



**STAR-ORION SOUTH DIAMOND PROJECT  
ENVIRONMENTAL IMPACT STATEMENT**

**SECTION 5.1  
BASELINE OVERVIEW**





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## 5.0 PROJECT SETTING AND BASELINE CHARACTERIZATION

This Section describes the Project setting and baseline characterization for the physical, biological and human environment. The Project setting is defined as the existing biophysical and human environment in the local and regional area at, and surrounding, the Project. The Project setting is described in terms of environmental, social, economic, heritage, and human health.

In terms of baseline characterization, baseline conditions are described for the local and regional areas, which are defined as the local study area (LSA) and the regional study area (RSA). The boundaries of these study areas are dependent upon the area of influence for each discipline (e.g. air quality, fisheries, social and economic). The data is provided at a level of detail that allows for the evaluation and prediction of environmental effects (Section 6.0).

### 5.1 OVERVIEW

Section five discusses the biophysical and human environmental setting for the Star-Orion South Diamond Project. The baseline is set out in 17 sections, eight physical, four biological and five human environmental, as shown in Table 5.1-1.

**Table 5.1-1: Topic Summary for Section 5**

Section	Topic	Section	Topic
5.2.1	Geology	5.3.2	Vegetation
5.2.2	Soils	5.3.3	Wildlife
5.2.3	Metal Leaching/ARD	5.3.4	Biodiversity
5.2.4	Air Quality and Climate	5.4.1	Socio-economics
5.2.5	Noise	5.4.2	Traditional Knowledge, Traditional Land Use
5.2.6	Hydrology	5.4.3	Non-traditional Land Use
5.2.7	Groundwater		
5.2.8	Surface Water	5.4.4	Human Health
5.3.1	Fisheries and Aquatics	5.4.5	Archaeology

This Section has been organized into four major subsections. Section 5.1 is this overview. Section 5.2 discusses the physical environment sections (i.e. 5.2.1 to 5.2.8, inclusive). Section 5.3 discusses the biological sections (5.3.1 to 5.3.4, inclusive) and section 5.4 discusses the human environment sections (i.e. 5.4.1 to 5.4.5, inclusive).

The Project is located within the Fort à la Corne (FaC) forest approximately 60 km east of the City of Prince Albert. The surficial geology and soil parent material of the FaC forest is comprised of geological deposits of the Pleistocene (1.8 – 0.01 Million years ago) or Recent age (less than 0.01 Million years ago; Anderson and Ellis, 1976). Pleistocene deposits are



most common and include the products of glaciation and related lacustrine and fluvial processes.

The climate of the FalC area can be characterized by long, cold winters with mean January temperature of  $-19.1^{\circ}\text{C}$  and short, hot summers with a mean July temperature of  $17.5^{\circ}\text{C}$ . Air quality is typical of pristine rural areas in northern Canada with any contaminants generated from outside the area either by forest fires or long distance transport of trace elements at very low concentrations.

Background surface water is moderately hard (188 to 336 mg/l) with a moderate salt content (TDS of 251 to 1,058 mg/l). Metals levels are generally low (with the exception of aluminum, iron, and chromium) with many at concentrations that are below detection levels. Nutrient levels (i.e. nitrogen and phosphorus) are also relatively low. Some natural exceedances of Saskatchewan interim surface water quality objectives occur in the tested waterways: total aluminum, arsenic, cadmium (laboratory detection limit is above objective value), chromium, iron and potentially mercury (laboratory detection limit is above objective value).

The FalC forest is an island forest of 132,502 ha surrounded by agricultural land. This forested land, provides suitable habitat for a wide variety of wildlife species. The occurrence of a number of species is also due to the proximity of the Saskatchewan River, and its associated tributaries and riparian habitats that provide travel corridors for wildlife. The forest is habitat for a wide variety of mammalian species, including a number of economically important game species such as elk, white-tailed deer, moose, black bears, and furbearers such as beaver and muskrat. Other mammals that may be commonly found include red fox, raccoon, coyote, red squirrel, and northern short-tailed shrew. Although not common, there are several small wetland bogs in the FalC forest. If open water is present, bird species utilizing this habitat may include pied-billed grebe, red-necked grebe, mallard, blue-winged teal, green-winged teal, lesser scaup, common goldeneye, and bufflehead.

The Saskatchewan River and English Creek are known fish-bearing waters in the Project area. The Project is located north of the Saskatchewan River just downstream of the confluence of the North and South branches of the Saskatchewan River. The Saskatchewan River supports 26 fish species and English Creek supports five species. There are several small tributaries of the Saskatchewan River that originate within the FalC forest that have potential to provide fish habitat mostly in their lower reaches just upstream of their junctions with the Saskatchewan River.

