LARICINA GERMAIN PROJECT EXPANSION
SOCIO-ECONOMIC IMPACT ASSESSMENT

Submitted to Laricina Energy Ltd.

By Nichols Applied Management
Management and Economic Consultants

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1. Introduction

1.1 Project Description

Laricina Energy Ltd. (Laricina) currently operates an experimental in situ facility, known as the Saleski Pilot Project in the Municipal District of Opportunity. In October 2010, Laricina received regulatory approval from the Energy Resources Conservation Board (ERCB) and Alberta Environment (AENV) to construct the 5,000 barrel per day (bbls/d) Germain Commercial Demonstration Project (Phase 1) on the Germain leases, just west of the Saleski Pilot Project. Phase 1, which is currently under construction, is located approximately 46km northeast of Wabasca-Desmarais in Townships 84-85, Range 22 west of the 4th meridian.

Laricina is proposing an expansion of Phase 1 to increase production capacity to 155,000 bbls/d. The Germain Project Expansion (the Project) will be located near Phase 1 and will be carried out incrementally in three phases. In addition to standard SAGD technology, the expansion will include the addition of solvents to the reservoir. Actual timing of construction and phase size will depend on the timing of regulatory approvals and market conditions. For the purpose of this assessment, the following schedule has been assumed:

- Phase 1, the Germain Commercial Demonstration Project, (5,000 bbls/d), under construction and not part of this application;
- Phase 2 (30,000 bbls/d), start of construction in early 2013 and start of operations in late 2014;
- Phase 3 (60,000 bbls/d), start of construction in early 2016 and start of operations in late 2018;
- Phase 4 (60,000 bbls/d), start of construction in early 2019 and start of operations in late 2021.

If approved, the Project will operate for approximately 30 years following the completion of Phase 2.

The Project will leverage off of Laricina’s existing and approved operations. The construction and operations workforce will be flown in and out for shift rotations, and will be housed in an on-site camp. Some construction and operations workers are expected to commute by bus or personal vehicles to and from Wabasca-Desmarais, Slave Lake and beyond during shift rotations. Laricina’s future plans include an on-site airstrip to facilitate the fly-in-fly-out (FIFO) program, and this assessment assumes the presence of an on-site airstrip. The airstrip is subject to its own application and approval.
The capital costs of the Project are subject to uncertainty and will be refined as detailed engineering takes place. For the purposes of this analysis and based on preliminary engineering estimates the initial capital costs will total $4.5 billion for all three phases of the expansion. This includes:

- construction of the central processing facilities;
- initial well pads and pipelines;
- access road construction; and
- drilling of initial well pairs.

Bitumen recovered by the Project will be diluted and transported by pipeline to the Enbridge Cheecham terminal, located approximately 175km east of the Project. The pipeline is subject to its own application and approval. As such, alternative pipelines and terminals may be used. This assessment assumes the presence of both the product and diluent pipelines.

**Mitigation and Enhancement**

The Project has the following characteristics which serve to enhance positive socio-economic effects of the Project, including:

- a progressive reclamation program;
- a local hire program;
- a trapper compensation program; and
- community investment programs.

Certain characteristics of the Project will reduce or eliminate negative socio-economic effects.

- an on-site camp for construction and operations;
- FIFO program with an airstrip adjacent to the Project;
- pipelines to deliver diluents to and dilbit from the Project;
- on-site security staff; and
- on-site emergency services staff.
1.2 Summary of Conclusions

The Project will create positive economic and fiscal effects on the Socio-Economic Regional Study Area (RSA) consisting of the M.D. of Opportunity and the nearby First Nation communities. The Project is estimated to create:

- 5,170 person years of employment in the construction of the plants, the field facilities, the initial well pairs and associated drilling between 2013 and 2021;
- 140 operations positions to be hired between 2014 and 2021;
- 220 person years of employment annually linked to ongoing drilling.

Additional employment will be created outside the region in fabrication shops, construction yards, engineering firms, and for turnaround contractors.

Once all three phases are operational, the Project will add an estimated $32 million annually in municipal property taxes to the M.D. of Opportunity, assuming no change in mill rates. The Project will also contribute provincial and federal corporate income taxes of approximately $1.2 billion (NPV 2011) and $2.7 billion (NPV 2011) in provincial royalties over its 30 year operating life, assuming an $85 real (2011) price of oil.

The Project’s effects on the region will be muted due to the continued use by Laricina of construction and operations strategies that rely on an on-site work camp for construction and operations, supported by a FIFO worker commute program. The use of an on-site camp will minimize the direct Project effects on housing costs and municipal infrastructure. It will also limit the growth pressure on the permanent resident population in the region and thus minimize pressure on the social infrastructure which is currently limited and some of which is currently stressed. The use of a FIFO program will minimize but not eliminate Project-related traffic on local roads and provincial highways within the RSA.

This approach to construction and operations by Laricina is consistent with the limited residential and supplier capacity in the RSA, and its relative isolation. It reflects municipal input into the Comprehensive Regional Infrastructure Sustainability Plan (CRISP) wherein Wabasca-Desmarais is not designated as a growth node (CRISP 2011). Laricina will take a developmental approach to local hiring and procurement, using local contractors and workers where appropriate and engaging with the community to develop the local workforce and contractor capacity over time. With construction activity planned for roughly a decade and operations between 2015 and 2050, the Project will periodically assess the approach to construction and operations in view of changing circumstances in the work force, contractor availability, and social and transportation infrastructure in the RSA.
1.3 Scope of the Socio-Economic Assessment

The Socio-Economic Impact Assessment (SEIA) evaluates the impacts of the construction and operations of the Project on the communities of the region. The potential socio-economic impacts of the construction and operation of the Project include economic and fiscal benefits as well as pressures on social systems.

The SEIA draws on and refers to ongoing consultation by Laricina in the context of the Project and other initiatives.

1.3.1 Regulatory Setting

The SEIA addresses the Terms of Reference (TOR) for the Environmental Impact Assessment (EIA) of the Project as issued by AENV (Terms of Reference, 2011).

1.3.2 Key Issues and Questions

The SEIA draws on the following sources for identifying the key socio-economic issues:

- Section 7 of the TOR for the EIA of the Project, as issued by Alberta Environment in 2011 (AENV 2011);
- discussions with regional service providers;
- the responses by the ERCB, other stakeholders, and interveners, to recent oil sands SEIAs in the course of the regulatory review process, including public hearings;
- socio-economic studies and reports prepared by government, industry or regional service providers; and
- analysis of recent SEIAs for other oil sands projects.

These sources indicate that the key socio-economic issues to be considered in this analysis fall into the following categories:

- employment effects;
- regional and provincial economic benefits, including:
  - personal and business income;
  - government tax and royalty income;
- population effects;
- effects on regional infrastructure and services, including:
- housing, including worker housing;
- policing and emergency services;
- health services;
- social services;
- education services;
- recreation activities;
- municipal infrastructure and services;
- transportation effects; and

- traditional land use effects.

1.3.3 Key Indicators

The key indicators used to assess the effects of the Project on communities in the study area are:

- workforce;
- income;
- population change;
- effects of population changes on service providers and physical infrastructure;
- effects of increased traffic on the regional road network; and
- traditional land use and culture.

The key indicators used to assess the Project’s income and taxation consequences for governments are:

- municipal taxes;
- provincial corporate tax and resource royalty income; and
- federal corporate tax income.

Many of these key indicators are well suited for quantification and provide an easy-to-interpret measure for potential effects. Effects on service providers are based, in part, on key respondent interviews and are treated mostly qualitatively.

1.3.4 Assessment Cases

This analysis defines the following cases or scenarios:
The **Base Case**, which consists of all the economic activity in the RSA plus those large industrial Projects that are currently under construction or have regulatory approval. The latter captures all “cold production” heavy oil projects, including:

- Canadian Natural Resources Limited – Britnell, Woodenhouse, and Livock;
- Husky – McMullen;
- Cenovus – Pelican Lake;
- Laricina Saleski – Pilot; and
- Sunshine Oil – Muskwa.

The **Application Case**, which consists of all the economic activity assumed under the Base Case, plus the Project.

The **Cumulative Effects Assessment (CEA) Case**, which consists of all the economic activity assumed under the Application Case, plus those large industrial Projects that were disclosed as of June 15, 2011, including:

- Shell Grossmont Field Production and Heater Test Project;
- Paramount Energy Hoole Project;
- Cenovus Pelican Lake Grand Rapids Project; and
- Laricina Saleski Phase 1 Project.

### 1.3.5 Study Boundaries

#### 1.3.5.1 Temporal Considerations

The SEIA covers the project life from construction through to the end of operations. It will concentrate on the time between 2013 and 2025, reflecting that:

- on-site construction for the first Phase of the expansion Project is expected to take place between Q1 2013 and Q4 2014, with subsequent phases following between 2016 to 2021;
- operations for the Project are expected to begin in late 2014 and ramp up as additional phases come on stream between 2014 and 2022.

The 2013-2025 period captures the maximum socio-economic effects of the Project. It will also capture the maximum cumulative effects, noting that all projects included under the CEA case are assumed to reach full operations employment in 2015. Other projects may come forward beyond those considered in the CEA. These will be subject
to separate applications, including a cumulative effects assessment of industry
development as is known then.

1.3.5.2 Spatial Considerations

Regional Study Area (RSA)

The RSA consists of:

- The Municipal District (M.D.) of Opportunity of #17; and
- The First Nations reserves located within its boundaries.

The boundaries of the RSA have been defined based on the following considerations:

- the existing trading patterns and traffic flows in the region;
- the existing distribution of service providers and infrastructure in the region;
- Laricina’s past experience with the hiring of labour and the procurement of supplies for the construction of the Saleski Pilot Project and Germain Commercial Demonstration Project;
- the experience of other industrial projects in the region;
- land use concerns that are focused on the lands nearby the Project; and
- the availability of statistical data to adequately measure the impacts of the Project.

The analysis addresses in the most detail the Project’s effects on the nearest community: the Hamlet of Wabasca-Desmarais and the nearby Bigstone Cree Nation (BCN) Reserves (166, 166A, 166B, 166C, 166D, and the Desmarais settlement). Although the hamlet and reserves are separate entities, the two communities are geographically adjacent and share several key services. For the purpose of this study, the hamlet and nearby reserves will be treated as a single socio-economic community except where explicitly mentioned.

