It is assumed that WDN members fish in the Saskatchewan River. Access to fishing locations likely will not be affected by the Project. Other effects on fishing may include changes in water quality and quantity and changes to the aquatic ecosystem. A Fish Habitat Compensation Plan will be developed for the areas of fish habitat affected by the Project. All potential Project-related impacts on fish species in the Saskatchewan River were rated as not significant as impacts are anticipated to be minimal and mitigable (refer to Section 6.3.1). The Saskatchewan River may experience changes to water quantity, changes in water quality near the diffuser site, and changes to fish habitat at the diffuser site. Changes in the flow of the Saskatchewan River were modelled and found to be not significant for fish and fish habitat. Toxicity testing for water quality and water modelling at the diffuser found that the effect on fish near the diffuser will be not significant. Shore will continue to monitor water quality at the diffuser to ensure "parameter concentrations in the vicinity of the diffuser are not exceeding concentrations that are considered acceptable" (Section 6.3.1). Fish habitat loss due to the actual diffuser is included in the Fish Habitat Compensation Plan (Section 6.3.1.9).

Section 6.2.7 Surface Water Quality describes potential Project effects on surface water quality and sediment quality. To summarize, "residual effects on water quality after mitigation [are] forecasted to be not significant… All federal and provincial guidelines [are] forecasted to be met or are expected to fall within the natural variability of the Saskatchewan River and streams potentially affected by the project" (Section 6.2.7). Mine access road construction and maintenance are not predicted to affect water quality. Mitigation measures to maintain water quality are described in Section 2.0 and including recycling of water,

diversion of fresh water from potential contamination, and use of natural wetlands for treatment.

Habitation Valued Component

Ten habitation sites were recorded in the RSA, although there may be more sites which were not recorded. Nine of the sites are within the RSA, and one may be in the LSA or RSA. One is potentially along the Project access right-of-way. None are within the project footprint. Physical disturbance is not anticipated for any habitation site with the possible exception of the site along the Project access. Shore will continue to engage with WDN to determine if this habitation site will be impacted by the project and identify possible mitigations. Shore will also work with WDN to determine if access to any habitation sites will be changed.

Three of the habitation sites may be within the audible range of the mine, although these are within the acceptable nighttime noise levels as described in Section 6.2.3 Noise Impact Assessment.

Transportation Valued Component

WDN trails and transport corridors in the RSA include use of Division Road, Torch Trail, possibly portions of Wapiti Road and a nearby creek, the Saskatchewan River, and routes within the Project area possibly to the Saskatchewan River. Routes within the Project area will be inaccessible for the life of the Project. Based on the map provided, it is possible that around ten kilometers of travel routes will be impacted by the reduced access zone , which is less than 10% of the recorded travel routes (137km). It is unclear if the travel routes are used to access any particular location or site. Shore will continue to engage with WDN to ensure access to important sites and locations, in particular through the relocation of Lars Road.

Access will change in the FalC Forest due to the project. A lack of access within the FalC was noted as of particular concern to WDN members, “[c]urrent roadblocks and decommissioning of roads have made accessing portions of the Fort à la Corne Forest difficult” (Integral Ecology and Wahpeton Dakota Nation 2011: 31). As noted in Section 6.4.3 Non-Traditional Land and Resource Use, the following access upgrades will be made in and around FalC:

- Highway 55 to provide turning lanes from the highway on to the Shipman Trail access road,
- the Shipman Trail access road, and
- the White Fox River Bridge.

These upgrades will increase ease of access to FalC in general, in particular the all-weather Shipman Trail access road. Lars Road will be re-routed around the overburden pile. The increase in ease of access will be both positive and adverse for traditional users. Ease of access to conduct traditional harvest activities will be positive, but the increase in ease of access of non-Aboriginal harvesters and recreational users also may be adverse. Shore will work with WDN and other stakeholders to develop suitable access management strategies and participate in regional awareness or education initiatives that are intended to encourage appropriate use of the FalC Forest. Increase in non-Aboriginal hunting may be mitigated through changes in hunting regulations to limit non-Aboriginal hunting as described in the Wildlife Effects Assessment (Section 6.3.3). The frustration expressed by WDN members and noted above about lack of access due to existing and planned decommissioning of smaller side-roads indicates that increased side-road access (apart from the main roads, which remain open) would be considered a benefit.

Cultural and Spiritual Valued Component

Three cultural/spiritual values were recorded in the RSA. Two may be within the LSA; one of these might be impacted by the reduced access zone during the Operations phase (Star pit). Recorded points were randomized and buffered so exact locations were not included in the report. Shore has initiated a dialogue with WDN about mitigation for the one cultural/spiritual site which may be within the reduced access zone. The other two sites are not within the exclusion zone created by the Project. For all three sites, the noise level will be above the background baseline nighttime noise level but below the acceptable nighttime noise level (see 6.2.3 Noise Impact Assessment).

Indigenous Landscape Valued Component

Three traditional WDN place names were recorded in the RSA. According to the map, the whole forest is part of one or more names. Shore will engage with WDN about the named places for further information and mitigation as appropriate. WDN members also indicated a concern that the Project may impact their ability to transmit traditional knowledge and use information, and the effect of the Project on WDN spiritual connection to the forest. The transmission or teaching of skills required to carry out traditional activities is generally considered to require time ‘on the land’ – in other words, multi-generational ‘practice’ of traditional skills. Interruptions to hunting and harvesting may have an adverse effect on learning traditional skills for a younger generation.

Hunting and gathering activities will be displaced but not otherwise impacted. However, the possibility of an effect from changes to household activities due to employment will be bi-directional; i.e., positive due to more money to fund the harvest and adverse due to less time available for the harvest by those who work. If requested, Shore will work with the Wahpeton to ensure opportunities exist to teach and learn traditional skills in an appropriate

setting (for example, support for an Elder-led traditional science camp, perhaps even offering school credit).

Table 6.4.2-10: VC Effect Attributes for WDN

VC Assessed	Magnitude	Direction	Duration	Geographic Extent	Frequency	Significance Rating
Subsistence Valued Component	Low	Adverse	Long-term	Local	Continuous	Not significant
Habitation Valued Component	Low	Adverse	Long-term	Local	Continuous	Not significant
Transportation Valued Component	Low	Adverse and Positive	Long-term	Local and Regional	Continuous	Not significant
Cultural & Spiritual Valued Component*	Low/ Unknown	Adverse	Long-term	Local	Continuous	Not significant
Indigenous Landscape Valued Component	Low	Adverse	Long-term	Local	Continuous	Not significant

Note: * Confidence in this attribute is low until further discussions with WDN about mitigation and location of cultural site(s) are held.

Other concerns and recommendations

The WDN TLU report included a list of concerns and seven numbered mitigation recommendations (Integral Ecology and Wahpeton Dakota Nation 2011: 33-34). These are included here with further information relating to impact assessment. Discussions between WDN and Shore about effective mitigation and WPN concerns and recommendations, including an impact-benefit agreement, are on-going and will be considered in detailed project planning and implementation.

A. *Destruction of forest considered disrespectful:*

1. *Recommendation: utmost care to create as little environmental disturbance as possible*.

Information on disturbance is included in Section 6.4.3 Non-Traditional Land and Resource Use and Section 6.3.3 Wildlife.

2. *Recommendation: implementation of mine reclamation practices that will restore impacted land to a state that will support equivalent ecosystem productivity and traditionally used species populations as pre-development conditions.*

As noted above, the total amount of areas of vegetation ranked as high and medium for traditional plant use potential will decrease slightly as a result of project clearing. Residual effects are expected to be reduced to low at project closure for both the LSA and RSA (see Appendix 6.3.2-A). Project effects on ungulate populations within the RSA are small, reversible, and can be easily mitigated. Waterfowl habitat will increase over the base case upon project closure. Sections 2.7 Decommissioning, Closure and Reclamation Phase, 7.5 Closure and Reclamation Plan, and 10.2.4 Closure include further information on closure and reclamation. Shore will work with WDN when doing detailed project planning for all phases including decommissioning/closure.

3. *Recommendation: the participation of WDN members on environmental monitoring activities throughout the construction, operation and reclamation of the Project*.

Shore would be pleased to discuss appropriate participation of WDN members in environmental monitoring. This could be accomplished through direct employment or consideration through future agreements to ensure benefits to Aboriginal communities.

B. *Potential negative effects to human health:*

- *Concern: contaminants from proposed mine will have negative effects on human health*.

The Country Food Assessment (Section 6.4.5) indicates that there likely will be negligible exposure to chemicals of potential concern through the consumption of fish, plants and berries, and game.

C. *Loss of hunting area, especially large game*:

- *Concern: cultural connection to land fostered through hunting will be diminished.*

The effects on hunting will be mitigated as described above. Shore will continue to engage with WDN to promote traditional use of the FalC Forest.

- *Concern: game animals as food source will be harder to come by*.

Project effects on ungulate populations within the RSA are small, reversible, and can be easily mitigated.

4. *Recommendation: set aside hunting preserve of equal size and game productivity as affected forest area*.

Shore encourages the WDN to work with the Government on this issue.

D. *Contamination of the Saskatchewan River*:

- *Concern: fish will no longer be safe to eat*.

The Country Food Assessment (Section 6.4.5) indicates that there will likely be negligible exposure to chemicals of potential concern through the consumption of fish, plants and berries, and game.

- *Concern: the health of the river will decline and its ability to continue to be a cultural and spiritual site will be damaged.*

Changes to water quantity and changes in water quality near the Saskatchewan River diffuser site, and changes to fish habitat at the diffuser site are described in Section 6.3.1. Changes in the flow of the Saskatchewan River were modelled and found to be not significant for fish and fish habitat. Toxicity testing for water quality and water modelling at the diffuser found that the effect on fish near the diffuser will be not significant. Shore will continue to monitor water quality at the diffuser to ensure "parameter concentrations in the vicinity of the diffuser are not exceeding concentrations that are considered acceptable" (Section 6.2.8).

E. *Aboriginal people's livelihoods will be negatively impacted*:

- *Concern: local Aboriginal people's livelihoods will be negatively impacted by environmental destruction from proposed mine*.

The TLU Effects Assessment has determined that economic effects on TLU will be not significant.

5. *Recommendation: employ Aboriginal people to be 60 percent of workforce in proposed mine. The Aboriginal people to be employed at the proposed mine should include Members of WDN.*

As noted in Section 6.4.1 Socio-Economic Effects, Shore will continue "to honour responsibilities associated with being a signatory to the FalC Employment Partnership whereby the parties agree that Aboriginal persons are significantly under-represented in the provincial workforce and that efforts on the part of all of the partners are needed to facilitate a representative workforce, where Aboriginal people are employed in all classifications in proportion to their representation in the working age population."

6. *Recommendation: provide preferred contracting opportunities to WDN- owned companies*.

Shore's procurement strategy, developed throughout exploration, attaches a high value to local and Aboriginal businesses. Shore intends to formalize these values in appropriate agreements with Aboriginal groups.

7. *Recommendation: negotiate a satisfactory impact benefit agreement with WDN*.

Shore recognizes that development of a satisfactory impact benefit agreement can be considered appropriate mitigation for effects on TLU. Shore intends to continue to build the relationships established, as described in Chapter 4, and to work with Aboriginal groups to identify mutually beneficial agreements.

B. Loss of wildlife and plant habitat:

- *Concern: wildlife will be 'driven out' of the forest*.

Specific effects on wildlife are included in Section 6.3.3 Wildlife.

- *Concern: important ceremonial plants will become hard to find.*

As noted above, clearing will reduce traditional plant potential slightly (less than 1% in the RSA) during the project, but residual effects are low (see Appendix 6.3.2-A).

C. Lack of access to forest due to blocked roads

- *Concern: parts of Fort à la Corne forest will no longer be accessible for land use activities, including productive hunting areas and berry patches*.

Shore will continue to engage with WDN about the relocation of Lars Road and other access concerns, and encourage WDN to participate in regional planning.

Overall, the WDN TLU report asserts that,

> Without the successful implementation of mitigation measures [numbered one through seven, above], WDN monitoring, and the provision of a satisfactory impact benefit agreement, the residual Project-related effects on the Aboriginal title and rights, and other interests of the WDN will be significant (Integral Ecology and Wahpeton Dakota Nation 2011: 42).

Effects Assessment: Red Earth Cree Nation and Sturgeon Lake First Nation

The Red Earth Cree Nation TLU report indicated they hunt for ducks, geese and grouse in the FalC area (Red Earth Cree Nation and Hobbs and Associates 2010). The Sturgeon Lake First Nation TLU report did not contain information on the traditional use of the area (Sturgeon Lake First Nation 2010). Some information on the number of Aboriginal people living on reserve who participated in traditional harvesting activities was collected as part of the 2001 census (Statistics Canada 2001). Data were available for the Sturgeon Lake 101 reserve but not the Red Earth 29 reserve. The information showed 27% of adults on the Sturgeon Lake 101 reserve hunted in the previous 12 months, with all of them hunting for food. On the Sturgeon Lake reserve, 39% of adults fished, with 85% fishing for food. Additionally, 53% of adults gathered wild plants, primarily (81%) for food. Eight percent of adults on the Sturgeon Lake 101 reserve reported trapping in the previous 12 months. However, the reported activities do not necessarily occur within the RSA.

Effects on Red Earth Cree Nation and Sturgeon Lake First Nation TLU may include changed and/or impeded access and exclusion from traditional use areas. Exclusion will be based on a physical brush barrier to be constructed around the project and other Project facilities, and for hunting, will also include a 500m buffer from all occupied areas. See Table 6.4.2-1 and Figure 6.4.2-1 for more information. Other possible effects on TLU are likely to be linked to direct physical disturbance. The Non-Traditional Land and Resource Use (NTLRU) effects assessment (Section 6.4.3, Non-Traditional Land and Resource Use) indicates that physical disturbance in the LSA and RSA will have no significant residual effects (Table 6.4.3-5 in Section 6.4.3, Non-Traditional Land and Resource Use).

