

8. CUMULATIVE ENVIRONMENTAL EFFECTS ASSESSMENT

A cumulative effects assessment (CEA) was prepared for the MGEC following the scope outlined in the Approved Application Terms of Reference (ATOR). It is appropriate to include a CEA in the environmental assessment for the MGEC because MGELP may be applying for incentive funding from the federal government under the recently announced federal ecoENERGY Renewable Initiative for low-impact renewable electricity generation and heating technologies. To be eligible for funding under this initiative, projects must satisfy the requirements of the Canadian Environmental Assessment Act (CEA Act; 1992, c. 37). The CEA Act states in section 16(a) that every screening or comprehensive study of a project shall include consideration of 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.

A cumulative effects assessment extends what is normally considered in an environmental impact assessment to include environmental effects over a larger scale and longer time period, multiple effects on valued ecosystem components of the various disturbances or activities associated with a proposed project, and the cumulative effects of the proposed project in combination with other projects that have been, or will be, carried out (CEA Agency, 1999a). As clarified by the Canadian Environmental Assessment Agency (CEA Agency, 1999b), cumulative environmental effects under the CEA Act extend beyond consideration of the biophysical environment and can also include socio-economic considerations, as defined in paragraph 2 of the CEA Act.

8.1 METHODS AND SCOPING OF POTENTIAL CUMULATIVE EFFECTS

8.1.1 Methods

The CEA for the MGEC follows the approach described in the Cumulative Effects Assessment Practitioners Guide (Hegmann et al, 1999). The approach includes the following five steps in an assessment framework:

- (i) Scoping
- (ii) Analysis of effects
- (iii) Identification of mitigation
- (iv) Evaluation of significance
- (v) Follow-up

This section considers the methods used to determine the cumulative effects of the proposed MGEC together with past, present and committed future activities in the project area. Earlier in this Application, the potential direct and indirect environmental impacts of the MGEC were assessed, starting first with a comprehensive description of baseline environmental and socio-economic conditions, and then describing and assessing the incremental and/or combined effects of the proposed MGEC on the existing baseline. For some of the environmental and socio-economic issues associated with the MGEC, the approach used for the environmental and socio-economic impact assessments also assesses cumulative environmental effects. The assessment of cumulative effects in this section builds upon this previous analysis.

Most of the methods used in the CEA are similar to those used to complete the environmental and socio-economic impact assessments for the MGEC and have been previously described. The main difference in a CEA is the consideration of the cumulative effects of the MGEC and future projects that will be carried out (i.e., those that are already under construction or that have received regulatory approval). An analysis of the combined effects of these projects considers additional effects on the same VECs that were included in the MGEC assessment, or effects that may not be manifest until considered at a regional scale, or over the long term when considered collectively.

The CEA presented here intentionally focuses on the main cumulative environmental and socio-economic effects. In cases where the potential cumulative effects were addressed in the environmental and socio-economic impact assessments for the MGEC, a summary of the findings from this analysis is presented and the reader is referred to the section in the Application where additional information is provided.

8.1.2 Scoping of Cumulative Effects

A review was conducted of the potential effects of the MGEC to identify those that are cumulative in nature. Potential effects were classified as cumulative environmental effects if:

- they arise from an aspect of the MGEC and could potentially have an environmental effect;
- the MGEC developments or activities act cumulatively with other past, present or committed future projects or activities to cause a potential environmental impact to a valued ecosystem component in the project study area. The other future projects or activities considered in this case must be expected to occur (not hypothetical).

The potential environmental effects from construction and operation of the MGEC are assessed in Section 5 of this application. This assessment considered the effects of the MGEC combined with baseline conditions. Some of these effects were concluded at a screening level to have negligible potential to result in cumulative environmental effects beyond the effects that had already been assessed. These effects are listed below with a summary of the reasons for excluding them from further consideration in the CEA:

Potential Project Effect	Reason not included in CEA
Increase in process effluent discharge to Williston Reservoir.	<ul style="list-style-type: none"> • Process effluent from MGEC is of high quality and expected to be non-toxic to fish prior to treatment. • MGEC process effluent will be treated in the Pope & Talbot treatment system and increase the current rate of effluent discharge from the Pope & Talbot pulp mill by less than 1% on average, and by up to 5% for a 24-hour peak flow. • The change in effluent quality and volume will be negligible. • The potential effect of the MGEC's process effluent on receiving waters was assessed and concluded to be negligible.

