

and the inability to be able to predict impact if site-specific data existed. There are no known bat hibernacula in the area and the nearest known abandoned mine shafts exist in Springhill, NS approximately 25 km from the proposed Amherst site (Hugh Broders pers. comm. 2008). However, Acciona is committed to monitoring the Project during its first year of operation to identify if bats are being killed, and will be prepared to adopt post-construction mitigation measures should there be a need. There are currently no guidelines in Nova Scotia for monitoring bat populations, in part due to the lack of good baseline data. In the absence of these guidelines, post-construction monitoring protocols and mitigation measures, should monitoring in the first year of operations deem them necessary, will be developed in consultation with NSDNR. Monitoring will include fall bat mortality surveys to be conducted at a frequency to be determined through consultation with regulators. Typically searches include a 40 m radius around each turbine. Additionally, as a part of the monitoring, searcher efficiency trails will be conducted and may include spring scavenger impact trials if required, to correct for these potential influences on the carcass monitoring. Bat mortality surveys will be conducted in conjunction with bird mortality surveys as required. This is further discussed in Section 6.

Impact Assessment and Mitigation

There are currently no protocols or guidance in place regarding bats and wind power in Nova Scotia. However, to evaluate the success of mitigation measures or need for further mitigation, post-construction monitoring will be conducted. This will include bat carcass monitoring around the turbines with associated studies examining carcass removal and observation ability to correct for these potential influences on the carcass monitoring, to be developed in consultation with NSDNR. One year of monitoring will be conducted, and then monitoring will be discontinued unless significant mortality is occurring. Further information on the post-construction monitoring program is presented in Section 6. The results of the post-construction monitoring will be used to assess the success of the mitigation measures in consultation with NSDNR and other biologists, which may lead to other mitigation being suggested using the options available at the time, which may include changes to lighting or operation. At this stage, the level of impact is considered **low** and **not significant**.

5.2.1.7 Safety Issues

Lands within the Project area do not present any safety issues, such as steep cliffs, deep or steep ravines and waterways. There currently exists clear, safe access to the Project area. Safety issues are typically associated with construction and decommissioning activities associated with the wind farm. However, safety issues must also be considered as they pertain to the operational phase and the potential interaction with the local populace and public access issues. Health and safety concerns related to electromagnetic fields (EMFs) and ice throw are issues that have been raised by the public at other projects in Canada, and are considered here. The following sections provide a discussion on the potential environmental effects associated with electromagnetic fields, infrasound and ice throw, and general health and safety issues.

Electromagnetic Fields

Concerns related to the potential negative effects of EMFs on children have been raised. However, the EMFs created by the operating wind farm will be localized and become weaker with distance. The strength of the EMF from equipment within the substation, such as transformers, decreases rapidly with increasing distance. Beyond the substation, the EMF produced by this equipment is typically

indistinguishable from background levels. Similarly, the EMF produced by the equipment within the turbines will be very weak, reduced not just by distance, but also by objects such as trees and other objects that conduct electricity. EMFs from buried cables can be 5 to 10 times less than overhead transmission systems carrying comparable currents at similar voltages. Previous studies have shown that magnetic field levels as a result of the cable distribution system are a fraction of those found in household appliances such as hairdryers, blenders or televisions (National Institute of Environmental Health Sciences 2002). As a result, there is no evidence that the proposed Project will present any human health effects related to EMFs.

Infrasound

Recently there has been concern for the potential of wind turbines to generate infrasound and the potential for infrasound to result in health effects. Infrasound is defined as wave phenomenon with the physical nature as sound, but with frequencies below the range of human hearing (HGC 2006). Recently the Canadian Wind Energy Association (CANWEA) commissioned a study on infrasound that demonstrated that while wind turbines are capable of generating infrasound, the levels of infrasound near the wind turbine are similar to ambient infrasound levels extant in the natural environment. In addition, the study found no evidence of adverse health effects due to infrasound from wind turbines (HGC 2006).