Effects on Red Earth Cree Nation and Sturgeon Lake First Nation TLU may also include:

- effects on wildlife, plant, and fisheries and their habitat leading to reduced abundance/availability for harvesting;
- changes to the environment (air and noise emissions, water quality, etc.) in a way that could adversely affect the health, abundance, or behaviour of wildlife, fish, or plant populations leading to reduced abundance or ability to harvest; and potential to adversely affect human health through consumption (or use) of these animals or plants;
- socio-economic factors which increase or decrease the ability to conduct traditional activities;
- loss of culturally important areas including burial sites, camps, cabins;
- influx of non-Aboriginal people accessing the area for hunting or other reasons which may affect wildlife and subsequently result in reductions in Aboriginal hunting success; and

As baseline information is not fully available, VCs of hunting, gathering, and fishing will be used. Other changes described below include changes in access and an influx of non-Aboriginal hunters.

Hunting

Hunting is often considered an important traditional activity. The ungulate Valued Component from the Wildlife Effects Assessment (Section 6.3.3) is used to assess effects on the hunting. . The wildlife effects assessment concludes that "Project effects on ungulate populations within the RSA are small, reversible, and can be easily mitigated" – mitigation suggestions are detailed in the wildlife effects assessment chapter (Section 6.3.3) and include suggesting changes to the hunting season draw quotas, season timing and bag limits within the ungulate population management units, and regional planning (likely to include closure of certain access trails). These mitigations may affect Aboriginal hunters positively by ensuring ungulate populations remain at a level adequate for hunting by regulating non-traditional hunting in the RSA. Aboriginal hunters may also be adversely affected if they regularly use access trails designated for closure to protect the ungulate populations. To mitigate this possible adverse effect, Shore will encourage Aboriginal participation in regional planning processes.

The wildlife effects assessment also indicates that the "effects assessment on terrestrial, aquatic and semi-aquatic fur-bearer populations within the RSA in general is also considered minimal during the construction and operations phases." The Country Food Assessment (Section 6.4.5) indicates that there likely will be negligible exposure to chemicals of potential concern through the consumption of fish, plants and berries, and game. As many Aboriginal hunters share meat with family and community members, impacts on hunting may trickle down to sharing of meat, which will have caloric, economic, social, and cultural effects. If hunting declines due to increased employment (see below) then it is possible that sharing of meat will decline. If hunting increases due to increased employment, then it is possible that the sharing of meat will increase.

As noted in section 6.4.1.8, "Shore Gold has indicated that local First Nations and Métis could account for 27 % of the operational workforce or approximately 200 jobs. Given that only 47 % of the adults on First Nations reserves in the SRSA were actively working or seeking work and that 301 of these were unemployed (an unemployment rate of 32 %), the addition of up to 200 jobs has the potential to drop Aboriginal unemployment rates." The economic effect of the project on Aboriginal harvesters may be both positive (potential for gaining high-paying employment, having disposable income to pay for hunting necessities) and adverse (removing opportunity due to time spent at the place of employment and potential employment-related quality of life issues).

Gathering

Aboriginal use of the FalC area likely would include the harvest of berries and medicinal plants. The mine may be audible on a quiet day to berry harvesters within 2-3 km of the exclusion zone. Berry harvest will be displaced from the exclusion zones for the life of the project to either existing berry areas throughout the RSA, or to new areas. Section 6.3.2

Vegetation and Plant Communities includes an assessment of potential impacts on 'traditional use plant potential' which refers to the capability for any vegetation type to support plant species used for traditional production rather than known traditional use. The assessment concludes that vegetation areas ranked medium to high for traditional use plant potential (see Appendix 6.3.2-A) is about 16% of the LSA (2,006 ha out of 12,218 ha) and 31% of the RSA (42,256 ha out of 132,768 ha). The total amount of areas of vegetation ranked as high and medium for traditional plant use potential will decrease by 13% in the LSA and <1% in the RSA as a result of project clearing.

At closure, according to this assessment, "Jack pine and trembling aspen dominated forests are expected to be the predominant vegetation type in the reclaimed landscape, and since these two forest types are responsible for a large proportion of the high and medium rankings of vegetation for traditional use plant potential, residual effects are expected to be reduced to low at project closure for both the LSA and RSA." Shore will work with Aboriginal communities to ensure traditional production of plants and berries is a consideration in reclamation and closure planning as appropriate. The Project is removing an area used for gathering from future use.

Fishing

A Fish Habitat Compensation Plan will be developed for the areas of fish habitat that the Project affects. All potential Project-related impacts on fish species in the Saskatchewan River were rated as not significant as impacts are anticipated to be minimal and mitigable (refer to Section 6.3.1). The Fisheries and Aquatic Resources Effects Assessment section describes potential Project effects by water body, including the Saskatchewan River.

The Saskatchewan River may experience changes to water quantity, changes in water quality near the diffuser site, and changes to fish habitat at the diffuser site. Changes in the flow of the Saskatchewan River were modelled and found to be not significant for fish and fish habitat. Toxicity testing for water quality and water modelling at the diffuser found that the effect on fish near the diffuser will be not significant. Shore will continue to monitor water quality at the diffuser to ensure "parameter concentrations in the vicinity of the diffuser are not exceeding concentrations that are considered acceptable" (Section 6.3.1). Fish habitat loss due to the actual diffuser is included in the Fish Habitat Compensation Plan (see section 6.3.1.9).

Section 6.2.7 Surface Water Quality describes potential Project effects on surface water quality and sediment quality. The assessment of water quality included several components: predictions the effects of the Saskatchewan River diffuser, as well as effects on site tributaries, the Codette Reservoir, potable water supply, and closure water quality of the streams and end pit lakes. Water immediately downstream (40 m) of the Saskatchewan River diffuser is modelled to have acceptable levels in all water quality parameters.

Modelling of water quality changes in streams predicted that water quality will remain generally within natural variations and close to baseline levels during Project activities and after closure. To summarize, "residual effects on water quality after mitigation [are] forecasted to be not significant… All federal and provincial guidelines [are] forecasted to be met or are expected to fall within the natural variability of the Saskatchewan River and streams potentially affected by the project" (Section 6.2.7). Mine access road construction and maintenance are not predicted to affect water quality. Mitigation measures to maintain water quality are described in Section 2.0 and including recycling of water, diversion of fresh water from potential contamination, and use of natural wetlands for treatment.

Changes in Access

Increased or decreased access to traditional lands may affect TLU. Transportation routes through the FalC area were identified by the Red Earth Cree Nation as important aspects of TLU (Hobbs and Associates 2010). Access to the exclusion zone created by the brush barrier and other Project facilities will prevent access to some areas previously used for traditional production. Lars Road will be re-routed to maintain previously existing access to areas outside of the Project footprint. Access along the Shipman Trail will be improved due to upgrades to the road. As stated in the NTLRU effects assessment section (6.4.2), changes to access to the RSA will be not significant.

Influx of Non-Aboriginal Hunters and Fishers

An increase of non-Aboriginal people using resources and areas important to TLU may affect TLU. However, the NTLRU effects assessment (Section 6.4.3, Non-Traditional Land and Resource Use) suggests that effects on access, land base, and hunting effort will be not significant.

Summary

Based on available information, effects to Red Earth Cree TLU and Sturgeon Lake TLU will be not significant (see Table 6.4.2-11).

Table 6.4.2-11: VC Effect Attributes for Red Earth Cree and Sturgeon Lake

VC Assessed	Magnitude	Direction	Duration	Geographic Extent	Frequency	Significance Rating
Hunting	Low	Adverse	Long-term	Local	Continuous	Not significant
Gathering	Low	Adverse	Long-term	Local	Continuous	Not significant
Fishing	Low	Adverse	Long-term	Local	Continuous	Not significant

6.4.2.3 Mitigation

Shore may mitigate effects on TLU through Impact and Benefit Agreements, through mitigation measures described above, and through mitigation measures as indicated in the wildlife, fisheries and aquatic resources, non-traditional land use, socio-economic, and vegetation effects assessments, and measures indicated in other effects assessment sections. Shore is committed to further dialogue about identifying and reducing or managing Project effects on TLU. Shore commits to "incorporate traditional knowledge and traditional land use information (when available) into closure planning so that traditional uses can continue after closure" (Section 2.7).

6.4.3 Non Traditional Land and Resource Use

This Section provides an assessment of existing non-traditional land and resource uses in the Project study areas.

6.4.3.1 Introduction

This assessment considers Project effects throughout the following Project phases: construction, operations and closure and decommissioning. Land uses assessed include those related to land use activity on Crown land, including related plans and policies, disturbance, access, industrial and commercial uses, and outdoor recreation.

6.4.3.2 Scoping, Effects Identification, and Confirmation

The Project is proposed in an area subject to numerous land and resource uses. Areas with overlapping land use interests and effects on land users, access and resources are identified and discussed in this Section.

Study Area

The spatial boundaries for the study area used in the effects assessment, both local and regional, parallel those of the terrestrial disciplines. Two study boundaries were established from the terrestrial disciplines and include the following:

- a local study area (LSA), including a Project footprint plus buffer zone (Figure 5.3.1-1); and
- a regional study area (RSA) including the Project and surrounding area determined to be a zone of influence (Figure 5.3.1-2).

The LSA is consistent with the one defined for the terrestrial disciplines, and is located within the FalC forest immediately north of the Saskatchewan River, and downstream of the convergence of the North and South Saskatchewan Rivers within townships 48, 49 and 50,

range 19-20, and west of the second meridian. The LSA encompasses a total area of 12,217 ha.

As with the LSA, the RSA used for the assessment is analogous to the one used by the terrestrial disciplines, and follows the boundaries of the FalC Forest (132,768 ha). As project disturbance does not extend outside the terrestrial RSA into the socio-economic regional study area (SRSA), inclusion of the latter study area was determined not to be relevant to the assessment of linear and non-linear disturbance.

The temporal boundaries include the baseline characteristics of the environment, at the time of the assessment, and include effects on land and resource use stakeholders during construction, operations and, closure and decommissioning phases of the Project.

Issues

Key Project issues for non-traditional land and resource use (NTLRU) were scoped and identified through a variety of methods described in Section 6.1 (Overview and Methods). Identified issues were scoped based on their potential interactions with Project components for the construction, operations and closure and decommissioning phases and were either considered in or scoped out of the assessment. The scope as described is consistent with the PSGs, issued by SMOE pursuant to the *Environmental Assessment Act* and the *Canadian Environmental Assessment Act*.

The relevant issues that were scoped and subsequently identified for further assessment during this exercise include the following:

- potential disturbance to industrial and commercial land interests, including forestry, and mineral exploration;
- potential conflict with tenures (tenure holders) on crown lands;
- potential disturbance to designated areas within land use planning areas, and consistency with municipal plans and policies;
- disturbance to non-Aboriginal hunting and fishing activities;
- disturbance to recreational activities; and
- disturbance to trapping activities; and
- temporary sensory disturbance to big game animals during construction period that might affect non-Aboriginal hunting pursuits in the immediate vicinity of Project facilities.

Issues that were not considered in the NTLRU assessment include:

- issues related to guide-outfitters. As stated in the Fort à la Corne Integrated Forest Land Use Plan (FalC IFLUP), guide outfitting is currently prohibited within the boundaries of

the FalC (RSA); therefore, issues related to guide outfitting were not included in the assessment;

- the effects on agriculture and grazing; currently, there are no agricultural or grazing activities that fall within the boundaries of the LSA; as a result, effects relating to agriculture, grazing and related activities were not assessed;
- effects related to environmentally important areas; there are no environmentally important areas located in the LSA nor RSA; therefore, effects relating to environmentally important areas were not assessed;
- potential disturbance to aggregate resources. It has been determined that most of the Project's aggregate needs will be met through the excavation of the Star and Orion South pits and the subsequent creation of the overburden and rock storage pile, and no issues are anticipated regarding aggregate resources within the study areas. The Project will, however, be required to comply with provincial sand and gravel policies currently in place for sand and gravel sites, as outlined in the FalC IFLUP;
- potential disturbance to Watershed Source Water Protection Plans; currently, these plans intersect small portions of the RSA and do not overlap with the LSA; and
- potential disturbance to power generation; power generation facilities, including Francois-Finlay Dam and Nipawin Power Station are located outside of both the LSA and the RSA; therefore, no issues are anticipated.

Effect Rating

In determining Project-specific effects and cumulative effects, this assessment compares three scenarios, including the 'the Base case,' 'the Project case' (the Base case plus the proposed Project) and the 'Cumulative Case' (the Project case with the addition of all reasonably foreseeable Projects acting in combination with the Project).

Magnitude ratings for non-traditional land and resource use Valued Components (VCs) were guided by a combination of Project-specific data, relevant literature, quantitative and spatial analysis, in addition to professional opinion. After considering the effectiveness of management, mitigation and compensation, residual environmental effects on land and resource use are characterized by rating each effect's magnitude, duration, geographical extent, frequency, reversibility, and level of confidence in the characterization criteria.

For the purposes of this assessment a significant residual adverse environmental effect on land and resource use is one where the VC in question has moderate or higher magnitude effects, either locally or regionally, and is determined to be permanent or long-term in duration.

Cumulative environmental effects are assessed from the sum of residual effects on a VC that would reasonably be expected to overlap with human activities outside the Project.

6.4.3.3 Valued Components

Valued Components (VCs) are those components that represent an important aspect to the healthy functioning of a system as a whole. VCs are also important because of what they represent to people and communities. A number of relevant scoping exercises were done when evaluating potential VCs for their inclusion in the assessment. These include a series of professional judgments to determine validity for inclusion, including ecological or social elements of concern, vulnerability to effects, previous identification in literature and by communities, in addition to other available information.

