

# **Annexe A**

# PRELIMINARY ENVIRONMENTAL REVIEWS

## Saint-Blaise / Saint-Valentin and West Napierville

Prepared for  
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by  
Helimax Energy Inc.

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**helimax**

Wind energy consultant for the world

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## DEFINITIONS AND SYMBOLS

amsl	above mean sea level
ha	hectare
IBA	Important Bird Area
IRDA	Research and Development Institute for the Agri-Environment database
km	kilometre
kV	kilovolt
MBS	Migratory Bird Sanctuary
NWA	National Wildlife Area

### NOTE:

According to Hélimax's knowledge, no municipal regulations related to wind energy development or the implementation of wind projects are currently in effect in the region under study. However, such regulations, if adopted in the future, could require modifications to be made to the assessment process.

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# 1 INTRODUCTION

## 1.1 Objectives

Hélimax has conducted a Preliminary Environmental Review for three potential wind project sites being considered by TCI Group: Saint-Blaise / Saint-Valentin<sup>1</sup> and West Napierville. These sites are located in Quebec's Montérégie region, approximately 37 km southeast of Montréal. A photograph of the agricultural land that characterizes these sites is shown in Figure 1-1. Figure 1-2 illustrates the site locations.

The objective of these studies was to identify a selected set of factors or constraints (social, environmental, technical) and determine if these constraints could significantly jeopardize the project's approval, resulting in project abandonment or substantial delays in its development. This process aims to reduce and manage the risk and avoid further development costs.

## 1.2 Methodology

A review and analysis of the main biological, physical, social and technical issues was conducted for each location, based on the items described below.

### 1.2.1 Biological Environment

#### *Protected Areas and Other Areas of Concern*

Protected areas within or in the vicinity of the project areas as well as other areas of concern were identified. Quebec's current list of protected areas is made up of provincial and federally designated lands, including:

- Provincial Parks / Park Reserves;
- National Parks;
- Outfitters;
- Community Wildlife Area;
- ZEC;<sup>2</sup>
- Wildlife Reserve;
- Area protected by the *Fondation de la Faune du Québec*;
- Wildlife Refuges;
- Provincial wildlife habitats (e.g. heronry, muskrat habitat, important waterbird habitat)
- Projected provincial parks;
- Migratory Bird Sanctuaries (MBS).

Other areas of concern included Important Bird Areas (IBA).

#### *Listed Species*

The potential presence of federally or provincially listed species (flora and fauna) was identified based on the following sources:

- Canadian Wildlife Service;

<sup>1</sup> The Saint-Blaise and Saint-Valentin sites are assessed together as they are overlapping.

<sup>2</sup> Zone d'exploitation contrôlée (controlled harvesting zone). Territorial infrastructures that were set up in 1978 to take over for private clubs. The management of these zones is entrusted to non-profit organizations and managed by local citizens.

- Important Bird Areas database;
- Environment Canada Species at Risk database;
- Quebec's Ministry of Sustainable Development, Environment and Parks;
- Quebec's Ministry of Natural Resources and Fauna.

### 1.2.2 Physical Environment

Issues related to the physical environment, such as soil types, topography, presence of wetlands and hydrographic features were identified. The following resources, databases, or documents were consulted:

- Research and Development Institute for the Agri-Environment (IRDA) database;
- Natural Resources Canada.

### 1.2.3 Human Environment

Potential land use conflicts were identified based on current land use and the presence of settlements within the project area. Land tenures were examined, as was the presence of First Nations Reserves, archaeological and historical sites (identified in maps). The following sources were reviewed:

- Aerial photographs;
- First Nations database, Natural Resources Canada, 2002
- Cadastral maps;
- Quebec's Ministry of Culture and Communication;
- MRCs and municipalities were not consulted in the context of this study.
- NTDB (National Topographic Database) 1:50 000, Natural Resources Canada

Other issues relevant to this mandate were also addressed. They included a preliminary assessment of the transmission lines in proximity to the sites, as well as the identification of nearby communication systems (TV, radio and microwave communication towers, including a micro-wave analysis) and airfields. The following sources were reviewed:

- Transmission lines: National Topographic Database (NTDB) ;
- Communication systems: Industry Canada ([www.strategis.ca](http://www.strategis.ca));
- Airfields: NavCanada and National Topographic Database.





**Figure 1-1: Agricultural Land in Montérégie Region**

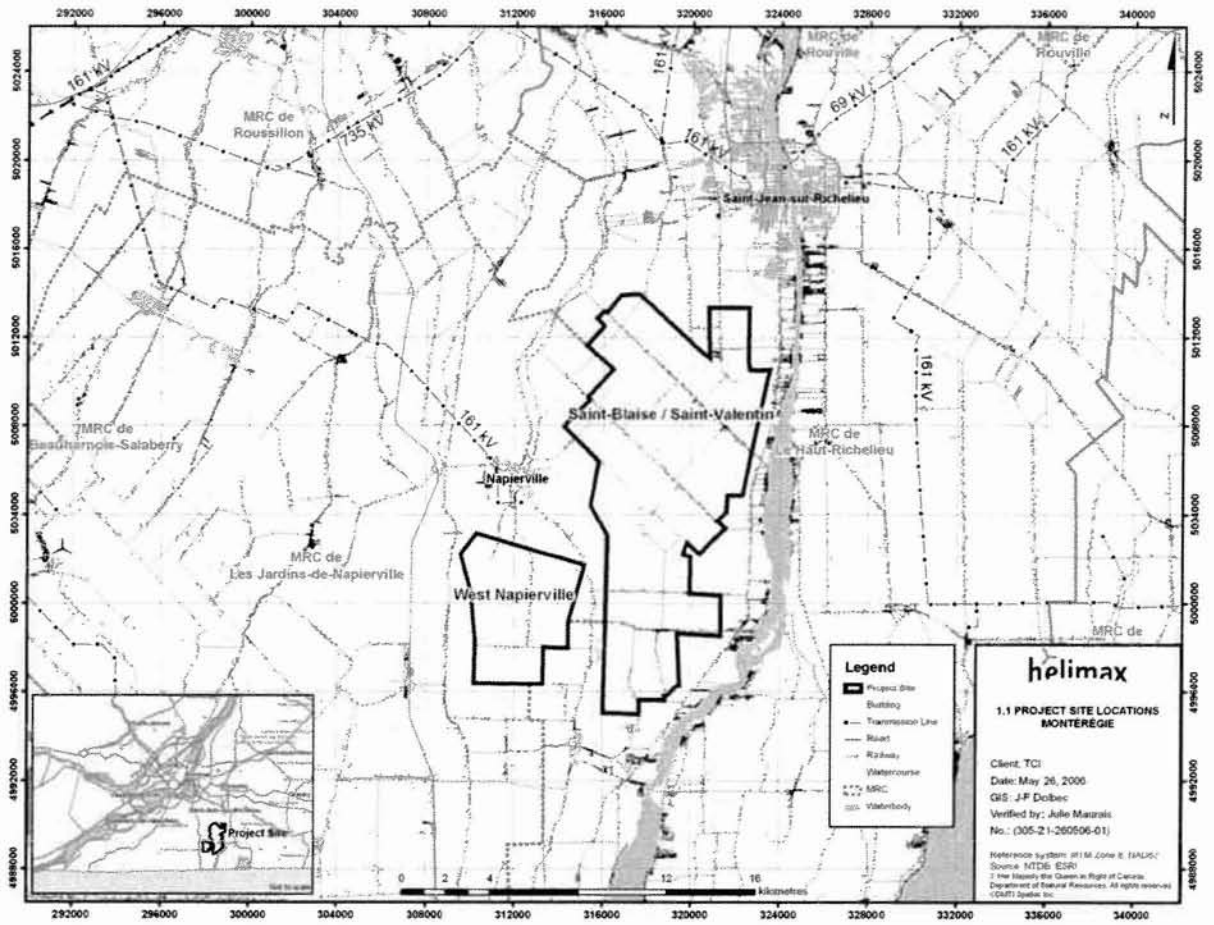


Figure 1-2: Overview of Project Site Locations

## 2 SAINT-BLAISE / SAINT-VALENTIN

### 2.1 Site Location and General Description

As Saint-Blaise and Saint-Valentin project areas overlap, they are characterized by a similar environmental and social reality. Hence, one environmental evaluation will be realized for both project areas.