In addition, there is no evidence that the current wind turbine technology proposed for this Project presents any potential problems related to the generation of infrasound energy. Furthermore, research in Alberta has identified that wind turbines may reduce infrasound by extracting energy from the wind, thus reducing the amount of infrasound generated by strong winds (Hepburn 2005).

Ice Throw

Ice throw can result in health and safety issues for on-site personnel during maintenance and operation of the wind turbines. As far as adjacent landowners are concerned, due to the setback distance to the nearest residence of approximately 500 m, it is extremely unlikely that ice throws would span that distance. Furthermore, there are only a few days a year where ice could potentially form on turbines based on the right combination of air temperature, wind speed and moisture in the air. The wind turbines are engineered to sense an unbalanced condition of the blades if the turbine blades have a buildup of ice on them. The wind turbines will not operate in this unbalanced condition as it could create damage to the turbine. As well, ice chunks typically thrown are relatively small and are unlikely to result in health and safety issues for adjacent landowners due to the setback distances. Indeed, ice forming on the blades is likely to occur when blades are not turning, and accumulated ice would drop straight down rather than thrown any appreciable distance. For operation and maintenance personnel, potential for health and safety concerns related to ice throw could be a reality, due to their close proximity to the wind turbines during periods when ice may fall from the turbines.

Health and Safety

Health and safety issues typically associated with construction and operational activities are a priority for Acciona. During construction and operation activities, access to the wind turbine facility will be restricted to authorized personnel wearing proper personal protective equipment and who have had appropriate safety training. Acciona has a written safety policy for operators and technicians including a detailed safety manual for staff, as well as an extensive occupational health and safety protocol for

wind energy facilities, which will be implemented. With the implementation of these mitigation measures, **no residual effects** are anticipated.

5.2.1.8 Electromagnetic Interference

A potential effect of a wind farm is interference with radioelectric signals, such as television, radio, cellular telephone, microwave transmission and radar. Consideration was given for this potential effect, and a background study was undertaken to identify radioelectric signals presently within the regional area that could be affected by the installation and operation of the Amherst Wind Energy Project's 20 wind turbines (Appendix G). Identified within the regional area were satellite television and radio, cable television and AM and FM radio broadcast signals and a radar station. The Amherst Aerodome and Amherst Heliport are nearby but do not use radionavigational aid and are therefore not going to be affected by the Project.

Due to proximity and turbine layout, satellite television and radio, cable television and AM and FM radio signals will not be affected by the operation of the Amherst Wind Energy Project. The majority of residents in the regional area either have satellite or cable television.

A complaint resolution system will be in place to record and investigate complaints regarding telecommunications interference. Mitigation will be conducted on a case by case basis pending results of the investigation.

Although no mitigation is presently planned for addressing this potential issue, Acciona is committed to responding with mitigation measures that are appropriate for the magnitude and extent of the problem, should one be identified.

5.2.2 Maintenance Activities

The wind turbines will be visited approximately once every three months for routine servicing. Furthermore, the facility will include a sophisticated wind energy oriented Supervisory Control and Data Acquisition (SCADA) data analysis program, as well as alarm and notification protocols. With such a system, faults can be instantly detected and addressed, operations can be monitored, equipment performance can be analyzed, trend analyses can be performed and long-term records maintained. For service-oriented visits the site will be accessed via light trucks. Although sensory disturbance to wildlife is possible, it will be short in duration, infrequent, in a small geographic area and will not be noticeable above the existing disturbance created by existing and ongoing agricultural activities.

5.3 Decommissioning Activities

Well-designed and constructed wind energy facilities may be operated for decades. Acciona expects individual wind turbines to perform for up to twenty years without significant repair or replacement. Transformer facilities, underground wiring and substation facilities are designed for at least a 50 year life span. Individual wind turbines may be replaced or repaired as their useful life comes to an end, or if more efficient and cost-effective technology becomes available. Acciona makes commitments regarding decommissioning to the landowners on whose land the equipment is placed.