The following are the VCs for NTLRU:

- land use plans and polices;
- physical disturbance;
- access;
- industrial and commercial land uses - which includes mineral exploration and forestry; and
- outdoor recreation - includes hunting, fishing and non-consumptive outdoor pursuits and related activities.

These VCs encompass the range of land and resource use activities within the LSA.

Potential Project environmental effects have been identified for each of these VCs in this section, which are consistent with the PSGs issued by the SMOE pursuant to the *Environment Assessment Act* and the scoping document issued by the Canadian Environmental Assessment Agency.

6.4.3.4 Effects Assessment

This Section describes the effects of the Project on land use plans and policies, disturbance, access, industrial and commercial land use and outdoor recreation.

Land Use Plans and Policies

The provincial land use plan directly relevant to the Project and the geographic extent of the LSA is the Saskatchewan Ministry of Environment's Draft FalC Provincial Forest Integrated Forest Land Use Plan (IFLUP).

Within the LSA, the Project intersects the 'Management, Sensitive and Protection Zones' as listed in the FalC IFLUP. Management directives for the 'Management Zone,' which intersects the largest portion of the Project footprint, require compliance with current guidelines, policies and regulations. The management zone intersects 4117 ha (98.9 %) of

the Project footprint within the LSA (Table 6.4.3-1). The zone currently has the lowest level of restriction and acceptable uses including those activities, such as mining, that are allowed through existing legislation and policies of the Saskatchewan provincial government.

Table 6.4.3-1: FalC IFLUP Zones within the Project Footprint

Zone	Footprint Area (ha)	% of Footprint
Management	4,116.9	98.9
Sensitive	43.5	1.0
Protection	2.7	0.1
Total	**4,163.1**	**100.0**

The Project footprint intersects 43.5 ha (1.0 % of the footprint area) of the 'Sensitive zone'. The 'Sensitive zone,' which focuses primarily on wildlife habitat conservation, permits mining and mineral exploration within its boundaries, subject to a review under the environmental assessment review process. Similarly, the 'Protection zone' (0.1 % of the footprint area), which employs the highest level of protection for unique or environmentally sensitive features, also permits mineral exploration and mining subject to a completed environmental assessment review process.

In keeping with the stated goals and objectives of the zoning framework, and if the environmental assessment is approved, the Project will comply with the objectives of the land use policies, plans and regulations related to all three zones within the FalC IFLUP. As a result, no interference is anticipated from the Project as a result of construction, operations, and decommissioning, and effects are determined to be neutral.

Similarly, the Project is also consistent with the objectives of municipal land use plans and policies as outlined by the Torch River Rural Municipality. As a result, no interference is anticipated from the Project, and potential effects are predicted to be neutral.

Disturbance

For the purposes of the land and resource use component, disturbance refers to the replacement of natural land cover with a human-modified landscape that may or may not be covered by infrastructure. Natural in this case refers to the original land cover prior to onset of industrial activities in the study area(s), or re-vegetated with new growth mature enough to support forest harvesting and/or the ecosystem services available prior to the original disturbance. The Project will add 3,881 ha of disturbance to the LSA, which is 12,217.72 ha (Table 6.4.3-2), due to construction of the Orion South and Star pits, water management reservoirs, wells, a sewage lagoon, two kimberlite containment areas (for Coarse and Fine

PK), multi-use corridors, a temporary construction camp, pipelines, an explosives storage area, associated site facilities and an overburden and rock storage pile.

In the context of the overall Project case (baseline plus the proposed Project), total disturbance in the LSA will increase from a Base case of 3,618 ha (see Table 5.4.3-2) to the combined Project case of 7,499 ha, resulting in an increase from 29.6 % to 61.4 % of the LSA being disturbed. The majority of the baseline disturbance is related to recent clearcutting (21%) in the LSA and is attributed to clearing land for mineral exploration activities. The Project's direct contribution to the overall disturbance within the LSA is 32 % (Table 6.4.3-2).

The areas that will be inaccessible for recreation or other resource uses varies by project phase from nearly 38% of the LSA during construction to over 44% when both the Star and Orion-South pits are being mined. The spatial extent of these phases is shown in Figure 6.4.3-1 Areas of Restricted Access for the Exercise of Traditional Activities over the Life of the Project. Prior to mitigation, this represents a predicted high magnitude effect within the LSA.

Table 6.4.3-2: Project Footprint Disturbance (Local Study Area)

Source of Disturbance	LSA Area (ha)	% of LSA
Overburden and Rock Storage Pile	2008.29	16.44
Orion South Pit	427.56	3.50
Star Pit	588.82	4.82
PKCF	513.59	4.20
Coarse PK	179.91	1.47
Camp/Plant Facilities	37.07	0.30
Runoff Pond	6.2	0.05
Diffuser	1.15	0.01
Conveyor	32.81	0.27
Multi-Use Corridors (includes right of way and Corridor within LSA)	79.62	0.65
Pipelines	2.95	0.02
Explosives Storage Area	0.04	0.00
Wells	0.07	0.00
Sewage Lagoon	2.88	0.02
Total Disturbed Area	**3880.96**	31.77
Total Inaccessible Area During Construction Phase	**4640.83**	37.98
Total Inaccessible Area During Star Phase	**5380.87**	44.04
Total Inaccessible Area During Orion-South Phase	**4781.13**	39.13

A portion of Project footprint disturbance extends into the RSA as the multiuse corridor which includes the right of way (ROW) for road access and utilities corridors. This adds an additional 61 ha, or less than 1 % of the total area of the RSA (i.e,. area outside the LSA).

The direct contribution of the Project footprint to the overall disturbance within the RSA (i.e., which includes areas within and outside the LSA) is 3 % (Table 6.4.3-3). The Project's direct contribution to the overall inaccessibility to non-traditional land users within the RSA varies by phase of the project between 3.5 % during construction and 4.1 % when both the Star and Orion-South pits are being mined as shown in Figure 6.4.3-1 Areas of Restricted Access for the Exercise of Traditional Activities over the Life of the Project. Disturbance will be minimized via progressive reclamation throughout the operations phase and extending into the decommissioning phase, in combination with consistent planning and management of the landscape. The decommissioning phase, which will include final closure and reclamation efforts, is anticipated to occur over a three year period.

Table 6.4.3-3: Project Footprint Disturbance (Regional Study Area)

Source of Disturbance	RSA Area (ha)	% of RSA
Overburden and Rock Storage Pile	2008.29	1.51
Orion South Pit	427.56	0.32
Star Pit	588.82	0.44
PKCF	513.59	0.39
Coarse PK	179.91	0.14
Camp/Plant Facilities	37.07	0.03
Runoff Pond	6.2	0.00
Diffuser	1.15	0.00
Conveyor	32.81	0.02
Multi-Use Corridors (includes ROW and Corridor within LSA and RSA)	140.95	0.11
Pipelines	2.95	0.00
Explosives Area	0.04	0.00
Wells	0.07	0.00
Sewage Lagoon	2.88	0.00
Total	**3,942.29**	2.97
Total Inaccessible Area During Construction Phase	**4640.83**	3.50
Total Inaccessible Area During Star Phase	**5380.87**	4.05
Total Inaccessible Area During Orion South Phase	**4781.13**	3.60

Progressive reclamation during the operating and decommissioning phases, in combination with the low of percentage disturbed and inaccessible areas of the RSA (4 % or less), will

result in residual effects that are considered negative (increased disturbance) and predicted to be low in magnitude.

Full project reclamation will not be complete until the final phase of the Project, and the effect is therefore anticipated to be long-term in duration and continuous in frequency, local in geographic extent (confined primarily to the LSA), and ultimately reversible. The residual effect rating for disturbance is stated with high confidence, and is considered to be not significant.

Access

Existing access within the LSA and RSA consist of roads and trails of varying length. Changes in access may have positive or negative effects on various land and resource uses; i.e., can be altered by year-round access that would be created by the project during construction and operations. Changes to access consist of the upgrading of existing roads within the FalC to a multi-use corridor including a site access road, ROW and utilities.

Access upgrades are proposed for:

- Highway 55 to provide turning lanes from the highway on to the Shipman Trail access road,
- the Shipman Trail access road, and
- the White Fox River Bridge.

These upgrades are summarized below and explained in further detail in section 2.0. Within the mine site, a conveyor maintenance road will be developed to allow ease of access to mine facilities.

Lars Road will be relocated to allow for stockpiling overburden. The routing of the relocated Lars Road is to be determined with stakeholder and Aboriginal community input. There is the possibility that existing trails from the Twin Lakes area could be upgraded to connect to the south part of Lars Road.

An access corridor encompassing a roadway, communication lines, and a natural gas pipeline is proposed. It will extend from Highway 55 near Shipman south to the current bridge at the White Fox River on Shipman Trail and on to the mine site.

Once in the FalC, the corridor will generally follow the existing alignment of Shipman Trail for approximately 4.6 km, then follow the height of land along the drainage divide between English Creek and Caution Creek, then proceed south to the proposed mine site. This alignment reduces stream crossings and potential environmental impacts. The road will be constructed along 9 km of existing rural municipality ROWs north of the FalC. Within the

FalC forest, approximately 20.9 km will be off-grid. Discussions with the Rural Municipality of Torch River indicate that an existing grid ROW elsewhere in the FalC forest will be exchanged for the proposed ROW alignment. The access corridor will cross an existing high pressure natural gas line south of Highway 55, the White Fox River at the northern boundary of the FalC and the upper reach of the East Ravine.

Provincial secondary highway grade standards will be followed for the construction of the access road. The access road will be constructed for a 110 km/h design speed and will be posted to a speed limit of 80 km/h or 90 km/h, meeting Ministry of Highways and Infrastructure standards. Two 3.7 m driving lanes plus paved 2 m shoulders are proposed for additional safety and ease of maintenance.

The preferred option for crossing the White Fox River is widening of the existing bridge. The widening will create a clear width of 12 m between the rails, and a roadway width of 11.4 m.

Overall, access to the FalC would be increased due to the upgrade of Shipman Trail to the point where it reaches the mine site. The mine site footprint becomes inaccessible (decrease in access) once construction begins and throughout the life of the mine to guard the safety of the public and the mining assets in the active mining areas. Prior to mitigation, this represents a moderate magnitude effect in the LSA since there is currently restricted access on the Shore lease areas and an overall predicted low to moderate magnitude effect in the RSA. Access related disturbance in both the LSA and RSA will span both construction and operation phases, and will be reclaimed, where necessary, over a five year period during the closure and decommissioning phase.

Shore will control access to the Project and ensure public safety with signage, rollback and fencing where necessary. Areas that are inaccessible are identified by project development phase in Table 6.4.3-3. Overall access to the RSA will be increased due to the Shipman Trail access road upgrades rendering it easier to travel on in all weather conditions than is currently the case. This road upgrade could be considered positive to land and resource users since it allows improved access for these uses. These changes to access could also be considered negative since increased access means more land and resource users could enter the area thus increasing competition for and use of these resources (such as wildlife). Access to the mine development area by land and resource users will be restricted entirely, which would be considered negative since it further limits access to within the Shore lease area. For these reasons, on balance, access for land and resource users is considered neutral.

Shore will work with First Nations and Métis people and stakeholders to develop suitable access management strategies and participate in regional awareness or education initiatives that are intended to encourage appropriate use of the FalC Forest.

Where applicable, Shore will follow the access management guidelines as set out by the FalC IFLUP. Access management guidelines outlined for the management zone of the FalC IFLUP indicate that operating plans within the FalC must minimize new access and utilize existing roads and trails whenever possible. In addition to clarifying responsibility for road maintenance, the guidelines suggest roads for industrial development should be closed as soon as possible after activities are completed. The guidelines also call for the continued maintenance of a linear development database (SMOE 2005).

In summary, with the implementation of these mitigation strategies, impact of the Project on access is considered neutral, local (restriction from mine development areas) and to a lesser extent, regional (improved access to land use areas but also could increase competition for resources). Effects due to linear access development outside of the Project footprint areas may potentially result in some positive effects for all resource users (see section on 'Outdoor Recreation' below), thus off-setting any negative effects at the local and regional levels to some extent. The magnitude of the effect is considered low and occurs continuously and over the long-term but is reversible at closure and therefore not significant.

Industrial and Commercial Land Uses

Exploration and forestry are the primary industrial and commercial land uses in the LSA.

Exploration

The LSA is subject to a variety of types of mineral exploration by several companies, including Forest Gate Resources Inc. and Great West Investments & Referrals, in addition to Shore and its affiliates. Within the larger FalC, mineral exploration claims are held by Ipsco Inc., Great Western Diamonds Corp, Star Uranium Corporation, Bandera Gold Ltd., and Ridgeback Global Resources Ltd.

The Project lies within mineral exploration claims held by Shore, its subsidiaries or partners, with the exception of the access road, which extends outside of Shore's claims. Project-related upgrades to the access roads within FALC will improve access to other claim areas, and can be considered a positive effect. Effects on mineral exploration claims holders due to the Project are not anticipated or could be considered positive.

Currently, there are no oil and gas activities occurring within the LSA, therefore no effects are anticipated.

Forestry

In the LSA, the FalC Plan sets out forest management strategies for the FalC, including a harvest volume schedule. Based on the FalC Plan, timber harvesting is permitted within the FalC, provided that the forest management strategies are met. Land disturbance in the LSA will represent a loss of harvestable land base due to presence of Project facilities on the

landscape that preclude reforestation until after site reclamation (see disturbance effects above). There will be a minimal loss of forestry resources as a result of the successive clearing of areas for the Star and Orion South pits, overburden and rock storage area, and the Coarse PK pile and the PKCF. It is anticipated that this loss will span the construction, operations and closure and decommissioning phases of the Project.