The Saint-Blaise / Saint-Valentin project area is located in the Montérégie region, approximately 1 km west of Saint-Paul-de-l'Île-aux-Noix, 3.7 km east of Napierville and 4.8 km south of Saint-Jean-sur-Richelieu. The project area lies within the MRC<sup>3</sup> Le Haut-Richelieu. More precisely, the project area comprises Saint-Valentin (southern half of project area) and Saint-Blaise-sur-Richelieu (northern half) municipalities.

The project area, which covers 100.9 km<sup>2</sup>, is characterized by flat topography. Secondary roads are found throughout most of the project area.

### 2.2 Biological Environment

The Saint-Blaise / Saint-Valentin project area is part of the St. Lawrence Lowland Ecoregion, which includes the region along the St. Lawrence River extending from Québec City to the Frontenac Axis<sup>4</sup> near Brockville, Ontario. (Natural Resources Canada, 2003; Environment Canada, 2005).

Mixed forests of sugar maple, yellow birch, eastern hemlock, and eastern white pine form the most stable vegetation in the region; beech occurs in milder areas. Dry sites are dominated by red pine, eastern white cedar, and red oak. Wetter sites support red maple, black ash, white spruce, tamarack, and eastern white cedar (Environment Canada, 2005). Wildlife includes deer, black bear, moose, hare, chipmunk, other small mammals, waterfowl, and other birds (Environment Canada, 2005).

An extensive system of waterways, including the St. Lawrence River and the Great Lakes, combined with surrounding rich fertile soils, creates one of the most attractive and productive ecozones in Canada (Natural Resources Canada, 2003). The Saint-Blaise / Saint-Valentin project area is entirely located on agricultural lands with some forested patches.

The St. Lawrence Lowland Ecoregion is characterized by warm summers and cold, snowy winters. The mean annual precipitation ranges from 800 to 1000 mm (Environment Canada, 2005).

#### 2.2.1 Protected Areas and Other Areas of Concern

There are no provincial or national parks around the Saint-Blaise / Saint-Valentin project area. However, there are areas of concern nearby including a heronry 1.2 km east of Saint-Valentin, and an Important Waterbird Area located along the Richelieu River, approximately 1.5 km east.

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<sup>3</sup> Municipalité régionale de comté – Regional County Municipality

<sup>4</sup> The Frontenac Axis is the southern extension of the Canadian Shield in eastern Ontario, extending from near Gananoque and Brockville along the St. Lawrence River to near Westport (The Nature Conservancy Canada).

## 2.2.2 Potential Presence of Listed Species

### 2.2.2.1 Fauna

Listed species of fauna which are susceptible of being found within or near the project area are shown below in Table 2-1.

It is important to mention that the fish and amphibian species mentioned below can be found within the Richelieu River or on its shore, but not in the project area itself.

**Table 2-1: Listed Fauna Species – Saint-Blaise / Saint-Valentin**

English Name	Latin Name	Provincial Status	Federal Status
<b>Birds</b>			
Loggerhead Shrike	<i>Lanius ludovicianus</i>	E	E
Peregrine Falcon <i>anatum</i>	<i>Falco peregrinus anatum</i>	T	E
Short-eared Owl	<i>Asio flammeus</i>	-	SC
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	-	SC
<b>Mammals</b>			
Woodland Vole	<i>Microtus pinetorum</i>	-	SC
<b>Reptiles and Amphibians</b>			
Wood Turtle	<i>Clemmys insculpta</i>	T	SC
Northern Map Turtle	<i>Graptemys geographica</i>	T	SC
Northern Chorus Frog	<i>Pseudacris triseriata</i>	T	-
<b>Fish</b>			
Copper Redhorse	<i>Moxostoma hubbsi</i>	E	E
River Redhorse	<i>Moxostoma carinatum</i>	-	SC

Sources: Ministry of Natural Resources and Fauna, 2005; Environment Canada, 2006  
 E: Endangered<sup>5</sup>; T: Threatened<sup>6</sup>; SC: Special Concern<sup>7</sup>

<sup>5</sup> Endangered: A species facing imminent extirpation or extinction

<sup>6</sup> Threatened: A species likely to become endangered if limiting factors are not reversed

<sup>7</sup> Special concern: a species of special concern because of characteristics that make it particularly sensitive to human activities or natural events

2.2.2.2 Flora

Listed species of flora which are susceptible of being found within or near the project area are shown below in Table 2-2.

Table 2-2: Listed Flora Species – Saint-Blaise / Saint-Valentin

English Name	Latin Name	Provincial Status	Federal Status
Putty-root	<i>Aplectrum hyemale</i>	E	-
White wood-aster	<i>Eurybia divaricata</i>	E	-
False hop sedge	<i>Carex lupuliformis</i>	E	E
Wall-rue fern	<i>Asplenium ruta-muraria</i>	E	-
American ginseng	<i>Panax quinquefolius</i>	E	E
Slender muhly	<i>Muhlenbergia tenuiflora</i>	E	-
Cork elm	<i>Ulmus thomasi</i>	E	-
Pitch pine	<i>Pinus rigida</i>	E	-
Broad beech fern	<i>Phegopteris hexagonoptera</i>	E	-
Round-leaf groundsel	<i>Packera obovata</i>	E	-
Bog fern	<i>Thelypteris simulate</i>	E	-
Blunt-lobed cliff fern	<i>Woodsia obtusa obtusa</i>	E	-
Canadian maidenhair	<i>Adiantum pedatum</i>	V	-
Wild leek	<i>Allium tricoccum</i>	V	-
Canada wild ginger	<i>Asarum canadense</i>	V	-
False mermaid-weed	<i>Floerkea proserpinacoides</i>	V	-
Canada lily	<i>Lilium canadense</i>	V	-
Ostrich fern (Fiddlehead fern)	<i>Matteuccia struthiopteris</i>	V	-
Bloodroot	<i>Sanguinaria canadensis</i>	V	-
Large-flowered trillium	<i>Trillium grandiflorum</i>	V	-

Sources: Ministry of Sustainable Development, Environment and Parks, 2006; Environment Canada, 2006  
E: Endangered; V: Vulnerable<sup>8</sup>

Among these species, the Canada wild ginger (*Asarum canadense*) and the ostrich fern (*Matteuccia struthiopteris*) are mostly found close to the Richelieu River (Ministry of Sustainable Development, Environment and Parks, 2006).

Figure 2-1 presents the features of the Saint-Blaise / Saint-Valentin biological environment.

<sup>8</sup> Vulnerable: A species is classified as vulnerable when its survival is precarious even though it is not considered in danger of extinction (Ministry of Sustainable Development, Environment and Parks, 2006).