Upon a decision to decommission a single wind turbine or the entire wind farm, all equipment above ground, including towers, nacelles, transformers and controllers will be removed. Wind turbines that are operational and have market value would be carefully removed using a crane, essentially in a reverse process to assembly and installation. The resale value of such equipment would cover the cost of removal in such a case. A market for good, used wind turbines has developed in North America, and a number of wind turbines installed in Alberta in the early 1990s originated from the U.S. used wind turbine market.

5.3.1 Removal of Turbine and Ancillary Equipment

Wind turbines that are no longer operational may also be removed by crane, but with less attention to preserving individual components, labelling them and storing them. Inoperative wind turbines have high salvage value. Steel and copper components are easily recycled, and there is a ready market for such materials. The remaining materials are primarily fibreglass and plastic. These may be sold to recycling facilities, or crushed and deposited in landfill sites. Experience in the U.S. with decommissioning of wind turbines has shown that the salvage value of wind turbines typically exceeds the costs of decommissioning (Gipe 1995).

Other above-ground equipment in the wind farm, including transformers and wiring, has a ready market in either used equipment sales or in salvage. Transformers will be simply removed and sold. Wiring will be removed and sold to metal salvage companies.

5.3.2 Removal of Buildings and Waste

Where foundations must be removed, standard demolition practices will be employed to remove the foundations to a depth that is well below active agricultural activity or depths with potential for future erosion and exposure. Resulting material will be removed and appropriately disposed.

5.3.3 Removal of Power Line

Underground cabling will be removed to suitable depths and any disturbance to the soil will be remediated or repaired upon completion.

5.3.4 Site Remediation/Reclamation

Wind energy facilities do not use or produce harmful waste products. There is no need for concern about residual toxic chemicals or exhaust products. Aside from normal recovery of lubricants from the gearbox and yaw mechanism, decommissioning activities are not required for waste. Lubricants will not contain any PCBs.

Wind energy facilities removed from agricultural lands usually require minimal remediation, as planting of the next crop will remove any sign of the facility. Where necessary, topsoil and re-grading of access trails in the fields will occur.

5.4 Accidents and Malfunctions

Acciona has developed environmental management, worker health and safety, emergency response and environmental protection plans to handle any accidents or malfunctions that may occur. The following sections detail these plans. These plans are expected to mitigate any potential accidents and malfunctions. Therefore, the level of impact is considered **low** and **not significant**.

5.4.1 Corporate Environmental Management Framework

Acciona is committed to ensuring that the construction, operation, and decommissioning of the proposed Amherst Wind Energy Project are conducted in an environmentally responsible manner. To accomplish this objective, the following initiatives will be addressed:

- integration with the corporate environmental management framework;
- compliance with worker health and safety rules;
- emergency response planning; and,
- environmental protection planning and environmental monitoring.

At Acciona, employees are the most valuable asset. It is their belief that every person is entitled to a safe and healthful place in which to work. Based on this belief, the following statement has been adopted as the Acciona safety standard: “**Safety: A Sustainable Practice**”. This safety standard will be utilized as the basis for establishing, maintaining and most importantly, implementing continuous improvement of Acciona’s Safety Management System.

As a leader in the development and sustainability of renewable technologies, Acciona also strives to be a leader in safety practices and to offer innovative safety solutions. The success of Acciona will depend not only on production and sales, but also how safely each job is performed. There is no job so important, nor any service so urgent, that they will not take time to work safely.

At Acciona, the establishment and maintenance of a safe environment is the shared responsibility between all employees, at all levels of the organization. To that end, every reasonable effort will be made in achieving the goal of accident prevention and health preservation

Acciona considers safety to be of prime importance, and they expect the full cooperation of all of Acciona employees in ensuring the safety of all employees, contractors and the general public.