Cleared timber volume for the Project represents a predicted low magnitude effect that is localized, negative, a continuous and long-term loss of harvestable land base for potential forestry operations in the FalC and reversible at closure.

The proposed mitigation measures, including early consultation and notification, will result in minimal residual effects.

Outdoor Recreation

Outdoor recreation activities in the LSA and RSA include non-consumptive (e.g., hiking, cross country skiing), and consumptive recreational activities, (e.g., hunting and fishing); the effects of the Project on these activities are described below.

Non-Consumptive Recreational Activities

The creation of improved access routes that will last throughout and beyond the Project lifecycle may provide greater access for recreational use in the RSA but access controls may limit recreation in the LSA. Consumptive and non-consumptive recreational uses of the RSA can be enhanced by the year-round access via upgraded access corridors Recreation uses of the Saskatchewan River such as canoeing will not be impeded during any phase of the project. Due to the high security near the Project facilities, recreation use of the secured portion of the LSA will not be permitted. As a result, there will be a loss of access to 4% of the RSA for snowmobiling, mountain biking, ATVing and cross-country skiing activity. However, other options in the region offer better trails for cross-country skiing (trails north and west of Gronlid) and snowmobiling (Twin Lakes Trail Blazer trails north of Nipawin and to the east of the FalC Forest), and therefore, the residual effect is expected to be minor. As access to the RSA facilitates recreation use and inaccessible areas constitute a small proportion of the RSA (4%), there will be low magnitude impacts predicted for recreation opportunities within the RSA. Although specific use of the LSA is not well known, due to the presence of many recreation areas outside of the LSA, the residual effect is also considered to be low.

Construction of the Project and its associated components could also create both visual and noise disturbances and safety issues that could negatively affect outdoor recreational users and their associated activities. There will be some degree of noise disturbance resulting from equipment, and construction related activities. Similarly, visual disturbance will occur in areas located in proximity to the Project and will span the construction and operation phases

(Section 6.4.4). Mitigation strategies for noise and visual disturbance and safety related issues as they relate to outdoor recreational activities include:

- advance notification of Project schedules in the local media;
- use of appropriate signage on affected recreational trails, warning users of temporary trail closures, if scheduling is not possible or feasible; and
- controlling of access to the Project sites during construction, operations and decommissioning and promotion of public safety with signage, brush rollback and fencing, where and when necessary.

The residual effect on recreation from of changes to access within the RSA as well as to visual/noise disturbance and safety related issues is expected to be low in magnitude, local in geographic extent, long- term in duration, continuous in frequency and negative in direction. This minor residual effect characterization is not significant, and is stated with high confidence.

Hunting

Effects to wildlife may arise from habitat loss and habitat fragmentation and sensory disturbance due to construction, operation and decommissioning at a local scale, but these potential effects will not be significant to wide ranging species (ungulates, large predators, birds) at the population level (Section 6.3.3). Similarly, access corridors created for the Project could potentially disrupt ecosystem functions, and change the forest cover and habitat for wildlife, potentially altering the behaviour and population density of wildlife. There will be local changes in habitat structure that will alter the local wildlife community, and some species will have a positive response and others a negative response, but overall, the effects will be local.

Changes in habitat structure and its effects on wildlife could affect hunting effort and success rate in the immediate vicinity of the Project footprint during construction, operations and decommissioning. These effects could be subjectively determined as either positive or negative. They would have a positive effect where additional creation of access routes could enable access to previously inaccessible remote areas, thereby increasing hunting opportunity. Conversely, they would have a negative effect where access may create habitat fragmentation and increased numbers of hunters competing for wildlife resources, thereby negatively affecting hunting effort and success. The disturbances will also affect occurrence of wildlife whereby some species may avoid use of the Project area and vicinity because of displacement from disturbance, while others (such as species preferring edge) may be attracted to the project area. This may also have a local effect on hunting effort and success through local alteration of wildlife occurrence.

Following mitigation, including progressive reclamation of the Project site during operations and decommissioning, there will be low residual effects. The final effect rating to hunting effort and success rate is determined to be low in magnitude, local in geographic extent, long-term, continuous and negative in direction. This effect rating is determined to be not significant.

Trapping

The LSA overlaps the fur conservation area (FCA) P-085, which is primarily used for trapping in the winter. Project facilities and access will intersect this FCA. About 4.8 % of this FCA will be directly affected by Project footprint and facilities (Table 6.4.3-4).

Table 6.4.3-4: Project Effects on Fur Management Area

Trapline Management Unit	FCA Area - (ha)	FCA Area Within LSA (ha)	FCA Area Within LSA (%)	FCA Area Inaccessible Area (ha)	FCA Area Inaccessible Area (%)
Fur Conservation Area (FCA) P-085	111,819.2	12,217.7	10.9	5,381	4.8

Improved access could make it easier for trappers to access parts of their trapping areas. However, improved access could also result in direct and/or indirect impacts to wildlife, thereby negatively impacting trapper success. The Project will have a low effect on fur-bearing animals within the LSA as the effect of access corridors for the Project will be local in extent. Even though access corridors created for the Project could potentially disrupt ecosystem functions, and change the forest cover and habitat for wildlife, potentially altering the behaviour and population density of wildlife; and while some species will have a positive response and others a negative response; overall, the effects will be local (Section 6.3.3). About 76% of the annual fur block harvest is composed of aquatic and semi-aquatic furbearer species which is largely beaver and muskrat. The project design is intended to avoid most of the wetland and riparian habitats these species could potentially occupy within the LSA, thereby mitigating potential impact to those species which is predicted to be minimal.

Shore will attempt to mitigate impacts and prevent potential loss of revenue, and will also provide compensation for the affected trapline holder(s) in accordance with the provincial guidelines and associated proof of lost revenue. Shore will undertake appropriate discussions, including the provision of maps and early notification of Project development, with affected parties prior to and throughout the life of the Project to ensure that trappers'

interests are properly considered, effects avoided where possible and compensation paid where appropriate.

Residual effects on trapper success and the available trapping land base are predicted to be low in magnitude, local in geographic extent, long-term, and negative in direction. Impacts are reversible, and the likelihood of this effect occurring is high. The effect on trapping is expected to be not significant and is stated with moderate confidence due to the presence of other factors which may influence trapping success.

Fishing

Potential effects on sports fishing could include effects on access to sport fisheries due to the temporary suspension/alteration of access during project construction and any changes to sportfish species related to changes in water quality and/or quantity.

The only viable waterbody within the LSA with sports fishing potential is the Saskatchewan River. The Saskatchewan River currently is home to a variety of sportfish, including walleye, sauger, yellow perch, northern pike, cisco, goldeye, mooneye and lake sturgeon.

There is some anecdotal evidence that fishing in the Saskatchewan River is currently undesirable because of perceived or real of contaminant concentrations in fish. Any additional changes to water quality in the Saskatchewan River from mine water releases could be perceived by fishers as a further deterrent for fishing (or fish consumption). Discussion of water quality effects and subsequent impacts to fish populations are contained in Sections 6.2 and 6.3. All potential Project-related impacts on fish species from changes in water quality in the Saskatchewan River were rated as not significant as impacts are anticipated to be minimal and mitigable (refer to Section 6.3.1).

Access to the portion of the Saskatchewan River that borders the LSA may be disrupted temporarily and could have the potential to cause minor inconvenience to sport fishers accessing the Saskatchewan River from the main access route north of the Project (i.e., Shipman Trail). However, sport fishers wishing to access the North Saskatchewan River are more likely to use the boat launch on Highway 6 than access the River through the FalC Forest. In addition, due to the fact that the region outside the study area contains a number of high quality sport fishing lakes, including Codette and Tobin lakes, that are highly accessible and in close proximity, one can deduce that there are other opportunities and areas for fishing, including the extent of Saskatchewan River outside the LSA. Therefore, the effects to accessing sport fisheries are predicted to be low in magnitude.

Following mitigation, Project specific contributions to the fishing success rates during all phases of the Project are predicted to be low in magnitude, long-term, negative in direction, continuous and local in geographic extent. The effects on sportfishing are considered not significant.

6.4.3.5 Summary of Residual Effects

The residual effects of the Project on NTLRU are summarized in Table 6.4.3-5.

Table 6.4.3-5: Residual Project Effects Summary Table

VC Assessed	Magnitude	Direction	Duration	Geographic Extent	Frequency	Significance Rating
Land Use Plans and Polices	n/a	Neutral	n/a	n/a	n/a	n/a
Disturbance	Low	Negative	Long-term	Local	Continuous	Not Significant
Access	Low	Neutral	Long-term	Local and Regional	Continuous	Not Significant
Exploration	n/a	Neutral	n/a	n/a	n/a	n/a
Forestry	Low	Negative	Long-term	Local	Continuous	Not Significant
Non-Consumptive Recreational Activities	Low	Negative	Long-term	Local	Continuous	Not Significant
Hunting	Low	Negative	Long-term	Local	Continuous	Not Significant
Trapping	Moderate	Negative	Long-term	Local	Continuous	Not Significant
Fishing	Low	Negative	Long-term	Local	Continuous	Not Significant

Note: n/a - not applicable.

6.4.3.6 Summary

This assessment has presented the potential effects of the Project on non-traditional land and resource uses and users. The majority of Project-specific land and resource use effects are negative since they increase disturbance and limit some uses in the local study area during the active mining period. Due to the presence of other regional recreation facilities and areas, and the positive influence an upgraded access road will have to allow better utilization of portions of the FalC Forest, effects are primarily low in magnitude Cumulative land use, linear access disturbance, and non-consumptive recreational use in the RSA is expected to be of low magnitude and long-term in duration if all proposed, planned and existing projects go ahead are described in Section 9.0.

6.4.4 Visual Assessment

6.4.4.1 Introduction

This Section describes the visual effects of the Project. Although ultimate determination of visual impact is highly subjective, several more qualitative factors, as described below, can be used to estimate potential effects.

6.4.4.2 Methods

Visual effects assessment methodology follows the intent of established methods (USDI-BLM 1980; BC Ministry of Forests 2001) while adapting these methods to attempt to describe the site specific nature of visual effects for the Project. In general, methodology includes determination of visibility using digital terrain models and other topographic detail, followed by digital rendering of real photographs to display potential changes in the landscape. These tools are then used to determine ratings to feed into an effects assessment. These ratings commonly include an estimate of the duration and frequency of visual changes, a determination of the sensitivity of those experiencing a visual change, and an estimate of the magnitude of visual change (Kent 1986).

Assessment of potential visual effects for the Project included consideration of three main factors, similar to those in Integral (2009): visibility, visual sensitivity (combination of frequency and subjective factors), and visual magnitude (consisting of scale and contrast within the overall landscape). These factors are described below. In addition, the visual material prepared for this assessment was presented to the public during Shore's 2010 Open Houses (Section 4.3.2) where the public had an opportunity to provide feedback as to the potential visual effects.

6.4.4.3 Visibility

Visibility refers to the possibility of viewing a change in the landscape as a result of the Project. Visibility is location specific, and depends on topography, screening by above ground objects (e.g., trees or buildings obstructing the views) and atmospheric conditions. Visibility was assessed using methods described in Appendix 6.4.4-A to determine from what areas the Project could be viewed, assuming no obstructions and clear atmospheric conditions. There are two results of this analysis: Project components potentially visible, or not visible.

6.4.4.4 Visual Sensitivity

Visual sensitivity is receptor specific, and assumes that various land users are more or less sensitive to changes in the landscape, based on frequency of use by an individual at a particular location, and whether or not the land users are located on private or public property. Consideration of ownership accounts for subjective factors that may increase

sensitivity to landscape changes. Visual sensitivity is determined according to Table 6.4.4-1 below.

Table 6.4.4-1: Determination of Visual Sensitivity

	Ownership	
Frequency of Use	**Public**	**Private**
Continuous (daily)	Moderate	High
Periodic (weekly/monthly)	Low	Moderate
Infrequent (seasonally/yearly)	Low	Low

6.4.4.5 Visual Magnitude

Visual magnitude describes how likely a change in the landscape is to be noticed. Visual effect considered how a feature contrasts with the surrounding landscape in size, shape, and color to develop a visual effect rating as described in Table 6.4.4-2. Visual effect can be illustrated by preparation of perspective views as described in Appendix 6.4.4-A.

Table 6.4.4-2: Visual Magnitude Rating

		Shape	
Scale	**Contrast**	**Similar to Landscape Features**	**Different than Landscape Features**
Smaller than the natural variability of Landscape Features	Low	Negligible	Negligible
	High	Negligible	Low
Similar to the natural variability of landscape features	Low	Negligible	Low
	High	Low	Moderate
Larger than the natural variability of landscape features	Low	Low	Moderate
	High	Moderate	High

6.4.4.6 Visual Effects Assessment

Visual effects assessment considers the interaction between visibility, visual sensitivity and visual magnitude to determine a visual effect rating. These interactions are summarized in Table 6.4.4-3.

Table 6.4.4-3: Visual Effect Assessment Ratings

Visibility	Sensitivity	Magnitude			
		Negligible	**Low**	**Moderate**	**High**
Not visible	Low	No effect	No effect	No effect	No effect
	Moderate	No effect	No effect	No effect	No effect
	High	No effect	No effect	No effect	No effect
Visible	Low	Negligible	Negligible	Low	Moderate
	Moderate	Negligible	Low	Moderate	High
	High	Low	Moderate	High	High

6.4.4.7 Existing Visual Environment

The existing visual environment in the Project area can be split into two main categories: forested and agricultural land. The FalC forest has a variation in forest types (see Section 6.3.2 - Vegetation) ranging from mature, dense, closed canopy forest to open regenerating forest. In general, the view in the FalC is constrained by the proximity of trees. However, in some of the open regenerating areas, especially where there is significant topography, views can be extensive.