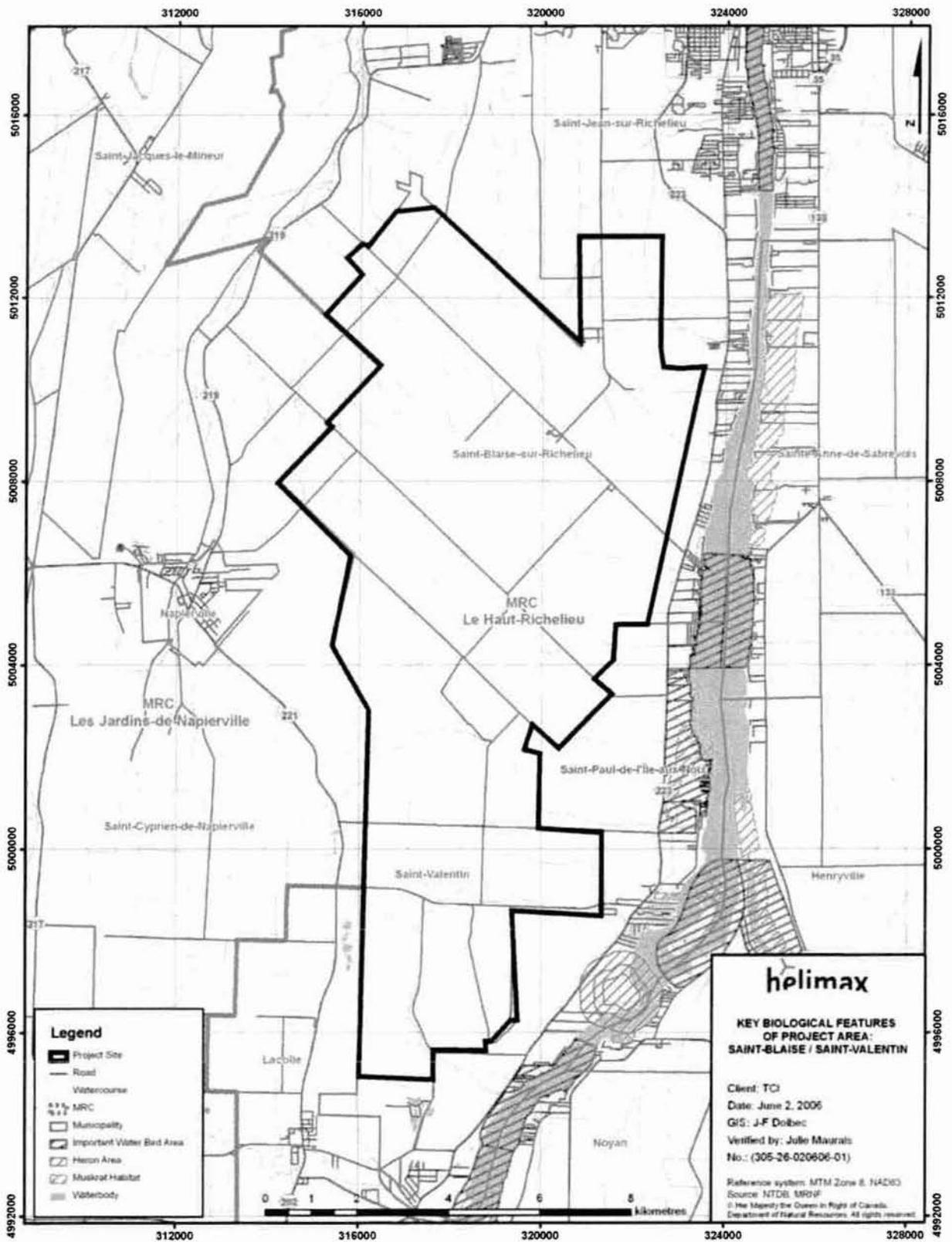


Figure 2-1: Biological Features – St-Blaise / St-Valentin

## 2.3 Physical Environment

### 2.3.1 Soil and Terrain General Characteristics

The Saint-Blaise / Saint-Valentin project sites are located in a relatively flat area along the Richelieu River. Elevations vary from 35 to 50 metres above mean sea level.

Surface soils in the Saint-Blaise / Saint-Valentin project area are characterized by morainic and glacio-lacustrine deposits, with some areas of marine origin. Most of the site is covered with clayey to loamy material, "poorly" to "moderately " drained, with some small areas of sandy to loamy sand, "moderately well drained" to "very rapidly drained" (IRDA, 2006). Organic soils, including wetland areas, cover nearly 10% of the total surface area. The overburden thickness throughout most of the site is 10 metres, with local variations from 1 to 25 metres (IRDA, 2006). Table 2-3 below shows the soil categories in the Saint-Blaise / Saint-Valentin project area along with the surface areas they occupy.

**Table 2-3: Soil Categories and Equivalent Surface Areas – St-Blaise / St-Valentin**

Soil Category	% of Surface Area
Sand (Very rapidly drained)	0.9
Sandy loam (Well to moderately well drained)	3.1
Loam (Moderately to poorly drained)	65.6
Clay/loam (Imperfectly to poorly drained)	19.9
Organic (including wetland, very poorly drained)	9.2
Other <sup>1</sup>	1.3
Total	100.0

<sup>1</sup> Includes watercourses, slopes, and non-available data

### 2.3.2 Hydrographic Features

Wetlands are present near the municipality boundary that separates Saint-Blaise from Saint-Valentin in the project area. Streams and small rivers run throughout the Saint-Blaise / Saint-Valentin project area, and the Richelieu River flows approximately 0.8 km east of the project site boundary.

Figure 2-2 presents the soil categories of the Saint-Blaise / Saint-Valentin project area.