Overall responsibility for the health and safety of all persons within the company rests with the Board of Directors of Acciona. Acciona delegates this responsibility to the individual operations managers for the purposes of the day to day running of the operation with the direct assistance of individual line managers and supervisors. There will be a safety officer who will have overall responsibility for the day-to-day safety operations at the Amherst Wind Energy Project. The safety officer will ensure through the management organization that:

- All persons employed by the company receive adequate health and safety training. In addition employees will receive adequate instruction and supervision to enable them to undertake their work in a safe manner.
- All machinery and equipment are suitable for their intended purpose and that it is maintained in a safe condition at all times.

- All persons working on site, whether or not employees of the company, are adequately notified of all known hazards and protective measures.
- That the company risk assessments, along with all other safety documentation, are brought to the attention of all relevant parties.
- All employees are required to comply with current National and Provincial statutory provisions. All staff must co-operate with the management of the company to allow it to comply with the legal requirements for health and safety.
- Individual members of staff, who have any concern regarding their own safety, or that of a third party, are responsible for reporting the matter to their manager without delay.

5.4.2 Worker Health and Safety Rules

Acciona has developed a comprehensive set of health and safety rules that govern the activities of all employees and contractors working on Acciona sites. Employees and contractors receive an orientation to these rules before entering Acciona sites for the first time.

The health and safety rules cover a range of aspects, including the following:

- clothing and protective equipment
- confined space entry
- alcohol and illegal drugs
- overhead work
- excess head and facial hair
- welding and burning
- firearms
- chemicals
- smoking, matches, and lighters
- compressed gas cylinders
- housekeeping
- air hoses
- respiratory protection
- ladders
- hydrogen sulphide
- scaffolds and platforms
- fires and other emergencies
- guard rails, platforms, and barricades
- manual material handling
- grinding tools
- lifting equipment
- reporting accidents/incidents
- excavation and trenching
- investigating accidents/incidents
- locking out equipment

These health and safety rules will be adhered to at the Amherst Wind Energy Project site at all times. A copy of the Health and Safety Rules for Contractors document will be included in the contract specifications to the primary construction contractor. All sub-contractors will be required to acknowledge and comply with the health and safety rules by signing an acknowledgement form.

5.4.3 Emergency Response Planning

Acciona will develop an emergency response plan for the unlikely event of a site emergency during any phase of the Project. The emergency response plan will include a report form and a map of the Project site, showing the most direct route from the site to an emergency resource such as a hospital. All on-site personnel and contractors will be required to complete a site safety and emergency response orientation prior to the start of pre-construction and construction activities. Prior to operation, Acciona will provide specialized equipment and training to local fire department for rescue needs within the Project.

5.4.4 Amherst Wind Energy Project Environmental Protection Plan

Acciona will prepare a Project-specific Environmental Protection Plan (EPP) that will be used on-site during all construction, operation and maintenance activities. The EPP will be written in construction specification format and will include the recommended mitigation measures in this EA report, as well as industry-accepted construction practices. The EPP will be used by the construction contractor and by all operations and maintenance workers during the life-of-the-Project.

5.5 Effects of the Environment on the Project

The following section outlines the effects of the environment on the Project, which includes climatic fluctuations and extreme events that are likely to occur in the Project area.

5.5.1 Climatic Fluctuations

The Project area experiences consistently high wind speeds on an annual basis, which is why this specific area was selected as a potential site for wind power generation. At nearby Moncton, average annual wind speeds (1971-2000) were roughly 17 km/h, although seasonal differences exist. Average wind speeds during the summer months drops to 13.7 km/h, but this increases during the winter to over 19 km/h. Prevailing winds consistently originated from the southwest during the period of 1971-2000.

At the site, average wind speeds over 12 months of measurements at 40 m height were 6.29 m/s. Average wind speeds during the summer months drops to 5.53 m/s, but this increases during the winter to about 7 m/s. Prevailing winds consistently originated from the southwest during the period.

According to 1971-2000 precipitation data at the Sackville station, precipitation occurs approximately 281 days per year and averages approximately 1,164 mm of precipitation throughout the year, where 80% is rain and the remainder is snow. Overall, fall is the foggiest time of year in New Brunswick and northern Nova Scotia, with Moncton having an average of 60 foggy days throughout the year. No specific data are available for the Project area, but the above numbers are expected to be reasonable estimates.