Red Earth Creek, Peerless Lake, Trout Lake -- three other communities in the RSA -- are not directly connected by road to Wabasca-Desmarais and the Project. The Chipewyan Lake community is not connected by all-weather road at all. This lack of connectivity will essentially shield these communities from any Project effects, except traditional land use effects. The community of Calling Lake, located adjacent to Highway 813 in the southern part of the RSA, is addressed in the discussion of traffic effects.
Gateway Communities

Wabasca-Desmarais is a small community with few services. As discussed in more detail in section 9, some project-related effects will bypass the community and gravitate to the Town of Slave Lake, the nearest full service community and one that serves as a gateway to and service centre for the RSA. The Town of Slave Lake is located approximately 122km from Wabasca-Desmarais and 162km from the Project. The Town of Athabasca also functions as a gateway community for the RSA. Traffic from the Capital Region that is home to many oil and gas service firms tends to use Highway 813 north to the RSA.
Figure 1.1 Regional Study Area
1.3.6 Analytical Approaches

The differences between the Base Case, Application Case, and Cumulative Effects Assessment Case are determined using a variety of methods, ranging from extensive quantitative analysis to qualitative approaches, including:

- economic input-output modeling of the Alberta economy to determine the impact of the Project in terms of total employment impacts and the impact on the provincial gross domestic product (GDP);
- labour market analysis to relate the construction workforce demands to the availability of workers in light of other anticipated heavy industrial construction in the province;
- population projections to determine the Project impact on regional population growth and on future social infrastructure demands;
- key respondent interviews and analysis of historical performance to gauge the capacity of education, health and other systems to respond to an influx of workers during the construction and operations phases of the Project; and
- data analysis and key respondent interviews with regard to construction and operations traffic issues on Highways 754 and 813.

The choice of assessment methodology depends on the issue and the availability of data.

1.4 Socio-Economic Setting

1.4.1 Wage Economy

The economy of the M.D. of Opportunity #17 (M.D.) is focused primarily on forestry, logging and oil and gas exploration and extraction. In mid 2011, approximately 70,000 barrels of heavy oil and bitumen were produced in the M.D. each day. There are several local contractors that service the oil and gas and forestry sectors within the RSA, including general labour, brush clearing, road building, and heavy equipment services.

The BCN is actively engaged in the oil and gas industry. Currently, it owns and operates several companies that service the oil and gas sector, including:

- Bigstone Oilfield Services and Supplies;
- North Eight Contracting; and
- Bigstone Medical Services.
The BCN also has a working interest in Bronco Energy, a firm seeking to recover oil by drilling on reserve land. BCN has invested in the development of commercial real estate within the Hamlet of Wabasca-Desmarais.

Wabasca-Desmarais and other communities in the RSA have few amenities. Residents routinely travel to the Town of Slave Lake for retail, banking, education, health and other services. They may travel as far as Edmonton for certain services such as advanced medical care. The M.D. has recently approved 200 acres of land for industrial development near Wabasca-Desmarais, with plans to have approximately three quarters of that land fully serviced (Tullis 2011, personal communication).

1.4.2 Traditional Economy

The RSA supports a traditional economy that is in addition to the wage economy. Aboriginal peoples have lived in north central Alberta for thousands of years and evidence of their presence can be found throughout the region. For example the Cree Burn Lake site, located some 200km northeast of Wabasca-Desmarais, was a hub for trading and cultural activities dating back some 8,000 years (Elders’ Voices 2011). The community of Wabasca-Desmarais goes back to establishment of a Hudson’s Bay trading post in the 1880s and the St. Johns Anglican Mission in 1894 (Anglican 2011). The Wabasca South settlement was renamed after Father Desmarais, an Oblate missionary, who visited the area in 1891.

The RSA includes both reserve lands of the BCN and lands used for hunting, trapping, gathering of medicinal plants and other traditional pursuits. Many aboriginal people in the RSA straddle both the traditional and wage economy.

The BCN has finalized a Treaty Land Entitlement Claim with Indian and Northern Affairs Canada and the Government of Alberta. This claim was filed in the early 1990s and goes back to the fact that the Treaty 8 Commission had missed a considerable number of First Nations people in its enumeration at the signing of Treaty 8 in 1899. The Treaty Land Entitlement claim, ratified by the BCN in 2010, includes:

- additional reserve lands for the BCN;
- the creation of the Peerless Trout First Nation with its own reserves and a membership made up mostly of aboriginal people living in Peerless Lake and Trout Lake;
- new infrastructure development, including two elementary schools, a high school, two water treatment facilities and a health care centre; and
- a cash settlement.
1.4.3 Labour Force

Educational Attainment

Approximately two-thirds of the labour force in the M.D. has not completed high school. The corresponding number for the labour force on the BCN Reserves is approximately 75%, both substantially higher than the provincial average of 23% (Statistics Canada 2006). The low educational attainment of the labour force within the RSA is reflected in the types of jobs performed by many local workers engaged in the oil and gas industry. Discussions with local contractors suggest that the majority of local workers are employed as general labour as opposed to skilled trades or more technically demanding operations jobs.

Unemployment and Participation Rates

The unemployment rate of the labour force in the RSA tends to be well above the provincial average. The unemployment rate for the M.D. was estimated at 14.4% in 2006 (Statistics Canada 2006). The corresponding number for the BCN Reserves was 27.7%, both well above the provincial rate of 4.3% (Statistics Canada 2006). The unemployment rate in the larger Athabasca-Grande Prairie economic region is estimated at 5.4% in May 2011, the provincial rate is also estimated at 5.4% (Alberta Finance June 2011). No corresponding estimate for Wabasca Desmarais is available.

The participation rates (i.e. the number of people working or looking for work as a percentage of the total population over 15 years of age) are estimated at 61.4%, and 61.6% for the M.D. and the BCN Reserves, respectively. Both are low relative to the provincial rate of 74% (Statistics Canada 2006). The low participation rates, which imply a relatively high number of discouraged workers who may be drawn back into the labour force if enough work is available, presents a difficulty in estimating the available workforce in the RSA which, in the 2006 federal census, was found to be 1,910 (Statistics Canada 2006). Discussions with local contractors indicate that as many as 250 discouraged or unemployed workers in the RSA posses the skills necessary to become employed by the Project in some capacity. These workers consist primarily of general labourers and equipment operators (personal communications: Auger 2011, Schroder 2011, Sinclair 2011).

1.4.4 Population

The population of the RSA is estimated at 5,117 (Statistics Canada 2006), distributed across the communities of Wabasca-Desmarais, Red Earth Creek, Calling Lake, Trout Lake, Peerless Lake, Sandy Lake, Chipewyan Lake, and BCN Reserves (166, 166A, 166B, 166C, 166D, Jean Baptist Gambler 183).

The closest population centre to the Project and the largest one in the RSA is the Hamlet of Wabasca-Desmarais (population 1,325) and the nearby BCN Reserves (166, 166A,
166B, 166C, 166D, and the Desmarais settlement; population 2,060) (Statistics Canada 2006). Together, the Hamlet of Wabasca-Desmarais and the nearby BCN Reserves account for 66% of the population in the study area.

**Table 1.1  2006 RSA Population**

<table>
<thead>
<tr>
<th>Community</th>
<th>2001</th>
<th>2006</th>
<th>2006 Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bigstone Cree Nation On Reserve</td>
<td>2,068</td>
<td>2,270</td>
<td>100</td>
</tr>
<tr>
<td>Wabasca 166</td>
<td>75</td>
<td>75</td>
<td>3</td>
</tr>
<tr>
<td>Wabasca 166A</td>
<td>505</td>
<td>645</td>
<td>28</td>
</tr>
<tr>
<td>Wabasca 166B</td>
<td>160</td>
<td>215</td>
<td>9</td>
</tr>
<tr>
<td>Wabasca 166C</td>
<td>180</td>
<td>175</td>
<td>8</td>
</tr>
<tr>
<td>Wabasca 166D</td>
<td>865</td>
<td>860</td>
<td>38</td>
</tr>
<tr>
<td>Jean Baptist Gambler 183 (Calling Lake)</td>
<td>169</td>
<td>210</td>
<td>9</td>
</tr>
<tr>
<td>Desmarais Settlement</td>
<td>114*</td>
<td>90*</td>
<td>4</td>
</tr>
<tr>
<td>Municipal District of Opportunity</td>
<td>3,037</td>
<td>2,847</td>
<td>100</td>
</tr>
<tr>
<td>Red Earth Creek</td>
<td>n/a</td>
<td>283</td>
<td>10</td>
</tr>
<tr>
<td>Calling Lake</td>
<td>n/a</td>
<td>192</td>
<td>7</td>
</tr>
<tr>
<td>Trout Lake</td>
<td>n/a</td>
<td>369</td>
<td>13</td>
</tr>
<tr>
<td>Peerless Lake</td>
<td>n/a</td>
<td>486</td>
<td>17</td>
</tr>
<tr>
<td>Wabasca-Desmarais</td>
<td>n/a</td>
<td>1,325</td>
<td>46</td>
</tr>
<tr>
<td>Sandy Lake</td>
<td>n/a</td>
<td>91</td>
<td>4</td>
</tr>
<tr>
<td>Chipewyan Lake</td>
<td>n/a</td>
<td>101</td>
<td>3</td>
</tr>
</tbody>
</table>

n/a = Not available  
* These values have been estimated based on the available federal Census data.  
Note: Totals may not add to 100% due to rounding.

The RSA population increased marginally from 5,105 in 2001 to 5,117 in 2006. Estimates of the population of the RSA should be interpreted with caution due to the difficulty of enumerations and the fluid demographic situation in these communities.

The population of the RSA is largely aboriginal with 84% of the population in the M.D. and virtually all people residing on BCN Reserves identifying themselves as First Nation or Métis (Statistics Canada 2006). The population is also young, with slightly more than half of the population 25 years of age or younger (Statistics Canada 2006).

The population of Wabasca-Desmarais grew between 2001 and 2006, but the growth was not uniform across the hamlet and the reserve. The 2006 Statistics Canada census indicates that the population of the Hamlet decreased by roughly 2% between 2000 and 2006, while the on-reserve population on the BCN grew by roughly 10%. The latest estimates prepared by Indian and Northern Affairs suggest that the on-reserve population in early 2011 has increased another 16% above 2006 levels, while the 2007 municipal census suggests that the population of the hamlet continues to decrease marginally.
In addition to the resident population within the RSA, there are a number of mobile workers living in both on-site and open off-site camps throughout the region. The mobile worker population varies over time due to the seasonal nature of conventional oil and gas projects and phased nature of oil sands construction projects. The capacity of open and on-site company camps in the Wabasca-Desmarais area is estimated to be 1,775 beds. When all camps are full, as they were in early 2011, the non-permanent population is roughly one-third of the permanent population.