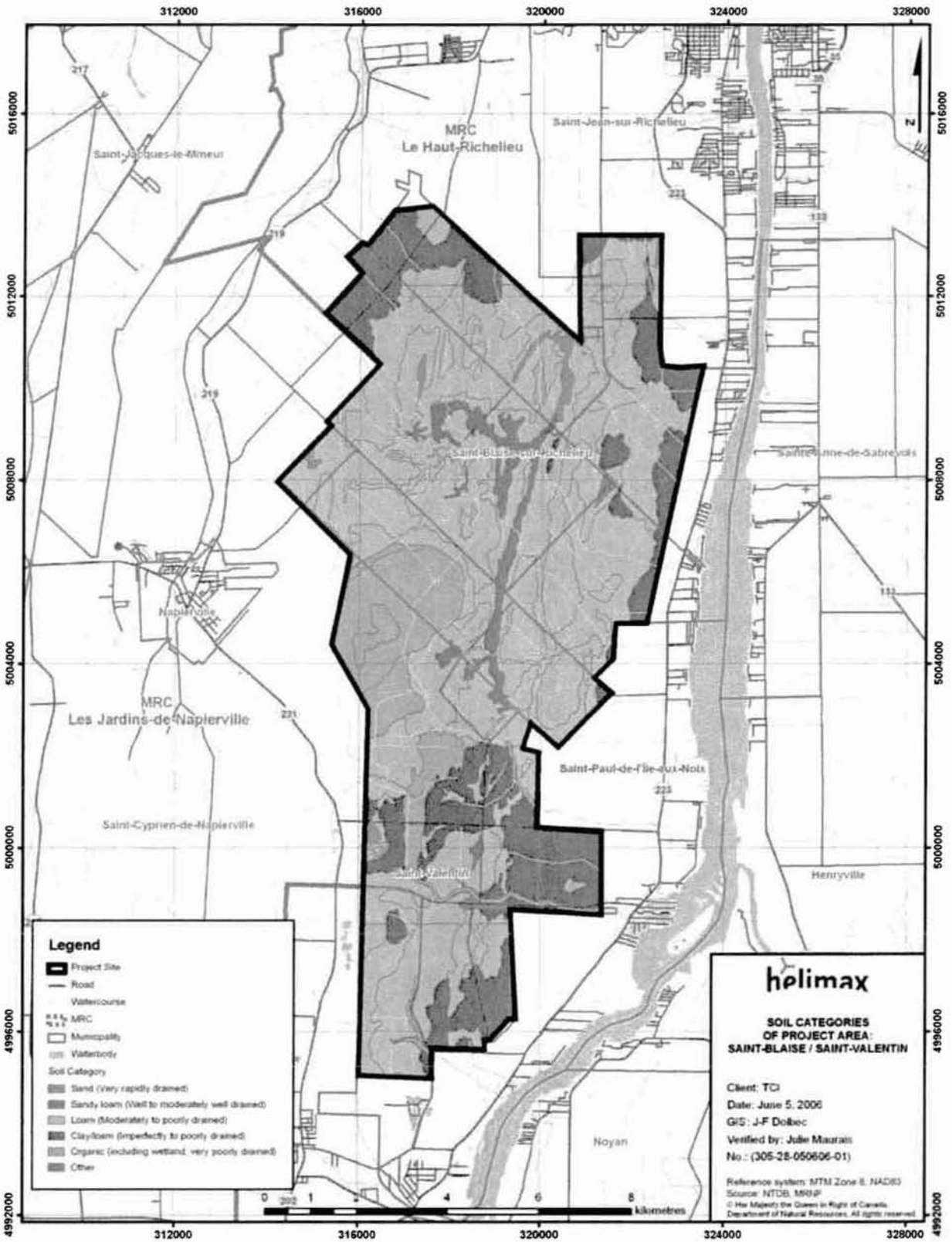


Figure 2-2: Physical Features – St-Blaise / St-Valentin



## 2.4 Human Environment

### 2.4.1 Land Use

The entire project area is located on private land. The project area is fairly populated; residences are mostly located along the main roads. Saint-Blaise-sur-Richelieu and Saint-Valentin, the two municipalities concerned by the project area, have populations of 2016 and 495 inhabitants, respectively (MRC Haut-Richelieu, 2004).

In the project area vicinity, there is one important city, Saint-Jean-sur-Richelieu, located 4.8 km north (82 000 inhabitants) as well as two smaller towns: Napierville, located 3.7 km west (3092 inhabitants) and Saint-Paul-de-l'Île-aux-Noix, situated 1 km east (1988 inhabitants) (MRC Haut-Richelieu, 2004). The shores of the Richelieu River are a particularly inhabited zone.

Agricultural lands interrupted by a few patches of forest cover the entire project area. Some agricultural lands within the project area are characterised by organic soils, which are amongst the most fertile land in Quebec. As discussed above, according to the IRDA database, an estimated, 9.2% of the site area is covered by organic soils. Agriculture in the region is characterized mainly by corn as well as dairy and poultry farms.

### 2.4.2 First Nations

There are no First Nations Reserves in the project area or in the vicinity.

### 2.4.3 Archaeological and Historical Sites

There are no known archaeological sites in the project area or in the vicinity (Ministry of Culture and Communications, 2006).

There is one historical site, *La maison Roy*, in the northwestern part of the project area. In the vicinity of the project area, there is one historical site 1 km north of the project area, four 1.8 km south and one 2.7 km south of the site's boundaries.

### 2.4.4 Transmission Lines

There is a 161-kV substation in the town limits of Napierville; transmission lines run northwest from the substation.

### 2.4.5 TV, Radio and Microwave Communication Towers

There are two radio frequency towers in the southern part of the project area and others outside the project area. There are also radio frequency links passing through the project area (see Figure 2-3); their width depends on their frequency and the distance between the respective towers.

There are no TV or radio communication towers in the project area or in the vicinity of the project area.

### 2.4.6 Airports or Landing Strips

The nearest airport is the Saint-Jean-sur-Richelieu airport, which is located 3.5 km north of the Saint-Blaise / Saint-Valentin project area.

### 2.4.7 Other Features

A railway crosses through the project area on the east side. Also, there are campgrounds, golf courses and mining activities within or in the vicinity of the project area.

Figure 2-3 presents the human features of the Saint-Blaise / Saint-Valentin project area.

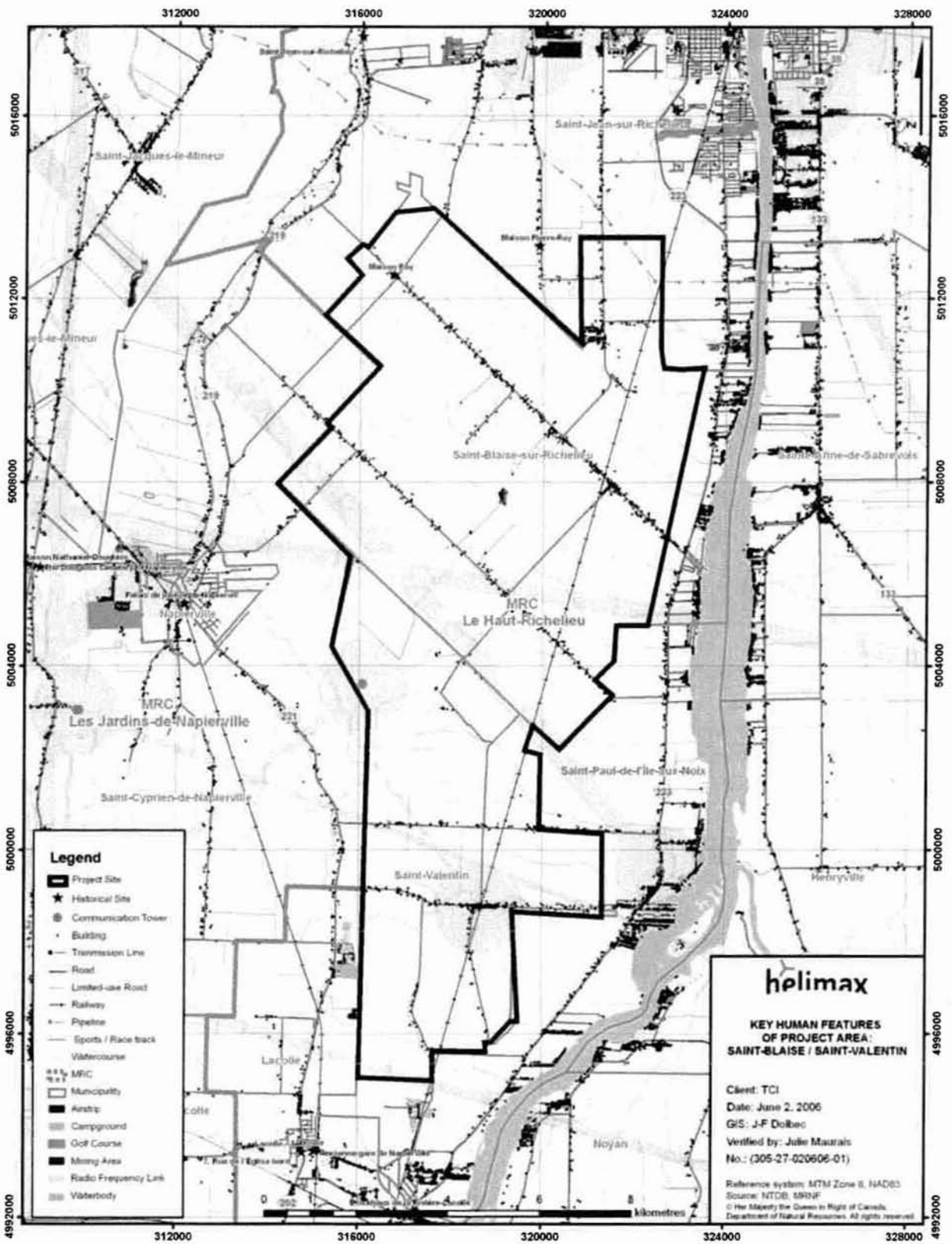


Figure 2-3: Human Features: St-Blaise / St-Valentin

## 2.5 Conclusion

According to the information obtained during the document and database review, no regulatory constraints should jeopardize the project. However, a few other issues could potentially have an impact on the project and should be addressed.