Climatic fluctuations also occur within the region. Wind occurring along the coast is frequent; however calms are experienced between 1 and 5% of the time depending on local exposure of the area. Strong winds exceeding 50 km/h blow mainly from the west and severe winds approaching hurricane force occur for an approximate duration of 1-2 hours each year along the coast. Gale force winds (63 km/h or greater) can occur during any month. They occur at sea about 10-15% of the time during winter months but are extremely uncommon in summer months. Storms associated with low pressure areas can take place at any point during the year, but are typically more severe and more frequent during the winter months. Winter storms often have strong winds accompanied by precipitation, changing from snow to rain (Environment Canada 2004).

5.5.2 Extreme Events

The wind turbines will be the highest features in the surrounding landscape, and therefore it is necessary that a lightning protection system be incorporated into each turbine. For the Project, each turbine blade material is fibreglass-reinforced epoxy resin with integral lightning protection supply. Each blade and each turbine tower are grounded to prevent adverse effects from lightning strikes. Additional

grounding rods can be installed at each turbine site. Most effects from a lightning strike would be dissipated. If lightning struck the generator at the top of the tower, serious damage could occur and the generator may be damaged.

The generator is designed to automatically shutdown at wind speeds that exceed 25 m/s. The turbine tower is designed to withstand excessive wind speeds. Extreme winds, approaching hurricane force occur in the region for an approximate duration of 1-2 hours each year. There have been no reported incidents of wind turbine towers collapsing due to high winds and preliminary geotechnical investigations did not show any predilection towards earthquakes at the Amherst site. More detailed results on this aspect will be included within the final geotechnical report. Comprehensive geotechnical work at each site will enable for proper design of wind turbine foundation. Extreme wind conditions are used as a parameter in this design. If base acceleration is found to have a large influence on turbine structure, then specific studies will be required for earthquake design, and appropriate design mitigation will be incorporated.

In the event of a lightning strike that hits a wind turbine generator, severe damage could occur and a new generator may need to be installed. However, it is highly unlikely that lightning would hit a wind turbine generator accurately enough to severely damage it. Taking into consideration the design features that will be used in the Project, a significant environmental effect is unlikely to occur.

5.6 Cumulative Effects

Subsection 16(1)(a) of *CEAA* requires that every screening of a project include an assessment of the “cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out”.

The evaluation of cumulative environmental effects follows five steps:

- Step 1 - Identify environmental effects resulting from Project-related activities.
- Step 2 - Identify other projects or activities that could interact with Project-related environmental effects.
- Step 3 - Exclude environmental effects of other projects or activities that are not likely to act in combination with the environmental effects of the Project.
- Step 4 - Identify the likely cumulative environmental effects that could result from the interaction of Project-related environmental effects with other past and future projects and activities.
- Step 5 - Evaluate the significance of likely cumulative environmental effects.

Under *CEAA*, an environmental assessment must determine whether the project under review adds to the combined adverse effects of past, existing and imminent projects and activities. Specifically, the assessment determines the degree to which a single project is contributing to the total cumulative effects of human activities and developments in the region.

A critical step in any environmental assessment is determining what other projects or activities have reached a level of certainty (*i.e.*, will be carried out) such that they are required to be considered.

It is helpful to consider the clarification provided by the Joint Review Panel for the Express Pipeline Project in Alberta. Following an analysis of subsection 16(1)(a) of *CEAA*, the Joint Review Panel determined that certain requirements must be met for the Panel to consider cumulative environmental effects:

- there must be a measurable environmental effect of the project being proposed;
- that environmental effect must be demonstrated to interact cumulatively with the environmental effects from other projects or activities; and
- it must be known that the other projects or activities have been, or will be, carried out and are not hypothetical (NEB and CEA Agency 1996).