1.4.5 Gateway Communities

Town of Slave Lake/M.D. of Lesser Slave River

The Town of Slave Lake serves as a gateway community to the RSA. It is the residential, retail and services hub for the area directly east and north-east of Lesser Slave Lake, and had a population of 6,705 in 2006, up from 6,600 in 2001. The trading area serviced by the Town of Slave Lake is over 15,000, including the M.D. of Lesser Slave River, the M.D. of Opportunity, and the First Nations reserves within its boundaries.

The economy of the M.D. of Lesser Slave River and the Town of Slave Lake is driven primarily by forestry. Other sectors include agriculture, oil and gas exploration and extraction, and tourism. Centred on the Mitsue Industrial area, located in the M.D. of Lesser Slave River just east of the Town of Slave Lake, the area is home to several major industrial facilities, including:

- West Timber Co. Slave Lake Pulp Mill;
- West Timber Co. Alberta Plywood Mill;
- Vanderwall Contracting Sawmill; and
- Tolko Industries Slave Lake Engineered Wood Plant (currently closed).

The Town of Slave Lake and the M.D. of Lesser Slave River are connected by road to the rest of the province via Highway 2, with Highway 33 as an alternative route, and by rail via the Canadian National Railway. The Town of Slave Lake has a well-developed retail sector and regional services, including the Slave Lake Community Health Centre.

To date, the oil and gas developments near Wabasca-Desmarais have provided a level of economic diversification for the Town of Slave Lake and the M.D. of Lesser Slave River. An estimated 14% and 12% of the labour force of Slave Lake and Lesser Slave River work in the oil and gas sector respectively. Key respondents in the Wabasca-Desmarais area indicate that oil and gas companies active in the area draw both on local area contractors and contractors from Slave Lake.
The Town of Slave Lake was damaged by forest fires in the summer of 2011. The reconstruction effort is underway and is being supported by the provincial government in the form of:

- $289 million of funding for temporary housing, a Regional Wildfire Recovery Program, and a Disaster Recovery Program; and
- a re-entry plan designed to streamline the rebuilding effort.

The Town is expected to once again be functioning as a gateway community to the RSA when the Project is assumed to begin construction in 2013.

Town of Athabasca

The Town of Athabasca is a gateway community to the RSA with respect to traffic from Edmonton area to the RSA. The Town of Athabasca, located roughly 160km southeast of Wabasca-Desmarais, is a community of 2,575 persons. It is home to the main campus of Athabasca University; the Alpac Mill is located just outside of the Town. The Town of Athabasca is also located near Highway 63, the main highway to Fort McMurray and the oil sands projects in the Wood Buffalo region.
2. Economic and Fiscal Effects

2.1 Situation Analysis

This section provides an overview of the current economic conditions in the RSA. It also analyzes the economic and fiscal effects of the Project. The traditional economy based on traditional land use is addressed in Section 3.

2.2 Income Effects

Construction Expenditure by Region

Total initial capital expenditure for the Project is estimated at $4.5 billion. Construction capital expenditures include wages and salaries paid to construction workers, professional engineering and environmental services, and the direct purchase of goods and services, such as equipment modules and structural elements. Capital outlays will likely begin before the construction period for items such as engineering and purchases of long lead-time equipment.

Table 2.1 provides a breakdown of the estimated construction expenditure by region, based on published supply ratios by industry, discussions with local service contractors, information provided by Laricina, and the past experiences of similar projects in the region (Alberta Finance, 2011). The table indicates that an estimated 51% of the total expenditure will accrue to the RSA and the rest of Alberta. An additional 32% will accrue to the rest of Canada, and the balance to foreign suppliers. The expenditure accruing to foreign suppliers is related primarily to the purchase of machinery and equipment.

Table 2.1 Construction Expenditure by Region

<table>
<thead>
<tr>
<th>Expenditures</th>
<th>RSA</th>
<th>Other Alberta</th>
<th>Other Canada</th>
<th>Foreign</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[$ millions]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
<td>-</td>
<td>202</td>
<td>59</td>
<td>20</td>
<td>281</td>
</tr>
<tr>
<td>Labour</td>
<td>43</td>
<td>1,414</td>
<td>1,155</td>
<td>2</td>
<td>2,615</td>
</tr>
<tr>
<td>Major equipment</td>
<td>-</td>
<td>127</td>
<td>42</td>
<td>97</td>
<td>253</td>
</tr>
<tr>
<td>Materials</td>
<td>1</td>
<td>502</td>
<td>189</td>
<td>618</td>
<td>1,325</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>2,245</td>
<td>1,455</td>
<td>737</td>
<td>4,474</td>
</tr>
<tr>
<td>Total [%]</td>
<td>1</td>
<td>50</td>
<td>32</td>
<td>16</td>
<td>100</td>
</tr>
</tbody>
</table>

– Not significant.

Note: Totals may not add to 100% due to rounding.

An estimated $44 million (or 1%) will accrue to the RSA, primarily in the form of wages paid to local contractors during the construction phase of the Project. This estimate is net of the spending that accrues to contractors who use out-of-region crews.

Sustaining Capital and Ongoing Drilling Expenditures by Region

Once operational, the project will incur costs in the form of ongoing drilling and sustaining capital expenditure. These expenditures include wages and salaries for
drilling/completions contractors, as well as well pad, tie-ins, road and plant related materials and equipment required to maintain the designed productive capacity of the plant. Sustaining capital and ongoing drilling expenditures will total approximately $9.2 billion over the life of the Project, averaging approximately $308 million per year. This is in addition to the initial capital expenditure needed to bring the project on-stream.

Table 2.2 shows a breakdown of the average annual sustaining capital and ongoing drilling costs by region, based on published supply ratios (Alberta Finance, 2011). Approximately 75% of the average annual sustaining capital and ongoing drilling expenditures will accrue to Alberta, including the RSA. Approximately $10 million of the expenditures in Alberta will accrue to the RSA, primarily as drilling and maintenance wages.

Table 2.2  Sustaining Capital and Ongoing Drilling Expenditure by Region

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour</td>
<td>9</td>
<td>51</td>
<td>3</td>
<td>-</td>
<td>63</td>
</tr>
<tr>
<td>Materials/Equipment</td>
<td>1</td>
<td>171</td>
<td>18</td>
<td>55</td>
<td>245</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>222</td>
<td>21</td>
<td>55</td>
<td>308</td>
</tr>
<tr>
<td>Total [%]</td>
<td>3</td>
<td>72</td>
<td>7</td>
<td>18</td>
<td>100</td>
</tr>
</tbody>
</table>

Note: Totals may not add to 100% due to rounding.

Operations Expenditure by Region

Once fully constructed, the annual operations expenditure of the project, excluding fuel and utilities, will total $10.3 billion ($345 million per year). These costs are in addition to the sustaining capital and ongoing drilling expenditures of approximately $9.2 billion ($308 million per year).

Table 2.3 provides a breakdown, by region, of the annual operations expenditure based on the published supply ratios by industry (Alberta Finance, 2011). An estimated 74% of the expenditures will accrue to Alberta, including the RSA, and an additional 11% to the rest of Canada.

Table 2.3  Operations Expenditure by Region

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour</td>
<td>2</td>
<td>30</td>
<td>4</td>
<td>-</td>
<td>36</td>
</tr>
<tr>
<td>Materials/Equipment</td>
<td>-</td>
<td>221</td>
<td>33</td>
<td>55</td>
<td>309</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>251</td>
<td>37</td>
<td>55</td>
<td>345</td>
</tr>
<tr>
<td>Total [%]</td>
<td>1</td>
<td>73</td>
<td>11</td>
<td>16</td>
<td>100</td>
</tr>
</tbody>
</table>

Note: Totals may not add to 100% due to rounding.
An estimated 1%, or $2 million, of the operations expenditure is expected to accrue to local area workers and contractors. Some of the contractor spending is likely to accrue to out-of-region workers in the early years of operations in view of the relatively small size of the RSA labour force. These estimates may change over time as the work force in the region develops.

**Local Hire and Procurement**

Laricina has policies in place to hire locally first and to use local contractors where feasible. The effect of local hire/procurement policies are tempered by the small labour force and limited number of contractors in the RSA. Discussion with key respondents in the oil and gas service sector operating in the Wabasca-Desmarais area indicate that:

- the majority of work done by local contractors in the oil and gas sector is related to road construction, brush clearing, and other general labour tasks; and
- the local labour force is currently lacking in skilled tradespersons required to fill the permanent operational jobs in the oil and gas sector.

Laricina has policies in place to work with members of the local community to receive the training required for long-term operations related employment at the Germain site.

### 2.3 Total Income Effects

The construction expenditures associated with the Project will constitute income for contractors, suppliers, and workers. These primary recipients will, in turn, spend a portion of this income on goods and services, thus circulating the expenditures throughout the economy, compounding the income effect of the Project.

**Construction**

Based on published statistics the project’s direct, indirect and induced impact in terms of Gross Domestic Product (GDP), and household income is approximately $3.0 billion and $1.9 billion respectively (Alberta Finance 2011).

**Operations**

The total (direct, indirect and induced) GDP impact of operating, ongoing drilling, and sustaining capital expenditures are estimated at $550 million. The total labour income effect of the Project’s operating, sustaining capital, and ongoing drilling expenditures is estimated at $290 million. The estimates represent averaged annual impact over the life of the Project and are based on published multipliers (Alberta Finance 2011).
2.4 Fiscal Effects

The Project contributes property taxes to the M.D. of Opportunity, oil sands royalties to the provincial government, and corporate taxes to the provincial and federal government. Project tax and royalty payments expand the ability of the different levels of government to fund programs and initiatives in the RSA and elsewhere.

Municipal Fiscal Effects

The project is located in the Municipal District of Opportunity, which is generally in a positive financial situation as evidenced by the following:

- a stable non-residential assessment base that is high relative to other rural municipalities in Alberta;
- municipal tax rates that are similar to other rural Alberta municipalities; and
- current debt levels which are lower than the Alberta average of all municipalities and also lower than the average rural municipality.

The total assessment base of the M.D. is approximately $2.6 billion in 2011, with non-residential structures, linear property, and machinery and equipment accounting for 92% of the assessment, and residences accounting for 8%. Once fully built, the Project is estimated to increase the non-residential assessment base by approximately $1.3 billion, or 55%.