Table 2-4 presents the key findings of the study. It should be noted that the information presented in this document was obtained by means of a desktop study using the most currently available data. However, it is possible that some data could nonetheless be outdated, or that a certain level of imprecision remains with respect to the exact geographical locations of certain features. Hence, field work will be necessary to validate the desktop assessment.

**Table 2-4: Issues Summary Table – Saint-Blaise / Saint-Valentin**

Issues		Finding / Level of Concern	Recommendations/Comments
<b>Biological</b>	Presence of protected areas (overlapping with the project area)	No	No specific issues regarding protected areas or other areas of concern were identified, since no such areas overlap the project limits.
	Presence of IBAs (overlapping with the project area)	No	
	Presence of other areas of concern (Overlapping or in the vicinity (3 km) of the project area)	Yes	The shore of the Richelieu River can be considered a sensitive biological zone.
	Listed species in the region	10 fauna 20 flora	The potential occurrence of endangered bird and plant species within the project area should be addressed by appropriate biological studies. If the project is located solely on agricultural lands, no rare plant species should be affected.
<b>Physical and Technical</b>	Slopes	0.6% (average)	There is no specific concern regarding site access as the topography is flat and secondary roads cover most of the project area.
	Access	Good	
	Interconnection to electric grid	Transmission line (Substation in Napierville)	Interconnection to the Hydro-Québec grid will have to be addressed, and will depend on the project size and available capacity of the local grid.
	Presence of organic soils (including wetlands)	Yes (9.2% of project area)	Wetlands should be avoided. Moreover, according to concerns raised by local population, organic soils, which are amongst the richest agricultural lands in Quebec, should be avoided.
	Drainage Quality	Poor drainage on most of project area	Due to the poor drainage found on most of the Saint-Blaise / Saint-Valentin project area, a geotechnical assessment is recommended early in the project to address potential construction issues.
	Presence of hydrographic features	Yes	Watercourses are present in the targeted area. A buffer zone should be established between wind turbines and watercourses.
	Effects on Communication Systems	Radio, TV: No	As there is no radio or TV communication tower in the vicinity of the Saint-Blaise / Saint-Valentin project area, no radio or TV interference issue is projected.

Issues		Finding / Level of Concern	Recommendations/Comments
		Radio Frequency links: Yes	There are two microwave radio towers within the project area and others in the vicinity of it. Wind turbines siting should take into consideration the presence of the radio frequency links to limit potential interference.
	Nearest airport/airstrip (distance from project area limits)	3.5 km (airport)	Considering the distance from the Saint-Jean-sur-Richelieu airport (3.5 km north), NAV Canada and Transport Canada should be consulted to ensure that the wind farm does not affect airport zoning regulations.
	Railway	Yes	A buffer zone should be established between the wind turbines and the railway.
<b>Social</b>	Land tenure	Private land	The site is located entirely on private land. Public consultations and negotiations with landowners should be planned early in the project.
	Land use	Agricultural	The site is located on agricultural lands. Though wind energy and agriculture are usually considered compatible, micro-siting may need to be addressed with each individual landowner.
	Population density	Moderate	The area is relatively densely populated; public consultation should be planned early to facilitate social acceptance of the project. Moreover, a buffer zone should be maintained around houses to ensure conformity with provincial noise levels.
	Presence of First Nations Reserves	No	There is no First Nations Reserve in the project area or in the vicinity of the project.
	Presence of archaeological sites	No	There are no known archaeological sites in the project area or in the vicinity of the project area. However, a study of the archaeological potential is still required in the environmental impact study.
	Presence of historical sites	Yes	The historical sites in the project area (La maison Roy) and outside the project area can be considered as sensitive zones. The effects of a wind farm on landscapes and tourism should be further assessed in the environmental impact study.
	Other features (campground, golf, mining, etc.)	Yes	These stakeholders should be consulted to ensure their social acceptance to the project.
Low concern – No or minimal validation effort is expected		Moderate concern – It would be preferable to validate and address this issue further.	High concern – Issue needs to be further addressed.

### 3 WEST NAPIERVILLE

#### 3.1 Site Location and General Description

The site is located in the Montérégie region, approximately 4.2 km west of Saint-Valentin and 2.5 km south of Napierville. The project area is situated in the MRC Les Jardins-de-Napierville, and in the municipality of Saint-Cyprien-de-Napierville.

The project area, which measures 26.3 km<sup>2</sup>, is characterized by a flat topography. A secondary road network covers most of the project area.

#### 3.2 Biological Environment

The West Napierville project area is part of the St. Lawrence Lowland Ecoregion, which includes the region along the St. Lawrence River extending from Québec City to the Frontenac Axis near Brockville, Ontario. (Natural Resources Canada, 2003; Environment Canada, 2005).

Mixed forests of sugar maple, yellow birch, eastern hemlock, and eastern white pine form the most stable vegetation in the region; beech occurs in milder areas. Dry sites are dominated by red pine, eastern white cedar, and red oak. Wetter sites support red maple, black ash, white spruce, tamarack, and eastern white cedar (Environment Canada, 2005). Wildlife includes deer, black bear, moose, hare, chipmunk, other small mammals, waterfowl, and other birds (Environment Canada, 2005).

An extensive system of waterways, including the St. Lawrence River and the Great Lakes, combined with surrounding rich fertile soils, creates one of the most attractive and productive ecozones in Canada (Natural Resources Canada, 2003). The West Napierville project area is entirely located on agricultural lands with some forested patches.

The St. Lawrence Lowland Ecoregion is characterized by warm summers and cold snowy winters. The mean annual precipitation ranges from 800 to 1000 mm (Environment Canada, 2005).

##### 3.2.1 Protected Areas and Other Areas of Concern

There are no provincial or national parks near the West Napierville project area. The only area of concern in the vicinity is an Important Water Bird Area (6 km east), and the White-tailed Deer Confinement Area (7.1 km south).

##### 3.2.2 Potential Presence of Listed Species

###### 3.2.2.1 Fauna

Listed species of fauna which are susceptible of being found within or near the project area are shown below in Table 3-1.

Table 3-1: Listed Fauna Species – West Napierville

English Name	Latin Name	Provincial (Quebec) Status	Federal Status
<b>Birds</b>			
Loggerhead Shrike	<i>Lanius ludovicianus</i>	E	E
Peregrine Falcon	<i>Falco peregrinus anatum</i>	T	E
Short-eared Owl	<i>Asio flammeus</i>	-	SC
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	-	SC
<b>Mammals</b>			
Woodland Vole	<i>Microtus pinetorum</i>	-	SC
<b>Reptiles and Amphibians</b>			
Northern Chorus Frog	<i>Pseudacris triseriata</i>	T	-

Sources: Ministry of Natural Resources and Fauna, 2005; Environment Canada, 2006  
E: Endangered; T: Threatened; SC: Species of Special Concern

### 3.2.2.2 Flora

Listed species of flora which are susceptible of being found within or near the project area are shown below in Table 3-2.