Furthermore, the Joint Review Panel indicated that it is an additional requirement that the cumulative environmental effect is *likely* to occur, that is, there must be some *probability*, rather than a mere possibility, that the cumulative environmental effect will occur. These criteria were used to guide the assessment of cumulative environmental effects of the proposed Project.

Environmental effects resulting from Project-related activities were identified and assessed in Sections 5.1 to 5.4. The evaluation of cumulative environmental effects is warranted for several environmental components discussed in these sections, namely birds and other wildlife, visual impact, noise and economic development. This section outlines cumulative environmental effects that may result from the Project in combination with other projects or activities that have been or will be carried out, within the regional area. For the purposes of this cumulative effects assessment, the regional area is defined as Cumberland County.

5.6.1 Past, Present and Future Projects in the Regional Area

Other wind farm projects have not occurred and to date, do not occur in the regional area; the area is mainly used for agriculture, tourism and recreational activities. There is unconfirmed speculation that another wind power project is being considered for lands adjacent to the Amherst site. At this time no announcements have been made about the potential project and specific details, including size and timing of site activities are unknown; it is therefore not considered likely for purposes of cumulative effects assessment. The Proponent is proposing another wind farm development in the nearby community of Aulac, New Brunswick. Specific site details are not available at this time as the proposed development is still in the very early planning stages. It is expected that any wind farm developments in the area would incorporate an assessment of cumulative environmental effects with the Amherst wind farm into that facility's assessment. Under *CEAA*, only those projects that are considered likely to proceed need be considered in a specific project EA.

Aside from wind power projects, additional considerations for cumulative effects include the presence of agricultural activities, communication towers, local traffic and economic development.

5.6.2 Interactions between Projects and Description of Cumulative Environmental Effects

Identifying potential cumulative effects is considered through a comparison of the temporal and spatial scope of the additional projects identified in the regional area. A qualitative assessment of these interactions is undertaken in the following section, using experience and professional opinion of the study team. Spatially, those projects that are within the regional area are considered to be relevant. Temporally, those projects that have existed in the past, exist presently, or are likely to exist in the near

future are considered relevant. Projects that have been proposed but have an unclear status are not considered relevant to this cumulative effects assessment.

Birds and Other Wildlife

Past and ongoing agricultural development in the regional area has resulted in a loss of forest and wetland habitat, and the active cultivation of much of the immediate Project area provides relatively poor breeding/nesting and staging habitat for birds and other wildlife. No additional loss of high quality habitat is expected to result from the development of the Project, and the Amherst Wind Energy Project is not expected to contribute to the cumulative environmental effects of human activities on wildlife habitat. In comments received on the draft EA report, NSDNR indicates that the Project area is located in an agricultural (working) landscape with a lengthy history of intensive alteration and variable use and moreover, its placement on the southwest side of the isthmus in association with other infrastructure significantly reduces the likelihood of cumulative effects of habitat site and connectivity loss. NSDNR also noted in their comments that they were satisfied that the location of the Project, in relatively close proximity to the Town of Amherst, will present no significant impact that can be reasonably inferred to wildlife or their habitat.

Wildlife mortality, specifically bird and bat mortality, is a residual environmental effect associated with the proposed Project. Bird and bat mortality may also occur as a result of collisions with overhead power lines, vehicles and buildings resulting in a cumulative effect. Historical evidence (see Section 5.2.1.5) has shown that wind turbines typically do not kill large numbers of birds and bats compared with other structures. It is therefore unlikely that the incremental contribution of the Amherst Wind Energy Project to bird and bat mortality will affect these species on a population basis causing adverse cumulative effects. Bird surveys did not reveal extensive use of the site by rare species making it also unlikely that rare species would experience significant cumulative effects. A post-construction bird and bat carcass monitoring program will confirm these predictions.

Visual Impact

The development of the Project, taken into consideration with existing power lines and communication towers will be considered a further visual obstruction. However, due to the presence of these structures, the visual impact that the Amherst Wind Energy Project is expected to be less than if the landscape was without these tall structures at all; it is not a pristine landscape, but rather one that has been previously influenced by human activities. No cumulative effects are expected with respect to shadow flicker. As a result, the cumulative effect of this Project with the other existing structures in the landscape is deemed to be not significant.