The amount of municipal taxes that the Project will pay is uncertain, as both the actual assessment of the facility and the tax rates in effect when it becomes operational are unknown. A preliminary estimate of the Project’s municipal tax payment is $9.2 million in 2015 once the first phase is operational and $28 million once all three phases are operational in 2021. This estimate assumes the 2010 municipal tax rates remain in effect. In reality, setting municipal tax rates is the prerogative of the M.D. Council and generally tax rates for different property classes are set based on the gap between required revenue to fund operating and capital budgets and other sources of funding, such as grants, fees, and licenses.

The use of an on-site camp and a FIFO program will limit the impact of the Project on municipal expenditures. Unlike the open camps in the region, the Project will not be tied directly into the water and sewer system of the M.D. It will, however, purchase potable water from the M.D. and haul out sewage to the lagoon in Wabasca-Desmarais. Laricina has also applied for a drinking water well license from Alberta Environment and, if developed, this well may offset the amount of potable water purchased from the M.D. The municipal tax payments are expected to be an order-of-magnitude higher than the municipal costs, making the Project a net contributor to the municipal fiscal health of the M.D.
Provincial Fiscal Effects

Once the first phase is fully operational, the project will pay royalties to the provincial government. Future royalty payments are subject to uncertainty as they are directly related to the prevailing market price of oil, the Canadian-US dollar exchange rate, and the differential between light and heavy crude oil. Production costs, including fuel, also impact the calculation of royalties.

For this analysis, it is assumed that:

- the Project is considered as a single, fully integrated (ring fenced) entity;
- discount rate of 8%;
- a long term WTI price of USD $85; and
- the 2008 Alberta government royalty framework is in effect for the life of the project.

Under these assumptions, the Project is estimated to pay royalties with a net present value in 2011 (NPV 2011) of $2.3 billion over the life of the project.

Laricina will also pay provincial and federal corporate income taxes on revenue derived from the Project. Under the same pricing assumptions described above and assuming the present tax framework applies over the life of the project, Laricina will pay corporate income taxes of approximately $1.2 billion (NPV 2011) over the life of the Project.

These provincial fiscal benefits are not net of potential costs to the province of social and physical infrastructure investment driven by oil sands industry expansion, including the Project. The CRISP outlines the requirement of provincially funded infrastructure in the Athabasca Oil Sands area, which includes the RSA, as bitumen production increases (CRISP 2010). These costs notwithstanding, oil sands are a net contributor to the fiscal position of Alberta. Bitumen royalties were $3.6 billion in 2010/11, are forecasted at $4.1 billion in 2011/12 and targeted at $7.1 billion in 2013/14 (GoA 2011). Most of the bitumen royalties are paid by projects in the Wood Buffalo area, but some are paid by projects in the Cold Lake and Peace River areas.

2.5 Employment Effects

On-Site Construction Employment

Construction of the project is expected to require 4,570 person years during the 2013 to 2021 period, of which approximately 2,970 are expected to be on-site, with the balance in construction yards and fabrication shops outside the RSA.
In addition to the 2,970 person years for the construction of the central facility, there will be initial drilling and completions activity which is expected to generate an additional 600 person years of onsite employment between 2013 and 2021.

All together and under the assumed schedule, the construction of the plants, field facilities, and the drilling of wells will create close to 3,570 person years of onsite employment over the nine-year construction period, with a peak of nearly 800 in 2018 and 2021, as shown in Figure 2.1.

**Figure 2.1 On-Site Construction Workforce**

![On-Site Construction Workforce](image)

*Off-Site Construction Employment*

The construction of the Project will create work in fabrication shops and construction yards outside of the RSA, mostly in the Edmonton area. The total off-site construction is estimated to be 1,600 person years over during the 2012 to 2021 period. Figure 2.2 shows that the off-site workforce is expected to peak at approximately 480 workers during 2016 given the assumed construction schedule.
Construction Employment by Type

The Project will employ a broad range of construction trades during the on-site plant, well pad, and pipeline construction activities, the bulk of which will be welders, pipe fitters, and iron workers. The Project will also create significant work for general labourers.

Table 2.4 provides an approximate breakdown of the construction trades represented in the on-site construction workforce.

**Table 2.4 On-Site Construction Workers by Occupation**

<table>
<thead>
<tr>
<th>Category</th>
<th>Total [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labourer</td>
<td>33</td>
</tr>
<tr>
<td>Welder</td>
<td>10</td>
</tr>
<tr>
<td>Concrete finisher</td>
<td>8</td>
</tr>
<tr>
<td>Iron worker</td>
<td>10</td>
</tr>
<tr>
<td>Pipe fitter</td>
<td>15</td>
</tr>
<tr>
<td>Heavy equipment operator</td>
<td>4</td>
</tr>
<tr>
<td>Electrician</td>
<td>8</td>
</tr>
<tr>
<td>Instrument tech</td>
<td>4</td>
</tr>
<tr>
<td>Insulator</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

As noted, there will be drilling operations during the construction period. The skills required for this work include the full range of rig workers, including roughnecks, motormen and drillers. Off-site workers, employed in fabrication yards, will include metal fabricators, pipe fitters and welders.
Engineering Employment

In addition to on and off-site construction employment, the project is expected to create an estimated 940 person years of engineering employment for engineering contractors. The majority of this work will accrue to engineering firms outside of the RSA in Edmonton and Calgary.

On-Site Operations Employment

Once all three phases are fully operational, the Project is expected to employ 140 people, including contractors. Approximately 85% of these full-time positions are expected to be Laricina employees with the balance staffed by contractors.

During the operational phase of the Project, there will be continuous drilling activities to ensure the productive capacity of each phase is maintained throughout the life of the Project. This ongoing drilling activity and associated field construction is expected to employ approximately 200 person years of labour annually on-site. This estimate is an annual average as the actual volume of drilling will vary from year to year and be performed primarily in the winter months. There are contractors within the RSA who have the ability to perform some of this type of work.

In addition to the permanent operations employment, the Project will employ between 350 and 700 contractors for approximately three weeks every two years for scheduled turnarounds.

Off-Site Operations Employment

Some of the well pad construction, drilling and well completions related to the Project will be performed off-site. For example, well pad equipment will be fabricated in production facilities in the greater Edmonton area. This employment is expected to average 22 person years of employment annually over the life of the Project.

Table 2.5 provides an approximate breakdown of the operations workforce by type represented in the on-site workforce.

Table 2.5 Operations Workers by Type

<table>
<thead>
<tr>
<th>Category</th>
<th>Total [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operators and maintenance workers</td>
<td>68</td>
</tr>
<tr>
<td>Technical and supervisory staff</td>
<td>13</td>
</tr>
<tr>
<td>Administrative positions</td>
<td>4</td>
</tr>
<tr>
<td>Maintenance contractors</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>
**Total Employment Effects**

The economic activity associated with the Project will stimulate employment with suppliers to the Project and in the general economy as the affected workers spend their income on goods and services, hence creating employment in consumer goods and services sectors. The employment effect of the Project on suppliers is referred to as indirect employment effects and the employment generation effect in the general economy as induced employment effects. An order-of-magnitude estimate of these indirect and induced employment effects using published multipliers derived from an Input-Output model of the Alberta economy (Alberta Finance 2011) is presented below.

The total direct employment effect of the construction phase of the Project, including the on- and off-site workforces and engineering is estimated at 6,110 person-years. The total direct, indirect and induced employment effect is estimated at 10,510 person-years over the construction period.

The total direct employment effect of the operations phase includes the regular operations work force, the ongoing maintenance work force and ongoing drilling activities. As noted above, the total estimated direct operations employment effect of the Project is approximately 360 full-time equivalent positions. The total direct, indirect and induced employment is estimated at 1,160 person-years annually.
3. **Traditional Land Use and Culture**

3.1 **Scope**

This section presents at a high level the effects associated with the Project on traditional land use and culture in the RSA. The focus is on the traditional land use and culture of the BCN.

3.2 **Situation Analysis**

Traditional land use is continuing to this day, with Aboriginal peoples engaging in hunting, trapping, fishing, and gathering of food and medicinal plants. Traditional land use studies across the Athabasca Oil Sands Area make it clear that traditional land use is intimately related to the culture, spirituality and identity of Aboriginal peoples.

Traditional land use and culture have changed over time with the emergence of wage economy opportunities in forestry and oil and gas development and improved access to remote communities. Some interconnected ways in which traditional land use and culture have changed include:

- reduced time on the land as people combine both traditional land uses and wage economy opportunities; and

- changing methods of teaching traditional cultural and environmental knowledge from a mostly oral and activity-based tradition to greater emphasis on systematic documentation, for example through Traditional Land Use studies.

The oil and gas and forestry industry developments are placing pressure on the traditional lands and culture of Aboriginal peoples in the region in a number of different ways, including:

- removing land from traditional land uses by means of in situ field facilities, plant sites and transportation networks;

- increasing the regional population and access to previously hard-to-get-to places, thus increasing the competition for traditional resources; and

- providing wage economy opportunities to local Aboriginal people, thus reducing their involvement in traditional pursuits.
3.3 Traditional Land Use Effects

Base Case

Oil and gas industry activities are taking place northeast of the community of Wabasca-Desmarais at the production facilities of Canadian Natural, Husky and others. The proximity of these developments to Wabasca-Desmarais affects the way residents of the community engage in their traditional land use and culture. As noted in Section 1.4.3, aboriginal people are active in the oil and gas industry, thus reducing their time available for traditional pursuits.

Application Case

The Project will further intensify oil and gas activity north of Wabasca-Desmarais. The Project will establish a small semi-permanent population in an area that is currently not populated.

Cumulative Effects Assessment Case

The Project and the other projects included in the Cumulative Effects Assessment (CEA) Case will see the area north of Wabasca-Desmarais emerge as a hub for bitumen production. Traditional land uses will be limited on or near oil production facilities for the duration of these projects, which are currently planned to last to 2040 or 2050. Additional projects may come forward.
4. Population

4.1 Scope

This section presents the population effects associated with the Project on the RSA. The focus is on the community of Wabasca-Desmarais and the adjacent BCN Reserves as the closest population centre to the Project.

4.2 Situation Analysis

As discussed in Section 1.4.4, the population of the RSA is estimated at 5,117 people in 2006. Approximately 64% of the population live in the Hamlet of Wabasca-Desmarais and the nearby BCN Reserves. Population is growing on the BCN Reserves, driven mostly by a young population and high fertility rates. The population in the M.D. is declining marginally. In addition to the permanent population, the RSA has a non-permanent segment, made up of mobile workers in camp accommodations. Camps in the RSA have an estimated 1,775 bed capacity.