Table 3-2: Listed Flora Species – West Napierville

English Name	Latin Name	Provincial (Quebec) Status	Federal Status
Putty-root	<i>Aplectrum hyemale</i>	E	-
White wood-aster	<i>Eurybia divaricata</i>	E	-
False hop sedge	<i>Carex lupuliformis</i>	E	E
Wall-rue fern	<i>Asplenium ruta-muraria</i>	E	-
American ginseng	<i>Panax quinquefolius</i>	E	E
Slender muhly	<i>Muhlenbergia tenuiflora</i>	E	-
Cork elm	<i>Ulmus thomasii</i>	E	-
Pitch pine	<i>Pinus rigida</i>	E	-
Broad beech fern	<i>Phegopteris hexagonoptera</i>	E	-
Round-leaf groundsel	<i>Packera obovata</i>	E	-
Bog fern	<i>Thelypteris simulate</i>	E	-
Blunt-lobed cliff fern	<i>Woodsia obtusa obtusa</i>	E	-
Canadian maidenhair	<i>Adiantum pedatum</i>	V	-
Wild leek	<i>Allium tricoccum</i>	V	-
False mermaid-weed	<i>Floerkea proserpinacoides</i>	V	-
Canada lily	<i>Lilium canadense</i>	V	-
Bloodroot	<i>Sanguinaria canadensis</i>	V	-
Large-flowered trillium	<i>Trillium grandiflorum</i>	V	-

Sources: Ministry of Sustainable Development, Environment and Parks, 2006; Environment Canada, 2006  
E: Endangered; V: Vulnerable

Figure 3-1 presents the features of the West Napierville biological environment.

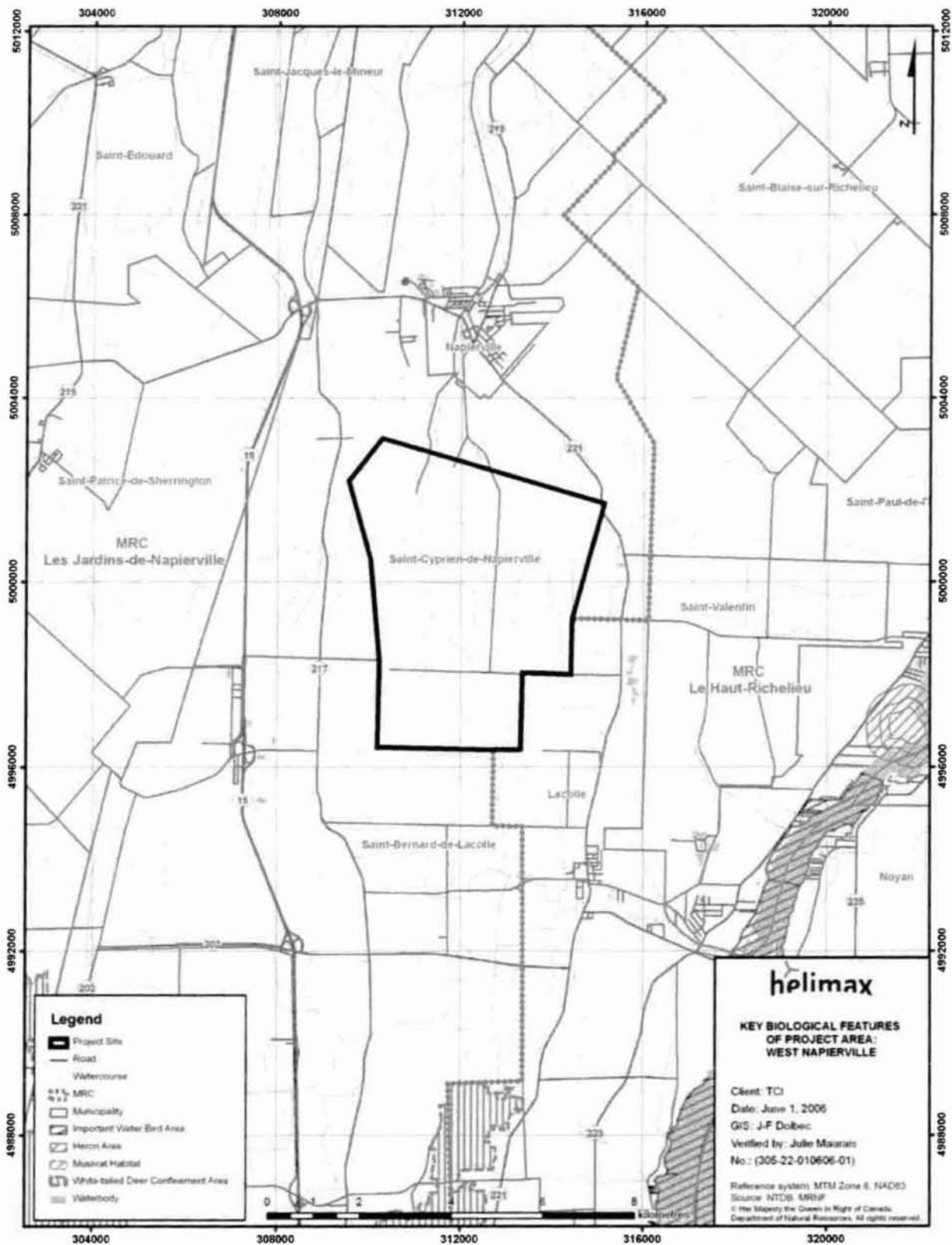


Figure 3-1: Biological Features – West Napierville

### 3.3 Physical Environment

#### 3.3.1 Soil and Terrain General Characteristics

The West Napierville project site is located in a relatively flat area along the Richelieu River. Elevations vary from 35 to 50 metres above mean sea level.

Within the West Napierville project area, the surface soils are mostly made of "poorly drained" clay to loam material. There are also two areas of "very poorly drained" organic soil, and a small sandy area "very rapidly drained" (IRDA, 2006). The overburden thickness throughout most of the site is 10 metres, with local variations from 5 to 17 metres (IRDA, 2006). Table 3-3 shows the soil categories along with the surface areas they occupy for the West Napierville project area.

Table 3-3: Soil Categories and Equivalent Surface Areas – West Napierville

Soil Category	% of Surface Area
Sand (Very rapidly drained)	5.2
Loam (Moderately to poorly drained)	9.8
Clay/loam (Imperfectly to poorly drained)	64.8
Organic (including wetland, very poorly drained)	19.4
Other <sup>1</sup>	0.8
Total	100

<sup>1</sup> Includes watercourses, slopes, and non-available data

#### 3.3.2 Hydrographic Features

Streams and small rivers run throughout the project area. The larger river in the vicinity is the Richelieu River, which flows approximately 8 km east of the project area limit. According to the data consulted, no wetlands are found within the project area.

Figure 3-2 presents the soil categories of the West Napierville project area.