Noise

Acceptable sound levels are expected to be produced by the Amherst Wind Energy Project. An incremental increase in sound, above the existing sound of agricultural activities and road noise, is expected but is considered to be not significant.

Economic Development

This Project will continue to contribute to the community through job creation for local contractors. It is estimated that the Project will provide 25 to 40 new or existing jobs during the construction phase, four new or existing jobs during the operation and maintenance phase, and two to ten new or existing jobs

during the decommissioning phase. In addition, the Project will provide significant tax revenues and income for landowners. The property tax paid will be approximately \$5,500 per MW (e.g., \$5,500 X 30 MW = \$165,000).

5.7 Summary of Potential Environmental Impacts and Cumulative Effects

A summary of recommended measures for managing and mitigating effects of the Project, based on the preceding analysis, is provided in Table 5-12.

Table 5-12 Summary of Impact Management and Proposed Mitigation Measures

Environmental Component	Project Activity	Potential Effects	Mitigation Measures
Birds and Other Wildlife	Construction & Decommissioning	Sensory Disturbance	Overall disturbance will be limited to designated workspaces. Delivery vehicles will remain on designated roads.
		Habitat Loss/Alteration	Construction on site will occur outside of the breeding season to the extent possible. If this is not possible during detailed layout surveying activities, a qualified biologist on-site will identify nests within or immediately adjacent to work areas, and flag them for avoidance during construction. Buffers will be developed in consultation with CWS for any nests identified by the biologist. Habitat loss may be mitigated by only clearing the amount of land necessary for construction activities and by limiting the overall land disturbance to within designated workspaces. Upon completion of construction and/or decommissioning, habitat will be restored to the extent possible. Areas of significance (e.g., nesting sites) will be avoided, to the extent possible.
		Mortality	In order to reduce the potential of bird mortality, land clearing and construction activities will be performed, to the extent possible. If this is not possible during detailed layout surveying activities, a biologist on-site will identify nests within or immediately adjacent to work areas, and flag them for avoidance during construction, to the extent possible.
	Operation	Sensory Disturbance	Not required.
		Mortality	The wind turbines will be designed and built in order to minimize the potential for bird collisions. Turbines were sited away from the banks of the river (37 m minimum buffer zone, blade length), to reduce the likelihood birds flying in close proximity to turbines. This separation distance was determined through observations and discussions with CWS. The turbines to be used extend no higher than 120 m above the ground thus avoiding the flight height of nocturnally migrating land birds. Lighting will be the minimum allowed by Transport Canada for aeronautical safety, and white strobe lights may be used with the minimum intensity and flashes per minute allowable. The turbines for this Project will be built using tubular steel towers. Electrical cables will be buried underground within the wind farm, to reduce perching opportunities for birds and to reduce the likelihood of collision with the wires. Where aboveground electrical lines are necessary, they will be to the minimum extent required. Post-construction monitoring will direct the need and form of further post-construction mitigation measures.
Water Quality/ Aquatic Environment	Construction & Decommissioning	Surface Water Contamination	All activities, including equipment maintenance and refuelling, should be controlled to prevent entry of petroleum products or other deleterious substances, including any debris, waste, rubble or concrete material, into a watercourse.