Change in effluent discharge to wetland.	<ul style="list-style-type: none"> • The annual effluent discharged to the wetland will decrease by 41%. • The effluent will have similar constituents to the current effluent. • Effluent quality is predicted to meet current permit criteria. • The effect of the MGEC effluent on the water quality in the wetland was assessed and concluded to be minimal.
Loss of vegetation on MGEC site.	<ul style="list-style-type: none"> • Most of the vegetation cleared is classified as disturbed or urban and of low habitat value. • No red or blue listed vascular plant species were observed, or are expected, on the MGEC site. • The effect of the vegetation loss was assessed and concluded to be minimal.
Increase in water diverted from Williston Reservoir.	<ul style="list-style-type: none"> • The rate of water diversion will increase by 5%, on average. • Williston Reservoir is very large and its level is managed. • The maximum rate of water diversion from Pope & Talbot and the MGEC combined is less than the licensed diversion rate. • The effect of the MGEC on water supply was assessed and concluded to be negligible.

Table 8.1-1 lists the selected regional VECs and hypothetical cumulative effects issues identified for the MGEC through a screening level review. Each of the identified potential cumulative effects were analyzed to assess their significance and to determine if additional mitigation and monitoring beyond that which MGEC has proposed is warranted. The results of this analysis are described in the following sections, with reference as appropriate to the environmental and socio-economic assessments presented elsewhere in this Application.

Table 8.1-1 Potential Cumulative Effects Identified for Assessment

Valued Ecosystem Component/Issue	Potential Project Effect	Hypothetical Cumulative Effect Mechanism
1. Air quality	Increased/decreased ground-level pollutant concentrations from MGEC emissions.	Emissions of common criteria pollutants (PM ₁₀ , PM _{2.5} , NO _x , CO, and SO ₂) may combine with existing and known future emissions to affect air quality in the airshed.
2. Air quality	Reduction in ground-level pollutant concentrations in the wood fuel supply areas from reduced incineration.	Use of wood residue by the MGEC will reduce the quantity of wood residue incinerated in beehive burners in fuel supply areas.
3. Greenhouse gas emissions	Reduction in contribution of provincial sources to climate change.	The reduction in greenhouse gas emissions will reduce provincial contribution to climate change.
4. Noise	Increased noise.	Noise from the MGEC may combine with noise from existing or known future sources to create unacceptable noise levels in the vicinity of the site.
5. Wildlife	Loss of habitat from land clearing.	Sensory disturbance and/or loss of habitat may affect certain wildlife species in the region.
6. Socio-economic effects	Positive or negative socio-economic effects on the community	Increased employment, needs for housing, and infrastructure or health services from the MGEC may act cumulatively with existing or known future project demands.

8.2 EXISTING AND FUTURE PROJECTS INCLUDED IN THE ASSESSMENT

A search for information on known future projects that may need to be included in the cumulative effects assessment was conducted by contacting the Economic Development Officer for Mackenzie, the regional office in Prince George of the Ministry of Environment and conducting a search of the Environmental Assessment Office web site. No committed or planned development projects in Mackenzie were identified in this search other than the MGEC.

The MGEC will affect the emissions from the Pope & Talbot pulp mill by enabling the shut down of the mill's old power boiler. The effect of shut down of the power boiler on air quality in the airshed was included in the assessment of the direct air quality impacts of the MGEC reported in Section 5.4.2.

Utilization of sawmill wood residue by the MGEC will reduce the need to dispose of this waste in beehive burners and by landfilling in the fuel supply areas. This indirect environmental benefit of the MGEC is discussed in Section 5.4.2.4, but could not be quantified because of a lack of information for the fuel supply areas on the baseline air quality and on the reduction in wood incineration that would occur. This cumulative effect is included here at a regional scale.