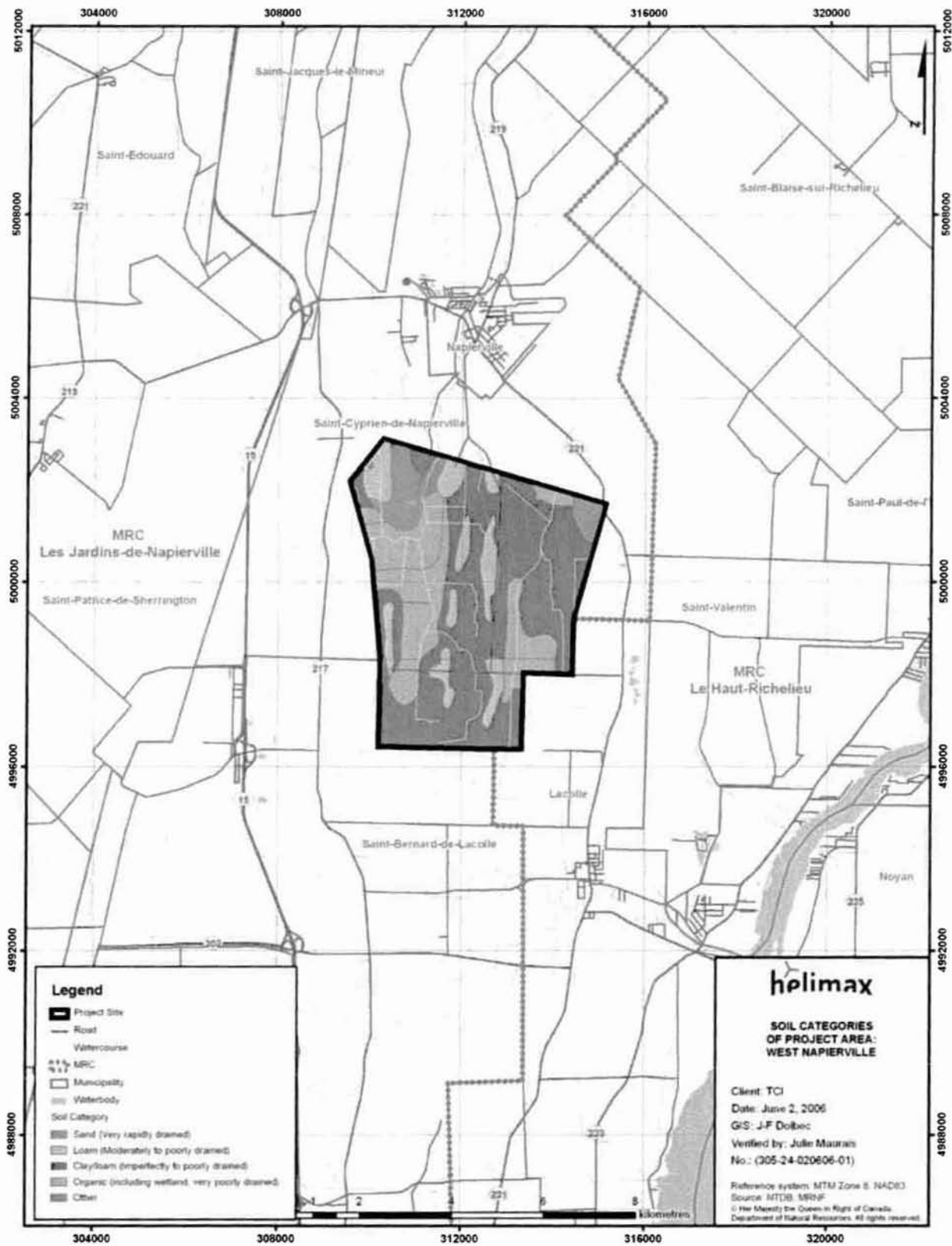


Figure 3-2: Physical Features – West Napierville

### 3.4 Social Environment and Other Issues

#### 3.4.1 Land Use

The entire project area is located on private lands. The project area is not very densely populated; residences are mostly located along the main roads. Saint-Cyprien-de-Napierville, the municipality in which the project area lies, has a population of 1343 (MRC Les Jardin-de-Napierville, 2006).

The town of Napierville (population: 3092) is located 2.5 km north of the project site area; Saint-Bernard-de-Lacolle municipality (population: 1517) lies adjacent to the southeast corner of the project area (MRC Les Jardin-de-Napierville, 2006).

Agricultural lands punctuated by a few patches of forest cover the entire project area. Some agricultural lands within the project area are composed of organic soils; these lands are amongst the most fertile in Quebec. As discussed above, according to the IRDA database, an estimated 19.4% of the site area is covered by organic soils. Agriculture in the area is characterized mainly by corn as well as dairy and poultry farms.

#### 3.4.2 First Nations

There are no First Nations Reserves in the project area or in the vicinity.

#### 3.4.3 Archaeological and historical site

There are no known archaeological sites in the project area or in the vicinity (Ministry of Culture and Communications, 2006).

There are no historical sites within the West Napierville project area. However, there are two historical sites located 3.5 km northwest, and two others 3.4 km southeast of the project area.

#### 3.4.4 Transmission Lines

There is a 161-kV substation in the town limits of Napierville; transmission lines run northwest from the substation.

#### 3.4.5 TV, Radio and Microwave Communication Towers

There are radio frequency towers located outside the project area. There are also radio frequency links passing through the project area (see Figure 3-3); their width depends on their frequency and the distance between the respective towers.

There is no TV or radio communication tower in the project area or in the vicinity of the project area.

#### 3.4.6 Airports or Landing Strips

There is a landing strip 5 km north of the project area. The nearest airport is the Saint-Jean-sur-Richelieu airport located 16.5 km to the northeast.

#### 3.4.7 Other Features

A railway crosses through the project area on the east side. Also, there are campgrounds, golf courses and mining activities within or in the vicinity of the project area.

Figure 3-3 presents the human features of the West Napierville project area.