The possibility for population growth due to increased levels of economic activity in the RSA is an emerging issue for the M.D. of Opportunity. The M.D. has planning documents that suggest a future population for the hamlet of between 10,000 and 15,000. It has also conducted planning studies to explore engineering solutions for possible increases in resident population associated with additional industrial activity in the region. However, the current industry development model is one of using mobile workers housed in project accommodation, thus limiting or even obviating permanent population growth. There appears to be a preference for this model in the community, although this may change. The CRISP for the Athabasca Oil Sands Area focuses on camp-based industry development in the Wabasca-Desmarais area in deference to community preference as expressed during the CRISP planning process (CRISP 2010).

4.3 Population Effects

Any estimate of the future population of the RSA is subject to uncertainty and is linked to the oil and gas industry development scenario and model, and the availability of housing and services in the RSA.

The level of development in the oil and gas industry is expected to be the main driver of employment creation and population growth within the RSA. For the purposes of this analysis, a Base Case, Application Case, and Cumulative Effects Assessment Case were defined based on available industry plans in early 2011. There are some potentially large developments that may occur in the future as commercial technology to extract oil from carbonate rock develops. The timing, size and likelihood of these future projects are unknown in early 2011.
As noted, the current industry operating model is to use mobile workers to construct and operate plants and house them in on-site worker accommodation. In general terms, operations and construction camps serve to:

- reduce the population effect of industrial development on the RSA by reducing the number of workers with spouses and family members in the region; and

- reduce the population growth-related effects on local services and infrastructure.

The use of construction and operations camps is linked to the limited number of houses and commercial services in Wabasca-Desmarais and the relative isolation and small size of the community. As noted and discussed in more detail below, there are plans and initiatives in place to expand the number of residential lots and retail and banking services. The availability of housing and retail and commercial services is a precondition for attracting people to the community.

**Base Case**

The Base Case population forecast limits the analysis of population effects to only those projects that are under construction or have regulatory approval six months prior to filing of this Application. Under these assumptions, the future industry activity is very similar to that experienced in the recent past, noting an increase in enhanced oil recovery schemes (polymer flooding), which is marginally more labour intensive than traditional heavy oil recovery techniques, and the emergence of experimental thermal in situ projects.

The Base Case population estimate is also influenced by the recent Treaty Land Entitlement settlement, which includes an expansion of BCN Reserves, the creation of the Peerless Trout First Nation with its own reserves, and new on-reserve infrastructure development. Population growth on reserves, driven by a young population and high birth rates, is generally muted by the availability of housing and services and the movement off reserve of people in search of employment, health, education and other services. In the case of the BCN, the Treaty Land Entitlement settlement can be expected to reduce the movement of people off reserve and thus have more of the high natural growth rate show up in the population numbers.

Taken together, the population growth in the RSA is expected to be marginally above the historical trends. Under Base Case assumptions, the population of the RSA is expected to grow by 0.98% per year between 2010 and 2025 to a total of 6,124. The majority of this growth is expected to accrue to the BCN Reserves and assumes that the Treaty Land Entitlement Claim is executed as currently anticipated.
Application Case

Laricina will build and operate the Project as a remote camp-based site. The commuting time between Wabasca-Desmarais and the site is approximately 1.5 hours one way due to the distance and the road conditions. This makes a daily commute infeasible.

The use of a FIFO program and on-site camps will limit the Project’s effect on the population growth in the RSA. The Project’s use of local workers and contractors will create jobs for local people and provide an incentive for the local workforce to remain in the region.

Under the Application Case assumptions and taking account of both the camp-based model and the local hire policies, the permanent population increase in the RSA is expected to grow by 1.02% per year in the 2010 to 2025 period to 6,165 persons.

Cumulative Effects Assessment Case

The CEA population forecast layers additional publicly disclosed projects over top of the Application Case population forecast. Under these assumptions, the permanent population of the RSA is expected to grow by 1.14% per year in the 2010 to 2025 period to 6,272 persons.

Additional and potentially very large projects may come forward in the RSA beyond those considered in the CEA. Population modeling conducted in the context of the CRISP suggests that the population of Wabasca-Desmarais and the adjacent BCN Reserves may grow to 15,100 if large-scale carbonate plays are constructed and become operational. In addition, the CRISP indicates that there may be up to 5,800 mobile workers in camp accommodation in that case (CRISP 2010).

4.3.1 Mobile Worker Effects

The current maximum mobile worker population in the RSA is approximately 1,775. During peak construction activity, the project will increase the number of mobile workers in the region by approximately 780, or 44%. The use of mobile workers as part of the construction workforce will:

- reduce those who would otherwise be available to fill job vacancies in the RSA;
- allow spouses and family members of camp workers to remain active in the labour force in the community in which they permanently reside; and
- spread the economic benefits of industrial development beyond the RSA communities.
Mobile workers also add to the pressures on the health system, especially emergency room, policing and emergency services, and transportation infrastructure (Nichols Applied Management 2007).
5. Housing

5.1 Scope

This section discusses the housing effect associated with the Base Case, Application Case, and the Cumulative Effects Assessment Case on the RSA. Housing on the BCN Reserves is limited to band members only.

5.2 Situation Analysis

M.D. of Opportunity

The M.D. of Opportunity had approximately 845 dwellings in 2006, down from an estimated 1,020 in 2001. Dwellings in the M.D. consist of single detached homes and moveable dwellings, with each type accounting for roughly half of all residences. Most of these dwellings are privately owned, although the Wabasca-Desmarais Housing Authority owns a small number of affordable housing units throughout the municipality (Sinclair 2011, personal communication). The provincial government also owns a small number of housing units designated for use by senior citizens (Sinclair 2011, personal communication).

There is currently a shortage of housing available for rental within the M.D. (Tullis 2011, personal communication; Sparks 2011, personal communication). The M.D. estimates that 43 (20% of the current stock) additional rental units are needed (Tullis 2011, personal communication). In 2010, the municipality approved the development of and sold 40 additional residential lots within the Hamlet of Wabasca-Desmarais and is currently completing the planning and engineering studies necessary to release an additional 80 plots of land for residential development (Tullis 2011, personal communication). The M.D. is also contemplating medium and high density housing developments in the future (Tullis 2011, personal communication). A ten-room hotel has also been approved for development in Wabasca-Desmarais which will add to the temporary accommodation stock in the community.

Bigstone Cree Nation

Housing on the BCN Reserves is managed by the Band and Aboriginal Affairs and Northern Development Canada. In 2006, the BCN Reserves had approximately 565 dwellings, up from an estimated 490 dwellings in 2001. There is currently a list of approximately 100 people waiting for housing on reserve (Young 2011, personal communication). This has led to overcrowding in the existing residences (Young 2011, personal communication). Factors that affect the availability of housing on reserve include:
• the cost of housing, especially for people not or only partially engaged in the wage economy; and

• federal government policies and funding for on-reserve housing.

*Accommodations for Current Laricina Projects*

Laricina currently houses workers, including trades and supervisory staff, employed in the operation of the Saleski Project and the construction of the Germain Commercial Demonstration Project in on-site camps exclusive to Laricina.

### 5.3 Housing Effects

The need for housing is driven by population growth. The housing effects presented assume the use of construction and operations camps by Laricina and other operators in the Project area, in line with the current practice. It is also assumed that the population growth driven by industrial development accrues primarily to the Hamlet of Wabasca-Desmarais as the largest open housing market in the RSA.

*Base Case*

Under Base Case assumptions and including the current shortfall in rental units, the housing requirement in the M.D of Opportunity is expected to grow by 56 units between 2010 and 2025. This is more than the proposed development of 40 residential lots in Wabasca-Desmarais alone. Other communities also have some capacity to accommodate additional housing units.

If, in addition to the 40 lots already sold and approved for development, the M.D releases the additional 80 lots for which planning and engineering studies are currently being completed, it will provide a sufficient supply to meet the demand for additional housing in the community through to 2025 and no additional crown land will be required for housing development.

The demand for housing on the BCN Reserves is expected to increase by 240 units between 2010 and 2025, which is in line with historic population growth rates and settlement patterns in that community. The federal government of Canada is responsible for funding the housing needs of First Nations people living on reserve in Canada.

*Application Case*

The Application Case housing forecast layers the Project over top of the Base Case. Under these assumptions, the RSA housing requirement related to the Project is 13 units higher than the Base Case assumption in 2025. Virtually all new growth is expected to accrue to the Hamlet of Wabasca-Desmarais as the closest population centre to the project with an open housing market.
If the 80 aforementioned lots are released for development, they will meet the additional housing needs in the community through 2025 and no additional crown land will be required for housing development.

Some of the project related employment is expected to accrue to BCN members who are currently living on reserve which may lead to additional funds available for the purchase of housing. However, housing supply on reserve is influenced more by INAC funding and the allocation by the Band of its own resources to housing than the band members’ ability to pay for housing. As noted in section 1.4.2, the recently ratified land claim is expected to expand housing and other infrastructure on the reserve. This expansion of the housing supply will take place with or without the Project or the income that it is expected to provide to Band members or companies.

**Cumulative Effects Assessment Case**

The CEA housing need forecast layers additional publicly disclosed projects over top of the Application Case population forecast. Under these assumptions, the RSA housing requirement related to the CEA is 32 units higher than the Application Case assumption in 2025. Virtually all new growth is expected to accrue to the Hamlet of Wabasca-Desmarais as the closest population centre to the project with an open housing market.

If the 80 aforementioned lots are released for development, they will meet the additional housing needs in the community through 2025 and no additional crown land will be required for housing development.

The housing starts necessary to accommodate CEA population increases are above the historical average, however they are within the current development plans of the M.D. The housing needs forecast under all cases, but especially under the CEA assumptions, is largely dependent on the timing of projects and the worker accommodation and transportation plans used by proponents. On-site camps and FIFO programs will reduce the additional need for housing in the region.

As outlined in the Application Case, the supply of housing on the BCN reserve will be influenced more by INAC and the BCN Housing Authority than the projects analyzed in the Cumulative Case.
6. Municipal Infrastructure

6.1 Scope

This section discusses the municipal infrastructure effects associated with the Base Case, Application Case and CEA on the RSA.