8.3 ASSESSMENT OF IMPACTS, MITIGATION AND RESIDUAL EFFECTS

8.3.1 Air Quality

As no other projects were identified in Mackenzie that could act cumulatively with the MGEC except the change in emissions at the Pope & Talbot pulp mill, the assessment in Section 5.4.2.4 represents the cumulative effects assessment and is summarized briefly below.

The MGEC will enable the shut down of the power boiler at the Pope & Talbot pulp mill, eliminating a substantial source of emissions, particularly particulate matter, because of the use of old emission control technology having a low control efficiency. This change will reduce emissions compared to the baseline level and reduce maximum ground-level particulate matter concentrations in Mackenzie.

The cumulative effects of emissions from MGEC on air quality in Mackenzie are predicted to be as follows:

- The maximum concentrations of PM₁₀ and PM_{2.5} will decline slightly because of the reduction in emissions with MGEC in operation. The maximum PM₁₀ and PM_{2.5} concentrations are predicted to be 54% and 44%, respectively, of the strictest objectives/standards.
- Maximum SO₂ concentrations are predicted not to change with MGEC in operation and to remain at less than 3.5% of the strictest objective levels for all averaging periods.
- Maximum NO₂ concentrations, assuming conservatively that all NO_x is converted to NO₂ immediately upon discharge from the stack, are predicted to be less than 29% of the strictest objective levels once the MGEC is operational.
- Maximum CO concentrations are predicted to be less than 2% of the 1-hour objective level and less than 4.8% of the 8-hour objective once MGEC is operational.

MGEC is concluded to have slightly beneficial cumulative effects as it will reduce particulate matter emissions and ambient concentrations. Other emitted pollutants will remain at low concentrations compared to regulatory guidelines and are concluded to have no significant adverse effects.

The MGEC will utilize wood residue from sawmills in Mackenzie, Bear Lake, Chetwynd and Fort St. James that has historically been incinerated in beehive burners near these communities. A wood-fired power plant similar in size to the MGEC was constructed in Williams Lake in the early 1990s to utilize sawmill wood residue that was being incinerated in a number of beehive burners located nearby. This resulted in a significant reduction in ambient concentrations of PM₁₀, PM_{2.5}, and other pollutants. A similar improvement in air quality is expected to occur in Mackenzie and other communities in the region from which wood residue will be obtained for the MGEC, as the amount of wood residue incinerated in local beehive burners will be significantly reduced, or eliminated.

MGEC will consume wood residue that is now being used to fuel the power boiler at the Pope & Talbot pulp mill or being incinerated in the region. The net amount of wood residue that will be redirected to the MGEC and no longer be incinerated is approximately 786,200 wet tonnes/yr (Table 8.3-1). This reduction in the amount of wood residue incinerated in the region will yield large reductions in pollutant emissions, as summarized in Table 8.3-1. The

reduction in PM emissions from avoided wood residue incineration will be about 10 times the PM emissions from the MGEC. Large reductions in emissions will also be achieved for other criteria pollutants.

Table 8.3-1 Estimate of Avoided Wood Residue Incineration and Emissions for Regional Beehive Burners

Estimate of Avoided Wood Residue Incineration:			
MGEC Power Boiler	Annual wood residue use @ 93% availability	943,371	tonnes/yr, wet
Pope & Talbot Power boiler	Current annual average wood residue use (2004-2006)	-157,206	tonnes/yr, wet
Net reduction in wood incinerated		786,166	tonnes/yr, wet
Estimate of Avoided Emissions from Beehive Burners:			
	Particulate Matter	2,559	tonnes/yr
	NOx	366	tonnes/yr
	CO	47,524	tonnes/yr
	SOx	37	tonnes/yr
	VOC	4,021	tonnes/yr

8.3.2 Greenhouse Gas Emissions

The MGEC will achieve a cumulative reduction in greenhouse gas emissions by enabling the shut down of the power boiler at the Pope & Talbot pulp mill. Potentially, the Canfor sawmill may also purchase steam from the MGEC, rather than using natural gas to heat its lumber dry kilns. The assessment of the direct effects of the MGEC on greenhouse gas emissions discussed in Section 5.5 of the Application considered the cumulative effect of MGEC on emissions from these mills.