Table 5-12 Summary of Impact Management and Proposed Mitigation Measures

Environmental Component	Project Activity	Potential Effects	Mitigation Measures
			Construction material, excess material, construction debris, and empty containers will be stored away from watercourses and watercourse banks.
		Sediment Loading	<p>Land clearing and construction will not take place within the immediate vicinity of a watercourse, with the exception of culvert installation.</p> <p>Temporary erosion and sediment control measures, silt fence, straw bales (<i>etc.</i>) will be maintained and kept in place until 100% of all work is complete.</p> <p>Culvert will be installed in the dry and during a time when fish runs are not an issue (ideally mid-July through September).</p>
Soils and Vegetation	Construction & Decommissioning	Soil Erosion and Compaction	<p>Limit access to the turbine sites via established access roads, where possible.</p> <p>Keep size of access roads to the minimum required for the safe construction, operation and decommissioning of the equipment.</p> <p>Whenever possible, clearing activities will be timed to periods when the ground surface is best able to support construction equipment (winter or dry season).</p> <p>Replace topsoil stored on-site in order that the land may be reclaimed to its original condition.</p>
		Loss of Plant Species	Buffer zone from LaPlanche River which may house sensitive species (30 m), with the exception of the culvert construction.
Noise	Construction & Decommissioning	Increase Sound Levels (short-term)	<p>Nearby residents will be advised of significant sound generating activities and these will be scheduled to create the least disruption to receptors. Heavy equipment will only be operated between 7:00am and 6:00pm, avoiding Sundays and holidays unless absolutely necessary.</p> <p>Equipment will be delivered between 7:00 a.m. and 10:00 p.m., avoiding Sundays and holidays unless absolutely necessary.</p> <p>Construction equipment will have mufflers.</p> <p>Noise abatement equipment, in good working order, will be used on all heavy machinery used on the Project.</p> <p>Adhering to the recommended setback between the Project site and receptors (<i>i.e.</i>, at least 500 m from houses).</p> <p>Attending to routine maintenance of the wind turbines and associated equipment, as recommended by the manufacturer.</p>

Table 5-12 Summary of Impact Management and Proposed Mitigation Measures

Environmental Component	Project Activity	Potential Effects	Mitigation Measures
	Operation	Increase Sound Levels (long-term)	Not required. Noise emissions have been considered in turbine siting.
Tourism	Construction & Decommissioning	Effect on Tourism (short-term)	Not required.
	Operation	Effect on Tourism (long-term)	Not required.
Local Community	Construction	Effect on Property Value	Not required.
		Effect on Tax Base	Not required.
		Effect on Employment	Not required.
		Effect on Traffic	No modifications to existing roads expected. A Special Move Permit and any associated approvals will be obtained through the Department of Transportation and Infrastructure Renewal for heavy load transport. Any mitigation measures required for approvals will be implemented. None have been identified at this stage.
	Operation	Effect on Local Economy	Local residents will be employed to the extent possible during the construction, operation and decommissioning of the Project.
		Effect on Property Value	Not required.
		Effect on Tax Base	Not required. Municipal taxes will be remunerated, thus increasing the local tax base, which could be used to increase funding of local municipal initiatives.
	Decommissioning	Effect on Employment	Not required.
Visual	Construction, Operation & Decommissioning	Effect on Adjacent Stakeholders	Not required. Turbines will be all of the same type and model, and will be painted light grey to reduce reflection. Screening opportunities for adjacent residences through tree planting or other measures may be considered where post-construction evaluation indicates a legitimate concern.
Archaeological and Cultural Resources	Construction	Effect on Archaeological/Cultural Resources	Areas of significance (<i>i.e.</i> , river banks) will be avoided with the exception of culvert installation and upgrades to old aboiteau crossing. Any features, artifacts or other cultural material will be reported to the Nova Scotia Museum prior to proceeding with construction activities.
Health and Safety	Construction, Operation & Decommissioning	Effect on Personnel	All on-site personnel will follow Acciona's existing safety protocol. On-site personnel will park vehicles in such a way as they are located upwind of the wind turbines so as to minimize the potential of ice throw resulting in property damage and personal injury.

Table 5-12 Summary of Impact Management and Proposed Mitigation Measures

Environmental Component	Project Activity	Potential Effects	Mitigation Measures
	Construction & Operation	Effect on Adjacent Stakeholders	<p>Warning signs will be posted at the perimeter of the Project area, discouraging trespassing on private lands.</p> <p>Appropriate setback distances from local residences have been incorporated into the site layout.</p> <p>During operation, access to the wind turbine sites will be restricted to authorized personnel only.</p>