6.2 Situation Analysis

M.D. of Opportunity

The M.D. provides municipal services to the Hamlet of Wabasca-Desmarais including:

- two water treatment plants;
- a sewage collection and treatment system using a series of lift stations and a local sewage lagoon; and
- an existing landfill site and recycling program, supported by weekly garbage pickup.

The M.D. has recently completed expansion of the two water treatment facilities and the sewage lagoon, resulting in a doubling of capacity (Cardinal 2011, personal communication; Holst 2011, personal communication). The municipality is also in the process of building a new recreation complex.

The mobile worker population in the region does make use of municipal infrastructure. There are several open camps operating in the region which are tied into the municipal water and sewer infrastructure. The population of the open camps can be as high as 555 during peak season. The on-site company camps in the region, which can house approximately 1,220 people, currently purchase potable water from the M.D. and have access to the sewage lagoons (Cardinal 2011, personal communication).

On-site work camps in the region do not access the Wabasca-Desmarais landfill to dispose of trash (Holst 2011, personal communication). The current practice is to haul garbage to Slave Lake where a sorting facility is able to properly process the trash (Holst 2011, personal communication).

The First Nation reserves adjacent to Wabasca-Desmarais also make use of the municipal infrastructure.
6.3 Municipal Infrastructure Effect

The focus of the municipal infrastructure analysis is on the M.D. of Opportunity and the Hamlet of Wabasca-Desmarais, where most Project-induced population growth is expected to occur.

Base Case

Current and planned municipal infrastructure plans present engineering solutions for a population of Wabasca-Desmarais of 15,000. These plans, in conjunction with the current infrastructure, are expected to be sufficient to service the anticipated population under the Base Case assumptions.

Future planning decisions regarding industrial and commercial development may further encourage growth within the M.D. The capacity of local municipal infrastructure will need to be considered as part of any growth plans going forward. The municipal infrastructure will be financed by rate payers in the M.D. and by means of grants from the provincial and federal governments.

Application Case

The additional population growth and hence municipal infrastructure requirements under the Application Case are modest. The municipal infrastructure currently in place and planned is expected to be sufficient to service the anticipated population under the Application Case assumptions.

Cumulative Effects Assessment Case

The additional population growth and hence municipal infrastructure requirements under Cumulative Effects Assessment Case assumptions are modest. The municipal infrastructure currently in place and planned is expected to be sufficient to service the anticipated population under the Cumulative Effects Assessment Case assumptions.

As noted, the oil sands expansion may well exceed the projects currently in the Cumulative Effects Assessment Case. The CRISP anticipates additional projects in the RSA in the later part of its forecast period (2010-2045) and suggests a resident population of 15,100 in Wabasca-Desmarais and the adjacent BCN Reserves. These population levels would require additional municipal infrastructure for which the M.D. has prepared planning and engineering studies. If the population levels in the latter part of the CRISP forecast period are achieved, additional crown land may be required to accommodate the development of additional municipal infrastructure.
7. Social Infrastructure

7.1 Scope

This section presents the social infrastructure effects associated with the Base Case, Application Case and CEA on the RSA.

7.2 Situation Analysis

7.2.1 Policing

Police service in the RSA is provided by the three Royal Canadian Mounted Police (RCMP) detachments located in Wabasca-Desmarais, Red Earth Creek; and Athabasca.

The detachment in Wabasca-Desmarais is responsible for the region surrounding the Project, including the Hamlet of Wabasca-Desmarais and the adjacent BCN Reserve. This detachment also responds to calls on the ALPAC road and the first 100km of Highway 813 south from Wabasca-Desmarais and approximately halfway to Slave Lake on Highway 754.

The Wabasca-Desmarais RCMP detachment currently consists of ten officers. Of the ten officers in the detachment, seven are provincially funded. The remaining three officers are funded through a special community initiative supported by the M.D., the BCN and the Province.

Crime is an issue in the RSA, specifically in the community of Wabasca-Desmarais and adjacent BCN Reserves:

- Wabasca-Desmarais is the second busiest detachment in the province according to the latest statistics available (RCMP 2008);

- crime statistics indicate a high level of crimes and much higher than in other communities nearby. The rate for all criminal code violations in the coverage area of the Wabasca-Desmarais RCMP detachment is 48 per 100 inhabitants, as compared to 18 for Slave Lake Detachment and 13 for Athabasca (Statistics Canada 2009).

Not only is the crime rate in Wabasca-Desmarais higher, the type of crime is skewed toward violent crimes. In 2009, 25% of all crimes reported to the Wabasca-Desmarais detachment were violent crimes (Statistics Canada 2009). This compares to 16% for Slave Lake and 23% in Athabasca (Statistics Canada 2009). The RCMP flags domestic violence, traffic violations, and theft from industrial sites as particular concerns (Meyers 2011, personal communication).
The detachment notes a number of challenges including (Meyer 2011, personal communication):

- understaffing;
- difficulty with the recruitment of officers, due to the isolated nature of the community; and
- a lack of specialized units, such as an identification unit or canine team.

In early 2011, there are no plans to increase the size of the detachment.

### 7.2.2 Emergency Services

Fire and rescue in the M.D. of Opportunity is provided by four volunteer fire departments in the communities of Wabasca-Desmarais, Red Earth Creek, Calling Lake, and Sandy Lake. There is also a small volunteer fire service on the BCN Reserve that is supplemented by the Wabasca-Desmarais department.

The contingent in Wabasca-Desmarais currently consists of approximately 20 volunteer members. The training and equipment provided to these volunteers is provided by the M.D. The Wabasca-Desmarais Fire Department responds to calls on the ALPAC road and highways 813 and 754. The department has also responded to industrial sites in support of on-site emergency services.

The fire service notes that the current level of volunteers is below the optimal number given the current level of activity. Work commitments of volunteer firefighters can limit the number of responders available for a fire or accident. Volunteer recruitment, training and retention, combined with high call-out numbers and the stress associated with responding to highway traffic accidents are issues for many volunteer fire departments.

As of April 1, 2009, Alberta Health Services (AHS) took over ambulance services province wide. Currently, AHS operates two ambulances which are housed at the Wabasca-Desmarais Healthcare Centre and may respond to calls on industrial sites or accept patient transfers from industrial ambulances. In the event of a serious emergency, patients can be transported by fixed wing aircraft from the Wabasca-Desmarais airport to Edmonton.

### 7.2.3 Health Services

There are two separate health service systems in the RSA:

- Alberta Health Services, which provides health care in the M.D.; and
• First Nations and Inuit Health Services of Health Canada, which provides health care on reserve.

The two services work collaboratively in the RSA and provide complementary services.

**M.D. of Opportunity**

Health care services in the region are provided by Alberta Health Services via the Wabasca-Desmarais Healthcare Centre. The Healthcare Centre has 10 inpatient beds and employs four physicians, four registered nurses, four licensed practical nurses, and support and administrative staff (Richardson 2011, personal communication). It provides acute and emergency care only and generally transfers all seriously injured or ill patients to Edmonton. Uncomplicated fractures and deliveries are sometimes transferred to the Slave Lake Hospital.

Health system challenges in the M.D. include (Richardson 2011, personal communication):

- a lack of a long term care facility in the region; and
- staff recruitment and retention.

**Bigstone Cree Nation**

The Bigstone Cree Health Commission (BCHC) is responsible for the delivery of public health services to the members of the BCN. The BCHC currently employs two physicians, one dentist and one pharmacist. The BCHC is currently building a new health centre (Phillips 2011, personal communication).

The BCHC offers programs to address a number of public health issues including:

- diabetes education;
- maternal and prenatal health;
- alcohol and drug abuse;
- mental health; and
- dietary management.

The BCHC operates a pharmacy and a senior’s lodge that currently offers lodging for twenty independent seniors. It has applied for provincial funding to offer long term care to residents (Phillips 2011, personal communication).

The BCHC reports similar challenges to the Wabasca-Desmarais Healthcare Centre related to attraction and retention of staff. To some degree this issue has been
addressed by actively recruiting and training current residents in healthcare-related fields (Phillips 2011, personal communication).

7.2.4 Education

M.D. of Opportunity

Northlands School Division No. 61 provides primary and secondary education in eight schools in the RSA. It operates three schools in the hamlet of Wabasca-Desmarais, offering programming from Kindergarten to grade 12. School division officials report a number of challenges:

- two schools operate at capacity and have relatively old facilities that limit ability to deliver some specialized programs;
- staff recruitment and retention, as evidenced by the fact that a majority of staff have less than five years experience and has a turnover rate of approximately 40% amongst the younger staff;
- domestic violence and poverty negatively impact student attendance;
- poor attendance; of approximately 400 students enrolled in Mistassiniy school, 260 to 280 attend on any given day (Jellett 2011, personal communication).

One underused facility in Wabasca-Desmarais may be used for the delivery of specialized programs to alleviate space pressures at the schools (Barret 2011, personal communication).

Post-secondary education in the M.D. is offered by Northern Lakes College with campuses in several Alberta communities including Wabasca-Desmarais, Peerless Lake, Trout Lake, and Calling Lake. The college delivers programs with a focus on academic upgrading, apprenticeship training, and adult learning. The college also offers introductory courses in aboriginal studies, education, social work, and the arts that may be transferred with credit to university programs elsewhere in the province.

Northlands School Division has been the subject of considerable controversy in 2010 and early 2011. The Minister of Education suspended the school board and appointed an Official Trustee as an interim measure to address concerns over student achievement results across the jurisdiction in early 2010. The Minister also appointed a three-member inquiry, which held extensive consultations across northern Alberta and issued its report and recommendations in early 2011. As of early April 2011, Alberta Education has accepted the commission’s recommendation for a multi-stakeholder Community Engagement Team to begin the process of analyzing the recommendations and developing a community-based response to them.
Bigstone Cree Nation

The BCN operates the Oski Pasikoniwew Kamik (community school) which strives to incorporate traditional values, beliefs and ways of life into the standard provincial curriculum. The school currently offers programming for children in grades 4 to 7, and the 2009-2010 enrolment is estimated at 200 (Peters 2011, personal communication). BCN students transfer to the Northland School Division for the higher grades.

7.2.5 Recreation

There are a range of recreational facilities and programming in the RSA. Wabasca-Desmarais has a swimming pool and gymnasium, an arena, and basketball and tennis courts and a skate park. There are several organized sport and recreation programs and there is a new field house and golf course under construction.

The M.D. also offers several opportunities to both residents and tourists for outdoor recreation including hunting, fishing, hiking, cross country skiing, and snowshoeing (M.D Opportunity).