The hydrogeology from ground surface down through the top portion of the Devonian Souris River Formation can be described as three units or systems, which are described below:

- a shallow system comprised of the surficial sands, silts, and clays (often referred to as the surficial stratified drift);



- a confining layer (sometimes referred to as an “aquitard”) comprised of till (Saskatoon and Sutherland Groups), locally the Empress Formation, and by the underlying Westgate and Joli Fou Formation Shale (part of the Lower Colorado Group); and
- a deep system comprised of the Mannville Group (including the Pense and Cantuar Formations, the latter further broken into seven members of variable sand, silt, and clay content) and the upper several metres of the underlying carbonates of the Souris River Formation; the latter is an arbitrary thickness selected for the purpose of this investigation.

Shallow groundwater is relatively fresh whereas Mannville Group (deep) groundwater is slightly brackish with an elevated total dissolved solids (~4,200 mg/L) and somewhat elevated trace metals.

The FaIC forest is close to several communities (including the cities of Prince Albert and Melfort) and First Nations. The FaIC forest supports a variety of outdoor recreational activities such as snowmobiling, berry picking, skiing, hiking, and a broad range of natural resource uses such as trapping, hunting, fishing, tourism, logging, traditional Aboriginal uses, mineral exploration, and reforestation activities.

The closest community to the proposed Project site is the James Smith Cree Nation Indian Reserve 100/100A which is located partially within the FaIC forest but mainly on the south side of the Saskatchewan River. The Muskoday First Nation Indian Reserve 99 is the next closest First Nation.

Other communities within the region include (Table 5.1-2):

**Table 5.1-2: Summary of Communities in the Area**

<b>Cities</b>	<b>Villages</b>	<b>Villages</b>	<b>Rural Municipalities</b>
City of Prince Albert	Valparaiso	Smeaton	Kinistino RM 459
City of Melfort	Love	Zenon Park	Willow Creek RM 458
<b>Towns</b>	Beatty	Weldon	Flett's Springs RM 429
Choiceland	Ridgedale	Codette	Star City RM 428
Star City	Weirdale	White Fox	Tisdale RM 427
Kinistino	Aylsham	<b>Rural Municipalities</b>	Nipawin RM 487
Birch Hills	Albertville	Garden River RM 490	Torch River RM 488
Tisdale	Meath Park	Connaught RM 457	Prince Albert RM 461
Nipawin		Birch Hills RM 460	Buckland RM 491

The transportation infrastructure consists of highways, secondary roads, railways, and airports. Several all-weather highways as well as a network of good quality secondary



roads serve the region. Highways 2 and 6 are main routes north and south and Highways 3 and 55 are main routes east and west, Hwy 55 is north of the Saskatchewan River and Hwy 3 lies south of the Saskatchewan River.

The regional economy is agricultural and resource-based combined with a sizeable service and transportation sector. The agricultural sector is diverse. The area around Melfort, Tisdale and Nipawin is one of the richest, most productive farmland areas in Canada. Crops such as wheat, barley, canola, peas, flax, lentils, alfalfa, canary seed, rye, various forage crops, spices, and other specialty crops are grown. Livestock such as cattle and hogs and specialty livestock (e.g., elk, deer, and wild boars) are also produced. In addition, the area provides important agricultural services such as meat processing, feed mills, seed cleaning plants, the distribution of farm chemicals, and the manufacturing and distribution of farm equipment and grain storage facilities. The resource sector includes mineral exploration, forestry, and wood processing.

The area is located within the confines of Treaty #6 and the James Smith Cree Nation, the Muskoday First Nation, the Red Earth Cree Nation, the Sturgeon Lake First Nation, Métis Nation Eastern Region II and Western Region II, and potentially other Aboriginal groups have asserted traditional uses over the area. Aboriginal people have traditionally used lands within the FaIC forest for hunting, fishing, trapping, berry picking, gathering medicinal plants and for traditional and ceremonial pursuits. The FaIC forest contains numerous traditional cultural areas, including one burial ground, some of which have been identified by James Smith Cree Nation. Historically, cabins have been erected in the FaIC forest and were used to support traditional exercises.

One hundred and fifty eight archaeological sites were identified in baseline surveys conducted between 2004 and 2007 and, to date, are the only sites that are on record with the Heritage Resources Branch in the local study area (Project footprint and buffer). These sites were documented during assessments completed in the context of diamond exploration activities. The majority of the recorded heritage sites in the region are located within the Saskatchewan River valley.