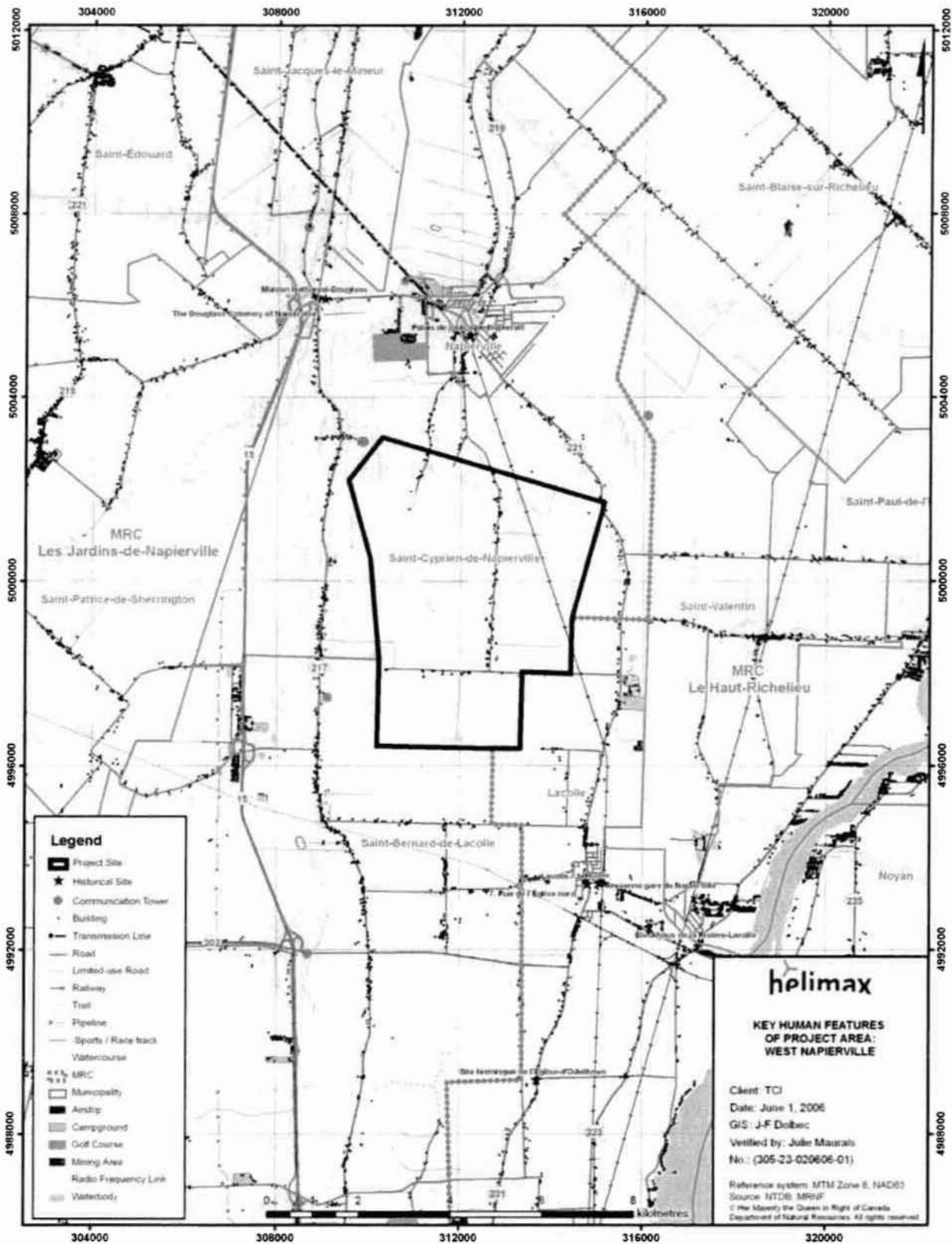


Figure 3-3: Human Features - West Napierville

### 3.5 Conclusion

According to the information obtained during the document and database review, no regulatory constraints should jeopardize the project. However, a few other issues could potentially have an impact on the West Napierville project and should be addressed.

Table 3-4 below presents the key findings of the study. It should be noted that the information presented in this document was obtained by means of a desktop study using the most currently available data. However, it is possible that some data could nonetheless be outdated, or that a certain level of imprecision remains with respect to the exact geographical locations of certain features. Hence, field work will be necessary to validate the desktop assessment.

Table 3-4: Issues Summary Table – West Napierville

Issues		Finding / Level of Concern	Recommendations/Comments
<b>Biological</b>	Presence of protected areas (overlapping with the project area)	No	No specific issues regarding protected areas or other areas of concern were identified, since no such areas overlap the project limits.
	Presence of IBAs (overlapping with the project area)	No	
	Presence of other areas of concern (overlapping with the project area)	No	
	Listed species in the region	6 fauna 18 flora	The potential occurrence of endangered bird and plant species within the project area should be addressed by appropriate biological studies. If the project is installed solely on agricultural lands, no rare plant species should be affected.
<b>Physical and Technical</b>	Slopes	0.8% (average)	There is no specific concern regarding site access as the topography is flat and secondary roads cover most of the project area.
	Access	Good	
	Interconnection to electric grid	Transmission line (Substation in Napierville)	Interconnection to the Hydro-Québec grid will have to be addressed and will depend on the project size and available capacity of the local grid.
	Presence of organic soils (including wetlands)	Yes, but no wetlands (19.4% of project area)	According to concerns raised by local population, organic soils, which are amongst the richest agricultural lands in Quebec, should be avoided.
	Drainage quality	Poor on most of project area	Due to the poor drainage found on most of the West Napierville project area, a geotechnical assessment is recommended early in the project to address potential construction issues.
	Presence of hydrographic features	Yes	Watercourses are present on the territory. A buffer zone should be established between wind turbines and watercourses.

Issues		Finding / Level of Concern	Recommendations/Comments
	Effects on communication systems	Radio, TV: No Radio Frequency Links: Yes	As there is no radio or TV communication tower in the vicinity of the West Napierville project area, no radio or TV interference issue is projected.  There are many microwave radio towers in the vicinity of the project area. Wind turbines siting should take into consideration the presence of the radio frequency links to limit potential interference.
	Nearest airport/airstrip (distance from project area limits)	5 km (landing strip) 16.5 km (airport)	Considering the distance from the Saint-Jean-sur-Richelieu airport, no major issue associated with airport zoning regulations is projected. However, further investigation should be carried out concerning the landing strip located north of the domain.
	Railway	Yes	A buffer zone should be established between the wind turbines and the railway.
<b>Social</b>	Land tenure	Private land	The site is located entirely on private land. Public consultations and negotiations with landowners should be planned early in the project.
	Land use	Agricultural	The site is located on agricultural lands. Though wind energy and agriculture are usually considered compatible, micro-siting may need to be addressed with each individual landowner.
	Population density	Low	Public consultation should be planned early to facilitate social acceptance of the project. Moreover, a buffer zone should be maintained around houses to ensure conformity with provincial noise levels.
	Presence of First Nations Reserves	No	There is no First Nations Reserve in the project area or in the vicinity of the project.
	Presence of archaeological sites	No	There are no known archaeological sites in the project area or in the vicinity of the project area. However, a study of the archaeological potential is still required in the environmental impact study.
	Presence of historical sites	Yes	Historical sites outside the project area can be considered as sensitive zones; the effects of the wind farm on landscapes and tourism should be further assessed in the environmental impact study.
	Other features (campground, golf and mining)	Yes	These stakeholders should be consulted to ensure their social acceptance to the project.
	Low concern – No or minimal validation effort is expected	Moderate concern – It would be preferable to validate and address this issue further	High concern – This issue needs to be further addressed

#### 4 REFERENCES

Environment Canada. 2005. Narrative Descriptions of Terrestrial Ecozones and Ecoregions of Canada. [http://www.ec.gc.ca/soer-ree/English/Framework/Nardesc/mixpln\\_e.cfm](http://www.ec.gc.ca/soer-ree/English/Framework/Nardesc/mixpln_e.cfm)

Environnement Canada. 2006. "Species at Risk" [http://www.speciesatrisk.gc.ca/default\\_e.cfm](http://www.speciesatrisk.gc.ca/default_e.cfm)

Environment Canada, 2006. "Designating and Protecting Species at Risk" [http://www.qc.ec.gc.ca/faune/oiseaux\\_menaces/html/designation\\_protection\\_e.html](http://www.qc.ec.gc.ca/faune/oiseaux_menaces/html/designation_protection_e.html)

Environment Canada. 2006b. "Migratory Bird Sanctuary – Quebec Region" [http://www.qc.ec.gc.ca/faune/faune/html/mbs\\_montmagny.html](http://www.qc.ec.gc.ca/faune/faune/html/mbs_montmagny.html)

Ministry of culture and communication. 2006. Information provided by the Direction générale de la Montérégie.

Ministère Ressources naturelles et faune, Québec. 2005 "Espèces fauniques menacées ou vulnérables au Québec". [http://www.fapaq.gouv.qc.ca/fr/etu\\_rec/esp\\_mena\\_vuln/liste.htm](http://www.fapaq.gouv.qc.ca/fr/etu_rec/esp_mena_vuln/liste.htm)

Ministry of Sustainable Development, Environment and Parks, 2006. "Plantes menacées ou vulnérables au Québec." <http://www.mddep.gouv.qc.ca/biodiversite/especes/index.htm>

MRC Haut-Richelieu, 2004. "Nos Municipalités." [http://www.mrchr.qc.ca/cgi-bin/index.cgi?page=c2\\_10](http://www.mrchr.qc.ca/cgi-bin/index.cgi?page=c2_10)

MRC Les Jardin-de-Napierville, 2006. "Les municipalités des Jardins-de-Napierville." [http://www.cld-jardinsdenapierville.com/cld\\_municipalites.htm](http://www.cld-jardinsdenapierville.com/cld_municipalites.htm)

Natural Resources Canada, 2003. "Mixedwood Plain." [http://www.pfc.forestry.ca/canforest/canf/mixedwood1\\_e.html](http://www.pfc.forestry.ca/canforest/canf/mixedwood1_e.html)

Répertoires du patrimoine culturel du Québec. 2006. "Montérégie Region." <http://www.patrimoine-culturel.gouv.qc.ca/RPCQ/recherche.do?methode=accéder>

Research and Development Institute for the Agri-Environment (IRDA) database, 2006.