In the agricultural areas, views are typical of Saskatchewan farmland, with little industrial development visible at a distance with the exception of inland terminals and grain elevators.

6.4.4.8 Results

Results of the visual modeling are presented in the Sections below.

Visibility Assessment

The determination of visibility was based on locations that could see one or more parts of three major project components based on the pre-feasibility footprint: the overburden and rock storage pile with an assumed height of 60 m, the PKCF with an assumed height of 60 m, and the Coarse PK pile with an assumed height of 30 m. Since the nature and extent of project visibility was initially determined, the locations of the the Coarse PK pile and PKCF have been changed, and the area of the overburden and rock storage pile has been reduced. The PKCF moved to the east and south of the original location, while the Coarse PK pile moved north. The height of the PKCF is designed to be a maximum of 54.6 m above natural grade, while the height of the overburden and rock storage pile is a maximum of 60 m above grade. This overburden and rock storage height was used in the original analysis. Due to the scale of assessment, particularly the distance to perspective view points, these changes in position do not change the visibility of the Project, and previous

view shed and visibility analysis results are considered sufficient to complete the assessment. The visibility map is presented in Figure 6.4.4-1 and shows all areas with the potential to experience a visual landscape change as a result of the Project at closure when the full extent of the facilities is constructed. Visibility of the Project would be less during construction and greatest at closure.

In addition, potential visibility of the Project from Prince Albert was analyzed at increasing elevations. This analysis demonstrated that the Project was not visible from Prince Albert at an elevation of up to 100 m above ground level (Figure 6.4.4-2).

Visual Sensitivity

Four types of land uses are considered for determination of visual sensitivity based on land uses in the area (Section 5.4.3 - NTLU): permanent dwellings, public roads and recreation sites, forested areas and agricultural land. Visual sensitivity ratings would not change based on Project phase, as they are dependent on factors outside of the Project. Sensitivity ratings are presented in Table 6.4.4-4 below. These sensitivity ratings apply in general for the project area. For the perspective view locations, the sensitivity of each is considered low. For the James Smith Cree Nation and Wapiti viewpoint, the frequency of use is considered periodic, and land ownership is considered public, as the specific views shown are accessible to many individuals, while for the farmland view point, the frequency of use is considered infrequent, and the land ownership is private.

Table 6.4.4-4: Sensitivity Ratings for Project Area

Land Type	Frequency	Ownership	Rating
Permanent Dwellings	Continuous	Private	High
Roads/recreation sites	Periodic	Public	Low
Forested area	Infrequent	Public	Low
Agricultural Land	Infrequent	Private	Low

Visual Magnitude

Determination of visual magnitude ratings is informed by examination of three perspective views showing the perspective before development, and illustrating how the view would be altered. The location of the perspective view points are shown in Figure 6.4.4-1.

Farmland South of Smeaton

The unobstructed visibility assessment determined that it is possible to see the project facilities in the farmland north of the FalC and south of Highway 55. In selecting a location for the perspective views, several locations were considered, however the project was not

visible from any of the selected locations due to vegetation screening. As a result, the predevelopment view and the post development views are the same (Figure 6.4.4-3).

For construction, operations and closure, the visual effect would be considered negligible from this area as the Project would be screened from view.

Wapiti Ski Lift

The predevelopment and post development perspective views from the top of the Wapiti Ski Area chairlift are illustrated in Figure 6.4.4-4. From this viewpoint, the visual changes can be considered to be at a similar scale to the surrounding landscape, and be considered similar in shape to the surrounding landscape features.

During construction and operations, non-vegetated portions of the overburden pile would have lighter colours (due to the placement of beige sand mixed with gray till and clay) than the surrounding landscape and can be considered a high contrast. As progressive reclamation occurs during operations, this contrast will diminish, until at closure, the vegetated pile would have similar colours to the surrounding landscape, and be considered low contrast.

The Coarse PK pile and the PKCF will be constructed out a mixture of processed kimberlite from the different eruptive events with blue, green and grey tones (Section 5.2.1- Deposit and Local Area Geology). Consequently, during construction and operation these piles will be considered low contrast to the green tones in the surrounding landscape. At closure, revegetation would continue to create low contrast.

As a result, the visual magnitude from this viewpoint is considered low for construction, operations, and closure.

James Smith Cree Nation

The predevelopment and post development perspective views from the James Smith Cree Nation are illustrated in Figure 6.4.4-5. From this viewpoint, the site facilities are closer, and the visual changes can be considered to be at a greater scale than the surrounding landscape, but be considered similar in shape to the surrounding landscape features.

During construction and operations, non-vegetated portions of the overburden pile would have lighter colours (due to the placement of beige sand mixed with gray till and clay) than the surrounding landscape and can be considered a high contrast. As progressive reclamation occurs during operations, this contrast will diminish, until at closure, the vegetated pile would have similar colours to the surrounding landscape, and be considered low contrast.

The Coarse PK pile and the PKCF will be constructed out a mixture of processed kimberlite from the different eruptive events with blue, green and grey tones (Section 5.2.1- Deposit and Local Area Geology). Consequently, during construction and operation these piles will be considered low contrast to the green tones in the surrounding landscape. At closure, revegetation would continue to create low contrast.

For construction and operations, the visual effect from this viewpoint is considered moderate due to high contrast between the unreclaimed portions of the overburden and rock storage pile and the surrounding landscape.

At closure, the contrast is low, as the vegetation on the fully reclaimed structures blend into the surrounding landscape, and the visual magnitude is considered low.

Public Feedback

As mentioned, visual effects assessment is receptor specific, and depends upon the individual experiencing the visual change. During the Open House presentation in June 2010 (Section 4.3.2.2), Figures 6.4.4-1 and 6.4.4-3 to 6.4.4-5 were presented to the public for comment and an animated three dimensional fly-by of the facilities ran continuously on a monitor. Screen shots of the fly-by are shown in Figures 6.4.4-6 and 6.4.4-7. Verbal feedback during the open house presentations did not identify concerns with the potential visual changes, and no attendees submitted a written comment about the potential visual impact.

6.4.4.9 Visual Effects Assessment

Visual effects assessment is provided below for the three perspective view locations based on the ratings determined in above Sections.

Construction and Operations

Effect ratings for the construction and operations phase are summarized in Table 6.4.4-5.

Table 6.4.4-5: Summary of Construction Phase Visual Effects

Location	Visibility	Sensitivity	Magnitude	Effect Rating
Farmland	Not visible	Low	Low	No Effect
Wapiti Ski Hill	Visible	Low	Low	Negligible
James Smith Cree Nation	Visible	Low	Moderate	Low

Closure

The closure effect ratings are summarized in Table 6.4.4-6.

Table 6.4.4-6: Summary of Closure Phase Visual Effects

Location	Visibility	Sensitivity	Magnitude	Effect Rating
Farmland	Not visible	Low	Low	No Impact
Wapiti Ski Hill	Visible	Low	Low	Negligible
James Smith Cree Nation	Visible	Low	Low	Negligible

6.4.5 Human Health

This Section of the EIS provides an overview of the potential effects on health by evaluating how the Project might alter what people are exposed to and if these are likely to have any positive or negative effects. These include environmental health and worker health exposures[7]. Guidance from Saskatchewan Ministry of Environment (SMOE 2009) and Health Canada (2010a) has been used to develop this section. This Section should be read with cross-reference to

- Section 2.0 (Project Description);
- Section 5.4.4 (Human Health);
- Section 6.2.2 (Air Quality);
- Section 6.2.3 (Noise);
- Section 6.2.6 (Regional Geology and Hydrogeology);
- Section 6.2.7 (Surface Water Quality);
- Section 6.2.8 (Environmental Health);
- Section 6.3.3 (Wildlife and Habitat);
- Section 6.4.1 (Socio-Economic);
- Section 6.4.2 (Traditional Land Use); and
- Section 6.4.3 (Non-Traditional Land and Resource Use).

6.4.5.1 Introduction

The purpose of this human health effects assessment is to examine the relationship between the Project and the possible adverse health impact of people who might be affected by the Project. The specific objectives of the health effects assessment are to:

[7] Exposure agents can be potential hazards, health risks or factors that affect health.

- identify key exposures resulting from the Project that could affect people's health;
- identify if the impact of these factors will be negative or positive;
- identify if these impacts will have any effect ;
- identify what mitigations measures will be used to prevent or control any negative effects; and
- identify residual effects after mitigation.

The overall approach of this human health effects assessment is to build upon on the environmental and social components of the application to provide a description of the potential effects of relevant potential environmental, socio-economic and socio-community factors of the Project in terms of human health. Therefore, the assessment is primarily based on the information provided in other sections within the EIA as follows:

- Air Quality (Section 6.2.2);
- Noise (Section 6.2.3);
- Regional Geology and Hydrogeology (Section 6.2.6);
- Surface Water Quality (Section 6.2.7);
- Environmental Health (Section 6.2.8);
- Socio-Economic (Section 6.4.1);
- Traditional Land Use; (Section 6.4.2); and
- Non-Traditional Land and Resource Use (Section 6.4.3).

Each of the above sections presents a detailed assessment of potential effects of the Project from a biophysical or social perspective.

6.4.5.2 Valued Components

The valued components (VCs) for human health have been selected based on professional scientific judgment, a specific request by Health Canada (2010b) to examine human health in the context of Health Canada (2010a) guidelines, and potential stakeholder concern (see Section 4.0, Pubic and Aboriginal Engagement).

VCs selected for effects assessment of the Project are:

- Traffic;
- Air Quality;
- Country Foods;
- Drinking Water Quality;

- Recreational Water Quality;
- Noise; and
- Worker Health.

There is limited potential for exposure pathways to occur for some of the VCs outlined in the above list; however, Shore recognizes the importance of presenting a full discussion about potential environmental and social effects of public concern in the context of human health so it can be informative to the people who the Project might affect.

These VCs lie within Health Canada's scope of review of environmental assessments (Health Canada 2010a).

6.4.5.3 Effects Assessment

General methods for effects assessment (EA) are described in Section 6.1 (Overview and Methods) and the socio-economic criteria have been adapted for assessing effects in the context of human health. For human health, effects are evaluated in terms of the change in exposure profiles for each potentially exposed population, based on information collected in the baseline study (see Section 5.4.4, Human Health) and the provided in the biophysical and social discipline EAs (see related disciplines in Section 6.0, Effects Assessment).

The human health study areas are those used to define the study area related to the air quality (Section 6.2.2), surface water quality (Section 6.2.7), hydrogeology (Section 6.2.6), noise (Section 6.2.3) and socio-economic (Section 6.4.1) disciplines. Shore has assumed the closest permanent resident is 10 km from the centre point of the proposed Project. This reflects a residence identified at Twp 48, Range 20, Section 20 and encompasses the pump house and drinking water wells in the pasture at the north end of the JSCN reserve; at least 10 km from the proposed Project.

Temporary and seasonal land users within the FalC forest (biophysical RSAs) include:

- Traditional land uses in the FalC (e.g., camping, using cabins, fishing, hunting, trapping, harvesting medicinal and edible plants)
- Recreational uses of the FaLC forest (e.g., hiking, biking, snowshoeing, cross-country skiing, horseback riding, canoeing, camping, bird watching, snowmobiling, fishing, trapping, recreational water sports and hunting).
- People working in the FaLC forest (e.g., exploration, aggregate, forestry and grazing related workers).

It is assumed that temporary and seasonal land users will periodically visit the area up to and including the project fence line for the duration of the construction and operations

phases. This assumption is consistent with traditional land use information provided to Shore and represents a worst-case exposure scenario for assessment.

Temporary and seasonal land users of the FalC forest include people resident within the broader socio-economic RSA and are considered within the scope of representative human receptors. These include:

- two cities (Prince Albert and Melfort);
- six towns (Nipawin, Choiceland, Tisdale, Kinistino, Star City, Birch Hills);
- 13 villages (Smeaton, Weirdale, Love, White Fox, Codette, Meath Park, Ridgedale, Albertville, Beatty, Aylsham, Weldon, Valparaiso, Zenon Park);
- people living on Reserves belonging to four First Nations (James Smith Cree Nation, Muskoday First Nation, Sturgeon Lake First Nation and Red Earth Cree Nation); and
- 12 rural municipalities (Tisdale (427), Star City (428), Flett's Springs (429), Connaught (457), Willow Creek (458), Kinistino (459), Birch Hills (460), Prince Albert (461), Nipawin (487), Torch River (488), Garden River (490) and Buckland (491).

Traffic

This Section describes the potential for exposure to traffic for the potentially exposed populations defined in the baseline (Section 5.4.4, Human Health). Effects are identified for the construction phase and then the operations phase of the Project. Mitigation measures are then discussed.

A more detailed assessment of the impact of the Project on traffic from a socio-economic perspective is described in Section 6.4.1 (Socio-Economic). The human health effects assessment is based on the information presented in this socio-economic study (Section 6.4.1, Socio-Economic).

Potential Effects During the Construction Phase

As described in Section 6.4.1 (Socio-Economic), during the construction phase, roads in the Socio-Economic Regional Study Area (SRSA) will be utilized to truck equipment and materials to the Project site, as well as for worker commuting. This will affect local communities and highways, primarily Project workers, other road users and pedestrians travelling in the vicinity of Gronlid, Choiceland and Smeaton (the potentially exposed population).

This is based on socio-economic data (see Section 6.4.1, Socio-Economic) that the following communities will experience the most increase (>20 %) in daily traffic volumes during construction:

- Highway 6. north of Gronlid (+26.7 %); and
- Highway 55, Weirdale (+26.0 %).