7.2.6 Social Services

Social service providers on the BCN Reserve and those operating within the M.D. of Opportunity routinely collaborate on program development and delivery in order to meet the needs of as many community members as possible (Gambler 2011, personal communication, Zufelt 2011, personal communication).

There is a range of social services available to residents of the M.D. of Opportunity and the BCN Reserve including:

- Wabasca-Desmarais Housing Authority (affordable housing);
- Pee-Kis-Kwe-Tan (Let’s Talk Society), an outpatient counselling program for people of all ages with alcohol, drug, or gambling problems;
- Bigstone Indian Child and Family Services;
- Women’s Emergency Shelter; and
- several youth outreach programs which focus on key issues within the community such as drug and alcohol awareness and employment preparation.

Social service organizations operating in the M.D. and on the BCN Reserves report several issues, including:

- the need for more affordable housing, overcrowding, and the often poor quality of existing homes;
• the need for licensed child care outside of traditional working hours; and
• the need for transportation for youth to and from outreach programs.

Social service organizations in the region are currently operating at or near capacity and are unable to increase the level of services offered due to low staffing levels and limited facility size. Alcohol and drug abuse, particularly among youth, add to the stresses in the social services system in Wabasca-Desmarais (Zufelt, 2011 personal communication).

7.3 Social Infrastructure Effects

The demand for social services is driven by changes in the population which accesses those services. The focus of this section is on selected services with a view to provide a sense of the effects. Additional planning by the responsible authorities will need to take place and, in many cases, is underway.

Base Case

Demand for social services is expected to increase in line with population. Table 7.1 provides an order-of-magnitude estimate of the number of additional resources that are needed to accommodate the estimated additional 980 people in the RSA between 2011 and 2025 under the Base Case assumptions. These estimates assume current service levels, which may or may not be appropriate.

Table 7.1 Additional Social Infrastructure Required, Base Case

<table>
<thead>
<tr>
<th>Selected Indicator</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Police officers</td>
<td>1.6</td>
</tr>
<tr>
<td>Fire department volunteers</td>
<td>3.1</td>
</tr>
<tr>
<td>Acute care beds</td>
<td>1.6</td>
</tr>
<tr>
<td>Teachers</td>
<td>10.1</td>
</tr>
</tbody>
</table>

Note: Relative to 2010 staffing levels and assuming no change in service levels.

Application Case

Demand for social services is expected to increase in line with population, and virtually all Application Case population growth is expected to accrue to the population centre of Wabasca-Desmarais and the nearby BCN Reserves. Table 7.2 provides an order-of-magnitude estimate of the number of additional resources that are needed to accommodate the estimated 40 to 50 additional people in the RSA under the Application Case assumptions. The estimates in the table indicate the level of resources in the indicator year over and above what would be needed under the Base Case assumptions.
Table 7.2  Additional Social Infrastructure Required, Application Case

<table>
<thead>
<tr>
<th>Selected Indicator</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Police officers</td>
<td>0.1</td>
</tr>
<tr>
<td>Fire department volunteers</td>
<td>0.2</td>
</tr>
<tr>
<td>Acute care beds</td>
<td>0.1</td>
</tr>
<tr>
<td>Teachers</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Note: Relative to 2010 staffing levels and assuming no change in service levels.

Both the construction and operations camps will have security and emergency services staff on site who will work with local service providers to meet the demand for services associated with the Project.

Cumulative Effects Assessment Case

Table 7.3 provides an order-of-magnitude estimate of the number of additional resources that are needed to accommodate the approximately 110 additional persons that may accrue to the RSA under Planned Development Assumptions. The estimates in the table indicate the level of resources in the indicator year over and above what would be needed under the Base Case assumptions.

Table 7.3  Additional Social Infrastructure Required, Cumulative Effects Assessment Case

<table>
<thead>
<tr>
<th>Selected Indicator</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Police officers</td>
<td>0.3</td>
</tr>
<tr>
<td>Fire department volunteers</td>
<td>0.6</td>
</tr>
<tr>
<td>Acute care beds</td>
<td>0.3</td>
</tr>
<tr>
<td>Teachers</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Note: Relative to 2010 staffing levels and assuming no change in service levels.

First Nations and Méts Social Effects

The development of oil sands in the RSA will impact the First Nations within its boundaries. Economic growth brought about by oil sands development will both limit opportunities for traditional pursuits, and make available income and employment opportunities to people with the requisite skills. Many Métis and First Nations community members currently need, and may continue to need, support in managing the changes brought on by oil sands expansion. This assistance may be needed in different forms for different people. For example, some may need programs aimed at keeping their children in school, others will need employment readiness training, and still others will need counselling for a range of social issues, including addictions. The closely knit nature of small aboriginal communities necessitates that any assistance or support offered will need to be highly personal.
8. Transportation

8.1 Scope

This section addresses the traffic effects under Base Case, Application Case and CEA assumptions. The focus is on Highway 754, which is the main transportation corridor between the gateway community of Slave Lake and the Project.

8.2 Situation Analysis

The Project uses industry roads north of Wabasca-Desmarais. There are two highways that connect Wabasca-Desmarais to the rest of Alberta:

- Highway 754 connects to Slave Lake via Highway 88. This road is also used by people from Wabasca-Desmarais to travel to and from Slave Lake for services and shopping;

- Highway 813 connects to the Town of Athabasca. This route is frequently used by traffic coming to Wabasca-Desmarais from the Edmonton area.

All provincial highways in the RSA are two-lane rural highways. Highway 813 has recently been upgraded and has wide shoulders. Highway 754 has relatively narrow shoulders. Traffic volumes on the highways in the RSA are shown in Table 8.1 and range from 700-900 on the rural stretches and 1,500 to 4,000 near communities. None of the highways are at or near capacity, although especially Highway 754 can be busy during the morning and afternoon peaks. Traffic on the highways is also affected by the number of logging trucks.

Table 8.1 Traffic Counts

<table>
<thead>
<tr>
<th>#</th>
<th>Location on the Highway</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>754</td>
<td>North of Intersection with 813</td>
<td>3,220</td>
<td>3,220</td>
<td>3,220</td>
<td>3,220</td>
<td>4,070</td>
<td>4,070</td>
</tr>
<tr>
<td>754</td>
<td>West of Wabasca</td>
<td>2,650</td>
<td>2,650</td>
<td>2,650</td>
<td>2,650</td>
<td>2,580</td>
<td>2,580</td>
</tr>
<tr>
<td>754</td>
<td>East of intersection with 88</td>
<td>680</td>
<td>720</td>
<td>680</td>
<td>720</td>
<td>660</td>
<td>910</td>
</tr>
<tr>
<td>88</td>
<td>South of 754/North of Slave Lake</td>
<td>1,400</td>
<td>1,550</td>
<td>1,450</td>
<td>1,530</td>
<td>1,370</td>
<td>1,550</td>
</tr>
<tr>
<td>813</td>
<td>South of Wabasca</td>
<td>470</td>
<td>500</td>
<td>680</td>
<td>680</td>
<td>680</td>
<td>680</td>
</tr>
<tr>
<td>813</td>
<td>North of Athabasca/South of Calling Lake</td>
<td>530</td>
<td>650</td>
<td>780</td>
<td>780</td>
<td>780</td>
<td>780</td>
</tr>
</tbody>
</table>

Source: Alberta Transportation

Traffic volumes vary with industry activity in the area. Volumes went down marginally between 2005 and 2010 on Highway 754 west of Wabasca-Desmarais and up by 6% per year near the intersection between Highway 754 and 88. Traffic volumes on other stretches have grown as well, but all from a low base, reflecting the upswing in activities by Canadian Natural and the construction of the Saleski Pilot and Germain Commercial Demonstration Project.
Traffic volume on Highway 754 north of the intersection of Highway 754 and 813 is higher than the traffic coming into the community on those highways. The intersection between Highway 754 and Highway 813 is controlled by means of four-way stop signs. It is the busiest intersection in the RSA, accommodating not only the traffic on both highways into the community, but also most of the local traffic to and from the gas and retail facilities located near the intersection and worker commutes from camp accommodation in the community to sites to the north and east.

Traffic between Wabasca-Desmarais and the oil and gas sites north of the community is mostly on forest industry roads. Many of these are narrow and winding and include one-lane bridges. Oil and gas industry traffic shares these roads with logging trucks. Industry users rely on two-way radio to facilitate traffic flow at bottlenecks, but traffic congestion does occur from time to time. The Wabasca-Desmarais RCMP detachment spends considerable time on traffic duties on industry roads.

Oversized loads avoid the busier parts of the highways in the RSA, by using a combination of provincial highways and industry roads. Oversized loads coming from the Edmonton area follow the oversized load corridor up Highway 63 and turn into the ALPAC plant from either Highway 55 or Highway 63 and continue up industry roads until they intersect with Highway 813 north of Athabasca. The high-load corridor avoids Wabasca-Desmarais by means of industry roads off Highway 813, east of the community.

Changes are being planned for the highway system in the region, including an extension of Highway 813 north to the Chipewyan Lake area and connecting to an east-west link between Highway 63 just north of Fort McMurray and Highways 88/988 around Red Earth Creek (CRISP 2010). As of early 2011, the timing of these highway developments is not known.

### 8.3 Transportation Effects

**Base Case**

Traffic volumes are expected to remain at roughly current levels with some accommodation of general highway system growth if only the projects in the base case proceed. Highways in the region are appropriately sized for the expected traffic volumes.

The resource-related traffic will continue to show daily morning and afternoon peaking patterns, which are especially noticeable between Wabasca-Desmarais and the production sites north and west of the community. By extension, the intersection of Highways 754 and 813, which is also the location of gas and other services, is expected to see a pattern of highest use during the morning and late afternoon peaks.
**Application Case**

Project construction will increase traffic volumes. Commuting workers and contractors will increase bus and private vehicle numbers and material trucks and modules will add to the number of trucks. The actual in situ oil sands induced traffic increases on Highway 881 near Conklin in the Regional Municipality of Wood Buffalo suggest that a SAGD project of 45,000 to 60,000 bbls/d on average creates between 200 and 250 vehicle movements per day during construction if it has on-site worker accommodation.

The experience near Conklin and Anzac also indicates that traffic volumes abate after the completion of construction. Operations tend to have roughly one-fifth of the traffic effect of construction, assuming an on-site work camp and pipeline transportation of the bitumen.