The exposure to road traffic for workers, other road users and any pedestrians on these highways will therefore increase. With a low level of confidence and clarity it can be stated that this could increase the potential for motor vehicle accidents; however this relationship is not directly proportional (i.e. a 38 % increase in traffic volume does not increase the likelihood of motor vehicle accidents by 38 %) and is dependent on multiple factors including road configuration, road capacity, road conditions, wildlife in the vicinity and driver attitude. It is assumed that the magnitude for increased traffic accidents in the SRSA is small because:

- roads are anticipated to be able to easily absorb the incremental Project-related volumes without triggering the need for road upgrades or unusual safety or maintenance concerns; and
- the increases in traffic are anticipated to be fairly minor in the context of low current traffic volumes on most roads in the Project area.

Risk is likely highest at unusually high traffic flow periods that will occur when bulk materials for facility construction are being delivered to site. Other potentially high risk periods would include Project related commuter traffic that occurs prior to and after each work shift; however, Shore plans to stagger shift and camp rotation start times to reduce traffic bottle-necks on site and incremental traffic volumes on surrounding highways. This will prevent these high risk periods occurring for workers, other road users and residents in communities along Highways 55 and 6.

Mitigation and monitoring measures for the construction phase include:

- regular discussion with local RCMP about emerging traffic issues, including accidents and injuries;
- regular communications to advise RCMP and municipalities of unusual heavy load vehicle deliveries;
- encouragement of carpooling among workers; and
- policies requiring adherence to speed limits and general road safety principles for workers and contractors.

From a socio-economic perspective, the traffic effects assessment (see Section 6.4.1, Socio-Economic) found the effects to be not significant. In terms of traffic safety and human health, the significance rating criteria are determined to be:

- the direction of effects is adverse, based on the increase in potential exposure to traffic and therefore traffic safety risk;
- the magnitude of effects is moderate because the change in traffic may be distinguishable for road users and pedestrians;
- the duration is short-term because the change in exposure is expected to last only throughout the construction period;
- the geographic extent is regional because changes in exposure will be for populations within the SRSA; and
    - the frequency is continuous based on the change in potential for increased exposure.

Taking the above factors into account, the significance rating for human health is judged Not Significant.

Potential Effects During the Operations Phase

As described in Section 6.4.1 (Socio-Economic), during the operations phase of the Project, all workers will commute from resident communities within the SRSA on a daily basis. Deliveries will continue to be made to the site via truck.

The following areas located on Highways 6 and 55 will experience the greatest increase (>20 %) in daily traffic volumes during operations (in decreasing order):

- Highway 55, Weirdale (+35.8 %)
- Highway 6, north of Gronlid (+34.7 %);
- Highway 55, east of Smeaton (+32.9 %);
- Highway 55, west of Smeaton (+28.6 %); and
- Highway 6, south of Choiceland (+23.8 %).

Exposures are lower for this highest potentially exposed population during the operations phase than in the construction phase. Similarly, it is assumed that the magnitude for increased traffic accidents in the RSA during the operations phase is small because:

- roads currently experience very low traffic volumes;
- roads are anticipated to be able to easily absorb the incremental Project-related volumes without triggering the need for road upgrades or unusual safety or maintenance concerns; and
- the increases in traffic are anticipated to be fairly minor in the context of low current traffic volumes on most roads in the Project area.

High risk periods will be reduced as Shore plans to stagger shift start times to reduce traffic bottle-necks on site and incremental traffic volumes on surrounding highways.

Mitigation and monitoring measures during the operations phase will include:

- regular discussion with local RCMP about emerging traffic issues, including accidents and injuries;
- encouragement of carpooling amongst workers; and
- policies requiring adherence to speed limits and general road safety principles for workers and contractors.

From a socio-economic perspective, the traffic effects assessment (see Section 6.4.1, Socio-Economic) found the effects to be not significant. In terms of traffic safety and human health, the significance rating criteria are determined to be:

- the direction of effects is adverse, based on the increase in potential exposure to traffic and therefore traffic safety risk;
- the magnitude of effects is moderate because the change in traffic may be distinguishable for road users and pedestrians;
- the duration is long-term because the change in exposure is expected to last throughout the operations phase;
- the geographic extent is regional because changes in exposure will be for populations within the SRSA; and
    - the frequency is continuous based on the change in potential for increased exposure to traffic.

Taking the above factors into account, the significance rating for human health is judged Not Significant.

Air Quality

This section describes the potential for exposure to air quality effects for the potentially exposed populations (i.e., temporary or seasonal land users in the FalC forest). Effects are identified for the construction phase and then the operations phase of the project. Mitigation measures are then discussed.

A more detailed assessment of the impact of the Project on air quality from a biophysical perspective is described in Section 6.2.2 (Air Quality). The Human health effects assessment is based on the information presented in the air quality study (Section 6.2.2, Air Quality).

Potential Effects During the Construction Phase

As described in Section 6.2.2 (Air Quality), during the construction phase potential emissions sources are:

- particulate matter from the operation of earth work and vehicle movement on temporary dirt roads;
- fugitive dust from construction activities, exposed topsoil, moved overburden, and stored dusty construction material; and
- diesel exhaust from heavy-duty diesel vehicles and stationary construction equipment.

Emissions from increased traffic volumes are negligible because of the very low traffic volumes involved. These were not included in the air dispersion model that was used to predict maximum air quality related concentrations.

The dispersion model results (see Section 6.2.2, Air Quality) are valid for both construction and operations phases and indicate increased ground level concentrations at the Project fence line for PM_{10}, TSP, SO_2 and NO_2. These increased ground level concentrations translate into increased potential exposures for temporary or seasonal land users or others in the FalC forest (the potentially exposed population); those users travelling closest to the fence line would experience the most increased exposures. Ambient Air Quality Objectives (AAQO) will be met for all potential contaminants at the fence line. The TLU information provided to Shore; includes evidence that camping areas lie at least 1 km from the proposed fence line but it is reasonable to expect some temporary and seasonal land users to approach this area.

As described in Section 6.2.2 (Air Quality), mitigation measures that will be implemented during the construction phase to minimize air quality effects include:

- implementation of fleet maintenance program to ensure that all diesel-powered equipment will operate efficiently, thereby reducing air emissions;
- imposition of vehicle speed limits to mitigate fugitive dust;
- use of dust suppression techniques, as is appropriate for weather conditions;
- reduction of vehicle emissions by limited idling of vehicles and equipment;
- use of delay blasting techniques;
- use of spill prevention techniques to refuel vehicles and stationary power equipment to avoid releases of hydrocarbons; this will also control worker exposure; and
- use of water spray to clean vehicles and equipment whenever possible.

An air quality and dust control plan will be developed prior to construction describing mitigation measures to be used to minimize air quality effects during Project construction.

From a biophysical perspective, the air quality effects assessment (see Section 6.2.2, Air Quality) found the effects will be not significant. The following attributes describe the significance of human health effects:

- the direction of effects is adverse, based on the increase in potential exposure to airborne contaminants;
- the magnitude of effects is low because the potentially exposed population is small (individuals); it is possible that temporary or seasonal land users will enter the area adjacent to the fence line of the Project;
- the duration is short-term because the change in exposure is expected to last only throughout the construction period;
- the geographic extent is local because changes in exposure will be limited to a potentially exposed population within the local study area; and
    - the frequency is continuous based on the change in potential for increased exposure.

Overall, the significance rating for human health is Not Significant, based on the air quality effects assessment (Section 6.2.2, Air Quality), which used human health related threshold criteria to evaluate significance.

Potential Effects During the Operations Phase

As described in Section 6.2.2 (Air Quality), during the operations phase potential emissions sources are:

- particulate matter from stationary and mobile equipment within the open pits (e.g. In-Pit Crusher and Conveyor (IPCC));
- fugitive dust from pulverization and abrasion activities (e.g., wheels, blades in-pit crusher/sizer) and wind erosion of an exposed surfaces such as the Processed Kimberlite Containment Facility (PKCF) berm and overburden and rock storage pile;
- particulate and gaseous emissions from point sources such as the waste incinerator, diesel fuel storage tanks and heaters; and
- particulate and gaseous emissions from mobile sources at the Project, such as vehicles including trucks, front-end loaders and pick-ups.

The dispersion model results (see Section 6.2.2, Air Quality) are valid for the construction and operations phases.

As described in Section 6.2.2 (Air Quality), mitigation measures that will be implemented during the operations phase to minimize air quality effects include:

- implementation of fleet maintenance program to ensure that all diesel-powered equipment will operate efficiently, thereby reducing air emissions;
- imposition of vehicle speed limits to mitigate fugitive dust;
- use of dust suppression techniques, as is appropriate for weather conditions;
- reduction of vehicle emissions by limited idling of vehicles and equipment;
- use of spill prevention techniques to refuel vehicles and stationary power equipment to avoid releases of hydrocarbons; this will also control worker exposure; and
- use of water spray to clean vehicles and equipment whenever possible.

An air quality and dust control plan will be developed prior to the operations phase describing mitigation measures to be used to minimize air quality effects during Project operations.

In terms of significance attributes for the operations phase:

- the direction of effects is adverse, based on the increase in potential exposure to airborne contaminants;
- the magnitude of effects is low because the potentially exposed population is small (individuals); it is possible that temporary or seasonal land users will enter the area adjacent to the fence line of the Project;
- the duration is long-term because the change in exposure is expected to last throughout the operations phase;
- the geographic extent is local because changes in exposure will be limited to a potentially exposed population within the local study area; and
    - the frequency is continuous based on the change in potential for increased exposure.

Overall, the significance rating for human health is Not Significant, based on the air quality effects assessment (Section 6.2.2, Air Quality), which applied a human health related threshold criteria.

Country Foods

This section describes the potential for exposure via country food consumption for the potentially exposed populations (i.e., temporary or seasonal land users in the FalC forest). Effects are identified for the construction phase and then the operations phase of the project. Mitigation measures are then discussed.

A more detailed assessment of the impact of the Project on country foods is described in Appendix 6.4.5-A. This country food assessment informs readers of the potential impact of environmental contaminants on human health.

Potential Effects During the Construction Phase

As described in Appendix 6.4.5-A, potential exposure pathways for uptake of contaminants into country foods are through dust emissions and surface water discharges. Project activity and resulting air pollution will vary almost continuously throughout the duration of the Project. To simplify the country foods assessment, a near worst case scenario has been analyzed for the year during which the largest amount of material will be mined and processed. This is predicted to occur in Year 6 when the Star pit is in operation phase 1 and waste stripping is in phases 1a to 4. Therefore, potential effects during the construction phase have not been explicitly modelled. Instead, this worst-case scenario has been assumed to be continuous throughout the mine life. As such, the effects assessment (below) for the operations phase is also valid for the construction phase and is conservative.

Potential Effects During the Operations Phase

The country foods assessment (Appendix 6.4.5-A) evaluated the potential for Project emissions to adversely affect human health through consumption of country foods harvested in the RSA.

The country foods assessment (Appendix 6.4.5-A) concluded:

- Country foods harvested in the RSA include berries, wild game, and fish.
- The COPC identified consist of metals that are associated with kimberlite ore and have the potential to accumulate in the food chain.
- The Project may interact with the surrounding environment through air and/or surface water emissions.
- Potential exposure resulting from Project emissions was assessed by examining the increase in the concentration of COPC in the receiving environment. The potential for risk was determined through a comparison of resulting concentrations with background concentrations.
- Dust deposition to soil makes no measurable difference to background soil concentrations of the various COPC under the worst case scenario.
- Dust deposition to plants results in non-detectable incremental plant COPC concentrations. Predicted safe plant consumption rates greatly exceed typical consumption rates.

- Effluent discharge through the diffuser to the Saskatchewan River makes no measurable difference to background surface water concentrations of the various COPC under the mean predicted increase.
- Based on these findings, country food exposure pathways are predicted to be insignificant.

As described in Section 6.2.2 (Air Quality), mitigation measures will be implemented during the construction and operations phases to minimize air quality effects. An air quality and dust control plan will be developed prior to the construction and operations phases detailing these mitigation measures.

In terms of significance attributes for the operations phase:

- the direction of effects is adverse, based on the potential increase in exposure to dust emissions and surface water discharges;
- the magnitude of effects is low because the potential change in exposures may or may not be measurable ;
- the duration is long-term because any change in exposure is expected to last throughout the operations phase;
- the geographic extent is regional because the potentially exposed population is resident within the SRSA; and
- the frequency is continuous based on the change in potential for increased exposure.

Overall, effects on human health are Not Significant, based on the country foods assessment (Appendix 6.4.5-A), which applied a human health risk assessment approach.

Drinking Water Quality

This Section describes the potential for exposure to substances in drinking water that may be consumed by potentially exposed populations. Potentially exposed populations for drinking water are populations receiving water from drinking water facilities and any consumers of directly sourced drinking water within the area of influence of the Project (see Section 5.4.4, Groundwater). Drinking water is sourced from the Saskatchewan River and groundwater sources (i.e., groundwater wells) in the RSA. Effects are identified for the construction phase and then the operations phase of the Project. Mitigation measures are discussed where appropriate.

A more detailed assessment of the impact of the Project on groundwater resources, including groundwater wells, is described from a biophysical perspective in Section 6.2.6 (Regional Geology and Hydrogeology). Similarly, for more detailed assessments of the effect of the Project on surface water and surface water quality, these are described from a

biophysical perspective in Section 6.2.4 (Hydrology) and Section 6.2.7 (Surface Water Quality).

Potential Effects During the Construction Phase

For direct effects to occur, water from the Project would need to arrive at the drinking water sources of potentially exposed populations.

Groundwater

Groundwater quality may be affected in the area of the mine facilities through unintended or incidental releases of contaminants or the leakage of water that is stored onsite in holding facilities or used in the mine process. Excavation of the Star and Orion South pits will create a hydraulic connection between the deep Mannville aquifer and the surficial aquifers. This connection is analogous to the paleochannel located to the north of the Site. Mannville water may move from the deep aquifers to the intermediate aquifers during pit in-filling. Once filled, the net groundwater gradient will be downward. Closure pit lake water quality is modeled in Section 6.2.7. Pit water may migrate through the aquifers to discharge areas: along nearby creeks, to seeps that will form along the walls of the open pits, and to seeps along the Saskatchewan River near the mine. Overall, the quantity of potentially affected groundwater will be small relative to surface water flows, and therefore, effects on water bodies receiving the groundwater discharge will be minor. There are also no groundwater users in the area of the mine between the mine facilities and open pits and the groundwater discharge areas, and therefore, no wells where by residents might drink potentially affected groundwater (i.e., there is no pathway for exposure). For further information, see Section 6.2.6 (Regional Geology and Hydrogeology),

Surface water

Surface water quality will be minimally affected in the Saskatchewan River. Discharge through the diffuser to the Saskatchewan River makes no measurable difference to background surface water concentrations under the mean predicted increase (see section 3.2.3 in Appendix 6.4.5-A ; all metals meet Health Canada drinking water guidelines except for Arsenic. Note that Arsenic concentrations are similarly above guidelines at the baseline condition, i.e., Health Canada drinking water guidelines are currently being exceeded, and the incremental increase from the discharge will not be detectable (see Section 6.2.7, Surface Water Quality). All drinking water sourced from the Saskatchewan River is treated before distribution to meet Saskatchewan drinking water guidelines.

With respect to surface water on-site, the general public will not be allowed unescorted on the Project site. Any FalC streams that cross the project will only be accessible to the public upstream from the Project (i.e., prior to any contact with the Project, and will therefore be unaffected).

From a biophysical perspective, the surface water quality effects assessment (see Section 6.2.7, Surface Water Quality) found the effects will not be significant. The following significance attributes describe the effects on human health:

- the direction of effects is adverse, based on the potential increase in exposure to TSP and trace metals in drinking water;
- the magnitude of effects is low because the change in exposure will not be detectable;;
- the duration is long-term because the effects are expected to last for the duration of the project;
- the geographic extent is regional because the potentially exposed population is within the SRSA; and
    - the frequency is continuous based on the change in potential for increased exposure.

Overall, the effect on human health is rated as Not Significant, based on the lack of measurable difference to background surface water concentrations (see Section 6.2.7, Surface Water Quality).

Potential Effects During the Operations Phase

For direct effects to occur, water from the Project would need to arrive at the drinking water sources of potentially exposed populations.

Groundwater

The effects assessment (above) for the construction phase is also valid for the operations phase.

Potable water for the Project site will be drawn from shallow groundwater and treated to meet Saskatchewan drinking water guidelines.

Surface water

The effects assessment (above) for the construction phase is also valid for the operations phase. Effects to human health are not significant (see construction phase above).

The following significance attributes describing the effects on human health were assessed in relation to Health Canada drinking water guidelines:

- the direction of effects is neutral, because there will be no measurable difference to background surface water concentrations;
- the magnitude of effects is negligible because any change in exposures will not be detectable;

- the duration is long-term because the effects are expected to last for the duration of the project;
- the geographic extent is regional because the potentially exposed population is within the SRSA; and
- the frequency is continuous based on the change in potential for increased exposure..

Overall, the effect on human health is rated as Not Significant, based on Health Canada drinking water guidelines (thresholds) for TSP and trace metals being met (see Section 6.2.7, Surface Water Quality).

Recreational Water Quality

This Section describes the potential for exposure to potential exposure agents in recreational water for potentially exposed populations. Potentially exposed populations for recreational water are limited to people canoeing, swimming, sailing and boating (see Section 5.4.4, Human Health). Effects are identified for the construction phase and the operations phase of the Project. Mitigation measures are then discussed.

A more detailed assessment of the effect of the Project on recreational use is described from a socio-economic perspective in Section 6.4.3 (Non-Traditional Land-Use). This human health effects assessment is based on the information presented in the sections outlined above. Other related effects are also described in Section 6.2.5 (Navigable Waters).

Potential Effects During the Construction Phase

Existing sewage and waste water treatment methods will continue during the construction phase until the new waste water treatment system is operational. Therefore, no change in recreational water quality is expected in the Saskatchewan River during this phase and no effects assessment is necessary.

Potential Effects During the Operations Phase

As described in Section 2.5.5.16 (Solid Waste Incinerator and Sewage Lagoon), waste water treatment at the Project will consist of a gravity sewer main to collect sewage and a two cell sewage lagoon to treat effluent. The lagoon will be designed according to Environmental Protection Branch Report No. 203 Guidelines for Sewage Works Design (SMOE 2008). The primary cell (1.27 ha) will receive a biological oxygen demand 5-day (BOD_5) loading of 30 kg/ha-day from a BOD_5 contribution of 77 g/capita. These design criteria include provisions to ensure that bacteria concentrations in discharge waters are low and within accepted levels. Any effluent containing bacteria would increase the exposure potential for temporary or seasonal land users in the Saskatchewan River, although this is expected to be negligible. Continuous discharge will maximize dilution and minimize

environmental (and human health) effects. Cells will be lined with a synthetic liner or suitable low permeability soil to prevent seepage, preventing any indirect pathway for bacterial migration to occur as a result of the Project.

Bacteria levels in the effluent stream will be monitored regularly for total and fecal coliform counts, as per the criteria set out by SMOE (2008).

The following significance attribute ratings decribe the effects on human health:

- the direction of effects is adverse, based on the increase in potential exposure to bacterial coliform, however, the likelihood of occurrence is very low;
- the magnitude of effects is low because few individuals would be affected;
- the duration is short-term because the change in exposure would only occur if a malfunction of short-duration (<24 hours) was to occur;
- the geographic extent is regional because the potentially exposed population is within the SRSA (in the Saskatchewan River); and
- the frequency is rate based on the unlikely scenario that coliform bacteria is released for increased exposure to occur.

Taking the above factors into account, the effect on human health is judged Not Significant.

Noise

This Section describes the potential for increased exposure to noise for potentially exposed populations (i.e., temporary or seasonal land users of the FalC forest (see Section 5.4.4, Human Health)). Effects are identified for the construction phase and then the operations phase of the Project. Mitigation measures are discussed.

A more detailed assessment of the effect of the Project on environmental noise from a biophysical perspective is described in Section 6.2.3 (Noise). This human health effects assessment is based on the information presented in this noise effects assessment (Section 6.2.3, Noise).

Potential Effects During Construction Phase

As described in Section 6.2.3 (Noise), construction noise emissions are expected to occur during the following activities:

- levelling and grading;
- vehicle/heavy equipment traffic;
- excavation;

- pile driving;
- concrete pouring;
- steel erection;
- mechanical installation; and
- commissioning and start-up.

Noise is relevant to the proposed Project if there are permanent residents or temporary or seasonal land users within the area directly affected by the Project. If highly annoyed, it would be reasonable to expect that these individuals make a complaint.

Noise modelling was completed for the effects assessment (see Section 6.2.3, Noise). The model used worst-case scenario techniques to ensure the results would be valid for both the construction and operations phases. The results indicate that noise levels beyond the fence line will be 45 dBA and lower. In terms of temporary or seasonal land users of the FalC forest, those who use the area immediately adjacent to the project fence line will experience an overall increase in noise level, from ~32 dBA to up to 45 dBA. These levels meet the recommended levels ($L_{eq\ night}$ = 45 dBA and $L_{eq\ day}$ = 55 dBA) set out by the Alberta Energy Resources Conservation Board (ERCB 2007) and are below Health Canada (2005) annoyance criteria (55 dBA).

From the TLU information provided to Shore; it is evident that camping areas lie within the 40 dBA - 45 dBA range boundary and it is reasonable to expect some temporary and seasonal land users to approach the fence line.

In terms of change in exposure profile, the Project will affect a change of up to 13 dBA. This amount of change in exposure will decrease for temporary or seasonal land users not immediately adjacent to the fence line. These increases are likely to be detectable to persons who regularly transit the area near the proposed fence line. Using data on probable response of a community to a predicted change in noise level published by International Standards Organization (ISO) of the United Nations (see Table 6.2.3-7 in Section 6.2.3, Noise), it is possible that some temporary and seasonal land users in the immediate vicinity of the fence line will be uncomfortable with the change in noise levels even if Health Canada (2005) annoyance criteria is not exceeded. This change in noise levels may temporarily affect quality of life factors (e.g., annoyance, stress) of these people. Shore will monitor and respond to any complaints received.

As described in Section 6.2.3, highest predicted sound levels within the James Smith Cree Nation reserve will be around 24 dBA, which is equal to the background noise level. Noise from the proposed Project will not be detectable in this area.

The following mitigation measures will be implemented to reduce effects associated with increases in noise levels during construction of the Project:

- noisy construction activities will be scheduled during daytime hours, to the extent possible;
- Occupational Health and Safety noise guidelines will be followed;
- regular inspection and maintenance of construction vehicles and equipment will be performed to ensure that they have quality mufflers and that worn parts are replaced;
- speed limits on site will be enforced;
- equipment will be turned off when not in use, if practicable;
- Project roads will be maintained to reduce noise associated with vibration and vehicle noise; and
- faulty parts generating excessive noise will be replaced or repaired.

From a biophysical perspective, the noise effects assessment (see Section 6.2.3, Noise) found the effects will be not significant. In terms of significance attributes for human health:

- the direction of effects is adverse, based on the increase in potential exposure to noise;
- the magnitude of effects is low because the potentially exposed population is small (individuals); it is possible that temporary and seasonal land users will utilise the area adjacent to the fence line of the Project;
- the duration is short-term because the change in exposure is expected to last only throughout the construction period;
- the geographic extent is local because changes in exposure will be limited to a potentially exposed population within the local study area; and
    - the frequency is continuous based on the change in potential for increased exposure.

Overall, the effects on human health are rated as Not Significant, based on the noise effects assessment (Section 6.2.2, Noise), which used human health related threshold criteria to evaluate significance.

Potential Effects During the Operations Phase

As described in Section 6.2.3 (Noise), for the operations phase, Project environment noise is associated with pit mine infrastructure, the processing plant, access roads, material hauling and waste disposal. Trucks engaged in hauling ore and waste rock material will be the predominant noise source. Other noise sources will include diesel-powered hydraulic excavators, shovels, loaders, crushers, conveyors, bulldozers, compactors, and blasthole drills.

Noise modelling was completed for the effects assessment (see Section 6.2.3, Noise) and the results are valid for the construction phase and operations phase. Complaints could be received from temporary or seasonal land users of the FalC forest in the immediate vicinity of the fence line and these will be monitored and addressed by Shore.

The following mitigation measures will be implemented to address increases in noise levels during operations:

- Occupational Health and Safety guidelines will be enforced at all times;
- electric motors and diesel engines will meet acoustic industrial standards;
- the process plant will be enclosed and to provide effective noise absorption by walls and roof material;
- equipment will be maintained to ensure that designer noise-output specifications continue to be met; and
- a noise survey will be conducted at the property line and at the location of critical receptors when the Project attains full production capacity to confirm compliance during daytime and night-time hours. The results of this survey will determine if any additional work is required.

From a biophysical perspective, the noise effects assessment (see Section 6.2.3, Noise) found the effects will not be significant. In terms of significance attributes for human health:

- the direction of effects is adverse, based on the increase in potential exposure to noise;
- the magnitude of effects is low because the potentially exposed population is small (individuals); it is possible that temporary and seasonal land users will utilise the area adjacent to the fence line of the Project;
- the duration is long-term because the change in exposure is expected to last throughout the operations phase;
- the geographic extent is local because changes in exposure will be limited to a potentially exposed population within the local study area; and
    - The frequency is continuous based on the change in potential for increased exposure.

Overall, the effects on human health are rated as Not Significant, based on the noise effects assessment (Section 6.2.2, Noise), which used human health related threshold criteria to evaluate significance.

Worker Health

This section describes the change in worker health and safety risks for project workers as the Project moves from exploration activities into the construction and then the operations phase. Mitigation measures are then discussed.

The term 'worker health' encompasses health and safety hazards that can cause injury or occupational disease. Key information on Shore's policies plus current health and safety risks are described in Section 5.4.4.6 (Worker Health), and health and safety provisions in the construction and operations phases are presented in Section 2.5.8.2 (Construction Health and Safety) and Section 2.6.13.2 (Operations Health and Safety) respectively.

Saskatchewan Workers Compensation Board (WCB) assessment rate data on injuries and occupational diseases (Saskatchewan WCB 2009) are used to evaluate the difference in hazard risk between the current site (exploration) activities and the future construction trade-type and open pit mining type industrial activities that are representative of the activities planned for the construction and operations phases of the Project. Assessment rates are essentially scores that Saskatchewan WCB 2009 awards to industries based on past claims for injuries and occupational diseases for that industry. These rates are used to calculate the premiums that industries pay to Saskatchewan WCB for purposes of future compensation.

Potential Effects During the Construction Phase

Worker health and safety risks at the Project will change in focus from mainly process plant related hazards (see Section 5.4.4.6, Worker Health) to construction safety hazards. These will include, but are not limited to, the following:

- heavy equipment;
- ground disturbance;
- confined spaces;
- electrical hazards (including lock out procedures);
- chemical hazards (e.g., diesel fuel, airborne contaminants);
- falling objects;
- exposure to noise and vibration; and
- working at heights.

Based on data published by Saskatchewan WCB (Saskatchewan WCB 2009), construction work is a hazardous industry when compared to open pit mining (i.e., the operations phase). The 2009 assessment rate for construction trades (2.57) is approximately double that of the

assessment rate for open pit mining (1.27). For comparison, the highest published rates are for Unions (6.00) and for Processing Meat, Poultry and Fish (4.55).