*Figure 8.1* shows the expected increase in Project related traffic north of Wabasca-Desmarais. It shows that the traffic is expected to increase under the Base Case and the Project Case. The incremental Project-induced traffic is expected to peak as the construction of subsequent phases overlaps with the start of production of Phase 2. The maximum impact is estimated is 532 additional vehicle movements on average in 2019 (or 12% over the Base Case). Traffic effects on the highways south of Wabasca-Desmarais are expected to be less as traffic disperses over both Highway 754 to Slave Lake and Highway 813 to Calling Lake and Athabasca.

**Figure 8.1  Project Induced Traffic, North of Wabasca-Desmarais**
The estimated traffic effect shown here is a conservative estimate in that it assumes that Project-induced traffic will be additional to the observed traffic volumes north of Wabasca-Desmarais. It is, however, expected that much of the worker commute traffic will be limited to the road system between the Project site and the expected airstrip that is assumed to be developed nearby. Some of the worker commute and most of the contractor traffic will be additive to the observed traffic north of Wabasca-Desmarais. The use of pipelines, as opposed to trucks, to move diluent to and dilbit from the Project will mitigate the additional traffic generated by the Project.

Even in the conservative case shown here, the highways in the region are appropriately sized for the expected traffic volumes. Additional traffic volumes will exacerbate the traffic situation at the intersection of Highways 754 and 813, which is already busy during the morning and afternoon peaks and on the industry roads north and east of Wabasca-Desmarais.

**Cumulative Effects Assessment Case**

The oil sands in the RSA are in a relatively early stage of development. Beyond the currently planned projects, there are a number of potentially large projects that may occur in the region. Both Husky and Shell have leases in the area and Shell is actively engaged in technology development with regards to oil in carbonate plays. The timing, size and operating model of these potential projects is not known at this time, but, if and when they occur, their size is likely to have substantial effects on the traffic volume and infrastructure in the RSA. The recently released CRISP addresses what road infrastructure will be required in the RSA if these projects proceed (CRISP 2010).
9. Gateway Community Effects

The oil and gas industry in the RSA is changing. Currently, the change is gradual with conventional cold production becoming more labour and infrastructure intensive through the introduction of polymer flooding of reservoirs. The Project will be the first large scale commercial thermal stimulated bitumen project in the Wabasca-Desmarais area. It constitutes a step change from the conventional oil and gas exploration and production in the RSA in that it requires considerable infrastructure investment and creates multi-year construction and long-term operations employment. Other projects may follow and once built, thermal stimulated oil sands facilities take on characteristics of manufacturing facilities in terms of long-term presence in the same location, focus on operational excellence, and cost minimization.

The roughly 30-year operating cycle of the Project, especially if considered in the context of the other long-term bitumen projects that may emerge, creates opportunities for a structural transformation of the RSA and its gateways. To date, the communities in the RSA have indicated a preference for the current model of oil and gas operations that relies extensively on mobile workers living in worker accommodation during shifts, but who remain resident elsewhere. This creates opportunities for the gateway communities, especially the Town of Slave Lake and the surrounding area. Already, an estimated 12-15% of labour forces of Slave Lake and Lesser Slave River work in the oil and gas industry. Discussions with operators in the Wabasca-Desmarais area note their use of contractors from Slave Lake and Lesser Slave River.

Experience from elsewhere may give some insight of how the Town of Slave Lake, the M.D. of Lesser Slave River and perhaps the Town of Athabasca may develop, if oil sands industry development takes off in the Wabasca-Desmarais area. Most instructive is the development of Bonnyville and the M.D. of Bonnyville. As shown in Table 9.1, the oil and gas industry is relatively larger in Bonnyville and the M.D. of Bonnyville than in the RSA, the Town of Slave Lake, and the M.D. of Lesser Slave Lake. The oil and gas industry was the fastest growing employment sector in Bonnyville and surrounding area between 2001 and 2006.

Table 9.1 Labour Force Participation in Oil and Gas Industry

<table>
<thead>
<tr>
<th></th>
<th>Distance to Oil Sands Facilities (km)</th>
<th>% of Labour Force in Oil and Gas Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wabasca-Desmarais</td>
<td>46</td>
<td>15%</td>
</tr>
<tr>
<td>Town of Slave Lake</td>
<td>185</td>
<td>14%</td>
</tr>
<tr>
<td>M.D. of Lesser Slave River</td>
<td>100 - 185</td>
<td>12%</td>
</tr>
<tr>
<td>Town of Bonnyville</td>
<td>60 - 100</td>
<td>20%</td>
</tr>
<tr>
<td>M.D. of Bonnyville</td>
<td>60 - 100</td>
<td>19%</td>
</tr>
</tbody>
</table>
There are, of course, many differences between the Bonnyville and Slave Lake areas, not least the importance of forestry around Slave Lake and the almost complete absence of forestry in the Bonnyville area. That said, Bonnyville and surrounding area has emerged as both a residential and a service centre for the oil sands industry. Bonnyville and surrounding area have facilitated this development by:

- opening up land for commercial and industrial development; and
- supporting the emergence of a private bus/van commuting system with a central worker marshalling point and associated parking facility.

The communities and the oil sands industry in the Bonnyville/Cold Lake area have also created a collaborative organization in the Lakeland Industry and Community Association (LICA). This association aims to establish understanding and rapport, share information and work toward mutually beneficial solutions to local concerns. Such synergy groups have emerged in other oil and gas regions as well.

If the gateway communities to the RSA identified above do grow to accommodate increased industrial activity in the RSA, the release of additional crown land may be required in order to satisfy the demand for additional residential, commercial, and industrial developments.
10. Mitigation and Enhancement

10.1 Introduction

Laricina Energy Ltd has existing operations in the RSA and is aware of the existing socio-economic conditions in the population centre of Wabasca-Desmarais and the nearby BCN Reserves. Laricina recognizes that:

- the size of the workforce needed for the construction and operation of the Project would overwhelm the local capacity in the RSA to accommodate the construction and operations workforce or to provide skilled operations workers; and
- the distance between the Project and the main population centre is such that a daily commute for workers would be impractical.

With a view to these realities, Laricina has adopted construction and operations strategies that:

- uses a FIFO worker transportation plan,
- makes use of on-site camps to house both construction and operations workers; and
- employs a developmental approach to local hiring and procurement.

Flying workers directly to the Project site and housing workers in on-site camps will minimize the direct Project effects on the demand for housing and municipal infrastructure in the RSA. It will also limit the growth pressure on the permanent resident population in the region and the social infrastructure that supports it.

The developmental approach to local hiring and procurement is evidenced by educational initiatives to help workers gain the skills necessary to work on the Project site.

10.2 Worker Accommodation

Construction Project Accommodation

The Project will be supported by an on-site camp designed to house the full peak on-site construction workforce of 1,000. The camp will conform to industry standards and remain in existence for the duration of the construction period.
Operations Project Accommodation

The Project will make use of an on-site camp for operations workers which will be sufficiently sized to accommodate the 140 person operations workforce. The camp will conform to the industry standards and remain in existence for the duration of the operations period.

10.3 Local Benefits

Laricina has a policy of buying or hiring local first, subject to quality and price considerations. Laricina will act as the prime contractor for the Project and is committed to breaking down selected contracts to a size that is within the scope of the RSA contractors.

Laricina is currently working with local educators to inform young people of the potential career opportunities with Laricina and the process through which they can begin careers in the oil and gas sector.

10.4 Communication and Consultation

The Project has long-life reserves and much can change over its operating timeframe. Laricina will continue to work with local stakeholders to adjust the main elements of its mitigation and enhancement strategies to changing circumstances. Laricina maintains an office in Wabasca-Desmarais where local stakeholders can engage directly with representatives of the company.

10.5 Traditional Land Use and Culture

Laricina recognizes both the importance of traditional culture to Aboriginal peoples and their stated desire to be involved in and benefit from the economic opportunities implied in the Project. Laricina will undertake the following initiatives to minimize the Project’s impact on traditional land use:

- progressive reclamation whenever practical;
- access management, including facilitation of access across the Project area by trappers to their traplines and compensation to trappers directly affected by the Project; and
- ongoing consultation with the BCN to, whenever possible, understand and mitigate, emerging issues.

Laricina is open to working with the community in support of Aboriginal culture retention. Examples include:
• supporting the collection of traditional ecological knowledge on medicinal plants, wildlife and spiritual and cultural sites on the traditional lands of the BCN;

• supporting Métis and Cree cultural retention programs, including language programming, and an oral history project; and

• providing aboriginal culture training to Laricina employees and contractors.

As community initiatives come forward, Laricina will assist and contribute where appropriate.

10.6 Social Infrastructure

Policing

In accordance with industry standards, the on-site camps for both construction and operations will employ security personnel in order to minimize the need to involve local law enforcement in security matters at the Project site.

The use of a FIFO model will minimize the amount of personal vehicle traffic travelling to and from the Project site which will mitigate the need for additional traffic enforcement on the roads within the RSA

Emergency Services

The Project’s mitigation measures for emergency services will be incorporated into the company’s normal operating plan. The following are examples of the type of initiative Laricina will employ in order to minimize the need to access local emergency service providers:

• explicit and enforced camp, workplace, and flight policies with regards to the use of alcohol, drugs, and illegal activities;

• on-site emergency medical technicians and paramedics and an emergency conveyance vehicle providing 24 hour service; and

• emergency response plan, including integrated incident/crisis management teams, full time certified emergency responders, and auxiliary emergency response teams.

Laricina will cooperate with other service providers and members of industry in the RSA to assist in addressing effects that are mostly outside its direct control by entering into mutual aid agreements where appropriate.
Social Services

Laricina is committed to continue to engage regional social service providers, including representatives of the M.D of Opportunity and the BCN, to identify potential issues and strategies to address these issues. The company will continue its financial support of local literacy programs.

10.7 Transportation

The use of a FIFO model in conjunction with the assumed on-site airstrip and camp minimizes the amount of vehicles travelling to and from the Project site, thus minimizing congestions and the need for additional traffic enforcement. Laricina will implement several additional traffic mitigation measures that include scheduling oversized loads and ensuring that Project related vehicles travelling the ALPAC road follow the established protocol of using a radio to communicate with other drivers to minimize incidents at narrow bridge crossings and low-visibility points along the road.

10.8 Monitoring

No formal monitoring program is proposed. However, Laricina continually monitors the impact of its activities though ongoing community and stakeholder engagement.
11. Works Cited


Royal Canadian Mounted Police (RCMP) K Division. 2008 Municipal and Provincial Rankings.


Young, Lawrence. Bigstone Cree Housing Authority. April 2011.

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