A 2009 assessment rate is not published for exploration mining; however, the Service Rigs and Water Well Drilling industry is likely the most similar to the current activities on site. The 2009 assessment rate for Service Rigs and Water Well Drilling is 2.40. This is similar to the 2009 assessment rate for construction trades i.e. (2.57). It is therefore assumed that the level of hazard risk will remain the same, even though the types of hazards will change.

Shore is committed to compliance with, and adherence to, its current Occupational Health and Safety (OH&S) program throughout the construction phase and shall continuously improve policies and procedures to protect the safety of individuals during project implementation. Many of the policies and procedures in place during Shore's exploration activities will continue to be refined and optimized through the transition from construction to production.

A Health and Safety manual will be developed through a team effort, including both management and representatives from all levels of the workforce. The manual will be readily available to all employees throughout the worksite and an Occupational Health and Safety Committee will be established at the site in accordance with applicable regulations. A thorough understanding of health and safety policies and procedures and an agreement to comply with the same will be a requirement of continued employment at the site.

In terms of significance attributes for human health:

- the direction of effects is adverse, based on potential exposure to occupational hazards;
- the magnitude of effects is moderate because the potentially exposed population (the workforce) is distinguishable, and the hazards are clearly distinguishable when compared to other industries;
- the duration is short-term because the change in exposure is expected to last only throughout the construction period;
- the geographic extent is local because changes in exposure will be limited to a potentially exposed population within the local study area (the Project); and
    - the frequency is continuous based on the change in potential for increased exposure.

Taking the above factors into account, the effects on human health are rated as Not Significant.

Potential Effects During the Operations Phase

During the operations phase, worker health and safety risks at the Project will change in focus from mainly construction related hazards (see above) to open pit mining and processing hazards. These will include, but are not limited to, the following:

- safety and fire risk of mobile and stationary equipment;
- driving hazards;
- exposure to particulates;
- exposure to noise and vibration;
- blasting safety;
- electrical hazards;
- chemical hazards (e.g. exposure to welding fumes, diesel fuel); and
- slope failure in the pits.

Based on data published by Saskatchewan WCB (Saskatchewan WCB 2009a), open pit mining is a less hazardous industry than construction work: the 2009 assessment rate for open pit mining (1.27) is approximately half that for construction trades (2.57). Therefore, the level of hazard risk during the operations phase should be lower than the level of hazard risk during the construction phase.

Shore is committed to compliance with its Occupational Health and Safety Program during the operations phase and shall develop and maintain an effective Health and Safety Plan to promote the health and safety of individuals working on site. The Program shall facilitate the development and ongoing review of operational policies as needed during operations. An onsite Health and Safety Department will be established for the operations phase of the Project, and will build upon the Occupational Health and Safety program that was in place during construction.

In terms of significance attributes for human health:

- the direction of effects is adverse, based on potential exposure to occupational hazards;
- the magnitude of effects is moderate because the potentially exposed population is (the workforce) is large and the hazards may or may not be distinguishable when compared to other industries;
- the duration is long-term because the change in exposure is expected to last throughout the operations phase;
- the geographic extent is local because changes in exposure will be limited to a potentially exposed population within the local study area (the Project); and

- the frequency is continuous based on the change in potential for increased exposure.

Taking the above factors into account, the effects on human health are rated as Not Significant.

6.4.5.4 Residual Effects

Residual effects have been assessed and are summarized in Table 6.4.5-1.

Table 6.4.5-1: Residual Effects for Human Health

Project Phase	Value Component	Nature of Effect	Direction	Magnitude	Duration	Frequency	Geographic Extent	Level of Confidence	Probability	Significance
Construction	Traffic (safety)	Increase in exposure to traffic on local highways for commuting Project workers, other road users and pedestrians	Adverse	Moderate	Short term	Continuous	Regional	Low	Moderate	Not significant
Construction	Air quality	Increase in exposure to air contaminant concentrations for temporary or seasonal land users in close proximity to the fence line	Adverse	Low	Short term	Continuous	Local	Moderate	Low	Not significant
Construction	Country foods	Limited increase in exposure to contaminant concentrations in country foods	Adverse	Low	Long term	Continuous	Regional	Low	Low	Not significant
Construction	Drinking water quality	No detectable increase in metal or other exposures in	Adverse	Low	Long term	Continuous	Regional	Low	Low	Not significant

Project Phase	Value Component	Nature of Effect	Direction	Magnitude	Duration	Frequency	Geographic Extent	Level of Confidence	Probability	Significance
		drinking water for local water consumers of surface water sourced drinking water								
Construction	Recreational water quality	No pathway	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Construction	Noise	Increase in noise exposure for temporary or seasonal land users in close proximity to the Project fence line	Adverse	Low	Short term	Intermittent and Continuous	Local	Moderate	Low	Not significant
Construction	Worker health	Change in occupational risk factors or hazards for workers	Adverse	Moderate	Short term	Intermittent and Continuous	Local	Moderate	Moderate	Not significant
Operations	Traffic	Increase in exposure to traffic on local highways for commuting Project workers, other road users and pedestrians	Adverse	Moderate	Long term	Continuous	Regional	Low	Moderate	Not significant

Project Phase	Value Component	Nature of Effect	Direction	Magnitude	Duration	Frequency	Geographic Extent	Level of Confidence	Probability	Significance
Operations	Air quality	Increase in exposure to air contaminant concentrations for temporary or seasonal land users in close proximity to the fence line	Adverse	Low	Long term	Continuous	Local	Moderate	Low	Not significant
Operations	Country foods	Limited increase in exposure to contaminant concentrations in country foods	Adverse	Low	Long term	Continuous	Regional	Low	Low	Not significant
Operations	Drinking water quality	No detectable increase in metal or other exposures in drinking water for local water consumers of surface water sourced drinking water	Adverse	Low	Long term	Continuous	Regional	Low	Low	Not significant
Operations	Recreational water quality	Increase in potential for exposure to bacteria	Adverse	Low	Long term	Continuous	Low (temporary or seasonal land users in Saskatchewan	Low	Low	Not significant

Project Phase	Value Component	Nature of Effect	Direction	Magnitude	Duration	Frequency	Geographic Extent	Level of Confidence	Probability	Significance
							River)			
Operations	Noise	Increase in noise exposure for temporary or seasonal land users in close proximity to the Project fence line	Adverse	Low	Long term	Intermittent and Continuous	Local	Moderate	Low	Not significant
Operations	Worker health	Change in occupational risk factors or hazards for workers	Adverse	Moderate	Long term	Intermittent and Continuous	Local	Moderate	Moderate	Not significant

6.4.6 Archaeology and Heritage Resources

The overall objective of the heritage resources effects assessment is to use the Project information collected in the baseline study to determine impacts to heritage resources from the Project, and provide appropriate mitigation if required.

This Section is based on the Heritage Resources Impact Mitigation report (Appendix 6.4.6-A). Changes to the Project footprint are discussed in Addendum 6.4.6-A.

6.4.6.1 Effects Assessment

The construction phase of the proposed open pits and associated infrastructure will require the clearing and removal of timber; removal of overburden and pit excavation, which will result in the modification of existing topography and the displacement of massive amounts of surface material and subsoil; re-deposition of overburden and processed kimberlite in designated areas; and construction of additional facilities for mine water, process water and fine PK.

These construction activities will impact or completely remove heritage resources located within the Project footprint. Historic surface features such as cabins, and buried Precontact sites will be damaged or destroyed during these activities. Artifacts will be displaced, resulting in the loss of contextual information, or the artifacts and features themselves may be destroyed, resulting in the complete loss of heritage information. In buried sites, context is important and the value of the archaeological resource is significantly reduced once it has been impacted. Impacts to heritage resources are permanent and irreversible.

As a result of potential impacts to heritage resources, a Heritage Resources Impact Mitigation (HRIM) strategy was developed to address the 108 archaeological sites originally located in the project footprint. Using scientific criteria, as well as input from the Heritage Resources Branch, these sites were rated based on their potential to provide information on past lifeways in the project area. The vast majority of sites (n=80 or 74% of sites) are small lithic finds and scatters with a sparse artifact density and limited intact component. Beyond the information that was gathered during the assessment phase of the program, they were considered to have low potential and no further work was recommended at these locations (Table 6.4.6-1). These heritage resources were adequately mitigated through post-impact excavation, assessment programs, collection of formed tools, site mapping, and submission of **Saskatchewan** Archaeological **Resource** Record forms to the Heritage Resources Branch.

The remaining high (n=9) and moderate (n=19) potential sites comprise 26 % of the known site sample (Table 6.4.6-1). These 28 sites had intact components that either demonstrated a high artifact density; a combination of multiple artifact types and/or a corresponding large surficial scatter; or the potential to contain activity areas or hearths. A three phase

mitigation program developed with input from the Heritage Resources Branch was recommended for these heritage resources. The mitigation program was subsequently carried out under Permits No. 08-145 and No. 10-237 (Golder 2010b and 2010c). A total of 454.5 m^2 were excavated and 77,408 artifacts recovered from the 28 sites (Table 6.4.6-1). A detailed summary of the HRIM results can be found in Appendix 6.4.6-A.

Table 6.4.6-1: Summary of Results from Excavated Sites

Borden No.	Total m² Excavated	Total Artifact Count	Artifacts (m²)	Features	Diagnostic Projectile Points	Typology
FhNe 11	80	26,304	328.8	-	3	McKean Complex
FhNe 12	3	102	34	1 cabin	-	1926 five cent piece
FhNe 14	5	165	33	-	-	-
FhNe 26	10	933	93.3	-	-	-
FhNe 27	9	390	43.3	-	2	Late Side-notched
FhNe 31	6	154	25.6	-	-	-
FhNe 34	6	70	11.6	-	1	2 Late Side-notched
FhNe 36	8	350	43.75	-	-	-
FhNe 45	6	15	2.5	-	-	-
FhNe 46	5	0	0	-	-	-
FhNe 49	10	1,193	119	-	1	Indet. Base Fragment
FhNe 74	10	3,207	320.7	-	-	-
FhNe 77	6	131	21.8	-	-	-
FhNe 82	20	1,906	95.3	-	1	Pelican Lake
FhNe 86*	23	13,476	586	-	1	Hanna
FhNe 87	4	0	0	-	-	-
FhNe 88**	84	11,154	132.7	1 FCR concentration	15	3 Late Side-notched
						1 Besant
						2 Pelican Lake
						4 McKean Complex
						1 Oxbow Preform
						1 Preform
						1 Indet. Base (Hanna?)

Borden No.	Total m² Excavated	Total Artifact Count	Artifacts (m²)	Features	Diagnostic Projectile Points	Typology
						2 Indet. Body Fragments
FhNe 90**	10.25	766	74.7	-	1	McKean Complex
FhNe 91**	21.25	1,030	50.9	1 potential hearth	-	-
FhNe 98	20	3,174	158.7	-	1	Early Side-notched
FhNe 102	10	1,374	137.4	-	-	-
FhNe 115	20	4,023	201.1	-	2	McKean Complex
FhNe 120	20	899	45	1 boiling pit	1	Early Side-notched
FhNe 126	8	143	17.8	-	-	-
FhNe 135	8	3,296	412.4	-	-	-
FhNe 138	20	1,213	60.6	-	-	-
FhNe 143	8	1,375	178.9	-	-	-
FhNe 155	4	4	1	-	-	-
FhNf 59	10	561	56.1	-	1	Pelican Lake
Total	**454.5**	**77,408**	**N/A**	**2**	**30**	**N/A**

Note: * Results from Western Heritage Services Ltd. (2006).
** Combined results from Golder (2010b) and Western Heritage Services Inc. (2006).

Clearance for the original Project footprint was contingent on a final mitigation program of moderate and high potential sites located in the facilities footprint. Upon review of the final mitigation reports submitted by Golder, the Heritage Resources Branch provided Shore with clearance letters as per Section 63 of *The Heritage Property Act* for the Project. These letters can be found in Appendix 5.4.5-C.

The Project footprint was revised based on the technical review of the draft EIS (Figure 1, Addendum 6.4.6-A). The revised footprint was submitted to the Heritage Resources Branch for screening (File No. 12-447). The revised footprint was found to impact 11 known sites not previously mitigated (Table 1, Addendum 6.4.6-A), of which 6 will require further investigation. The revised footprint also avoided direct impact of 28 known sites previously within the Overburden and Rock Storage Area, and 3 within the former water management reservoir. In addition, areas along the western and southern edge of the Overburden and Rock Storage Area, the perimeters of the Star and Orion South pits, an area within the Coarse Processed Kimberlite pile, and a small area along the southern edge of the Processed Kimberlite Management Facility will require assessment.

6.4.6.2 Monitoring and Future Mitigation

As a result of the HRIA/HRIM process, the majority of heritage resources in the revised facilities footprint (Appendix 6.4.6-A) have been fully mitigated. A supplemental HRIA for the 6 known sites in the revised footprint and for areas not previously assessed will be conducted, (Addendum 6.4.6-A) prior to construction. The exact locations of linear features will also be assessed at that time. This supplemental HRIA will be conducted according to the methods suggested by the Heritage Resources Branch in Addendum 6.4.6-A and parallel those used for the HRIM presented in Appendix 6.4.6-A. The supplemental HRIA and HRIM (if necessary) will be submitted prior to construction during the permitting phase.

Any further Project footprint changes including changes to infrastructure (e.g., roads, pipelines or transmission lines), will be screened for heritage sensitivity by a professional archaeologist and the Heritage Resources Branch consulted to determine assessment and mitigation requirements.

Even the most thorough investigation may not identify all archaeological materials that may be present. Shore is advised that if unanticipated archaeological materials or features (including, but not limited to: hearth features, lithic, ceramic and faunal artifacts) are encountered as a result of construction or reclamation activities, all work in the immediate area should cease and the Heritage Resources Branch contacted. In the event that human remains are uncovered, the RCMP and the Heritage Resources Branch must be contacted and all work within the immediate area must stop.