The boilers at MGEC will emit some greenhouse gas emissions, even though the plant is primarily fuelled by wood residue. This will include methane and nitrous oxide from combustion of wood residue in the main boiler and carbon dioxide, methane and nitrous oxide from combustion of natural gas in the auxiliary boilers. GHG emissions from these boilers were calculated assuming the wood-fired boiler operates at its maximum continuous rating 93% of the time and the natural gas-fired boilers operate at their maximum continuous rating 7% of the time in a year.

The total GHG emissions from the wood-fired boiler and the natural gas-fired backup boilers at the MGEC are estimated to be 25,834 tonnes CO₂ equivalent per year. The annual baseline GHG emissions from the Pope & Talbot power boiler are estimated to be 53,295 tonnes CO₂ equivalent. MGEC will therefore yield a cumulative net annual reduction from the baseline of 27,461 tonnes CO₂ equivalent, or 52%.

If Canfor also converts from natural gas to steam from the MGEC as a means of heating its lumber dry kilns, there could be a further reduction in greenhouse gas emissions. In this case, the MGEC would eliminate the current annual GHG emissions from the dry kiln of 29,820 tonnes CO₂ equivalent per year.

If the proposed MGEC provided steam to both the Pope & Talbot pulp mill and the Canfor sawmill, a net annual reduction in GHG emissions of 57,281 tonnes CO₂-equivalent would result from the proposed project. This is equivalent to a 69% reduction from the baseline GHG emissions for the two mills.

Canada's national emissions of carbon dioxide, methane and nitrous oxide were most recently inventoried by Environment Canada¹ for 2004. This report shows that 747 million tonnes CO₂-equivalent of greenhouse gases were emitted in 2004, with 65.5 million tonnes CO₂-equivalent, or 8.8%, emitted in British Columbia. The MGEC will result in a GHG emissions reduction of 27,461 tonnes CO₂-equivalent per year, which represents 0.04% of the provincial GHG emissions of carbon dioxide, methane and nitrous oxide. If steam sales from the MGEC were expanded to include the Canfor sawmill, the total reduction in GHG emissions would represent 0.09% of provincial GHG emissions.

8.3.3 Noise

The cumulative effects of noise emissions from the MGEC and existing noise sources were addressed as an integral part of the environmental impact assessment presented in Section 5.6 of this Application. The existing sources of noise that will act cumulatively with the MGEC are the Pope & Talbot pulp mill and the Canfor sawmill.

The major equipment required for the MGEC with the potential to contribute to plant operational noise emissions will meet the noise specifications presented in Section 3.4 of this Application. Control of equipment noise levels to meet these specifications will mitigate the potential cumulative noise impacts of the MGEC. Further noise attenuation will be achieved by placing the power boiler, auxiliary boiler, steam turbine generator and ancillary equipment inside a building.

There will be intermittent noise sources at the MGEC such as a hog to pulverize over-size wood residue, conveyer belts, mechanical ash handling systems, and mobile equipment used to manage the wood residue pile. These operations and the associated noise emissions are similar to current operations at the Pope & Talbot pulp mill and the Canfor sawmill. Significant noise impacts are not expected from these operations.

The main plant noise sources were modelled individually based on design sound power or sound pressure levels. The attenuation resulting from distance, air absorption, terrain, and vegetation was subtracted from the design noise level for each source to estimate noise levels at receptor sites in the surrounding area. The total noise at the receptor sites was then determined by combining the noise levels of the individual plant noise sources. The cumulative noise level at the receptor sites was determined by adding the combined noise impact of the MGEC to the measured baseline noise (L₉₀) previously determined (See Section 5.6.2.3).

The predicted cumulative noise levels at the monitoring sites with MGEC in operation are less than 58 dBA and well below 65 dBA, the acceptable limit for noise impacts in industrial/commercial areas.

Based on the noise assessment, which included the effects of existing noise sources, the MGEC is expected to have no significant cumulative noise impacts.

¹ http://www.ec.gc.ca/pdb/ghg/inventory_report/2004_report/toc_e.cfm

8.3.4 Wildlife

Cumulative effects to wildlife can potentially occur when there is significant cumulative loss of habitat and/or when clearing for project construction increases human access to an area and creates barriers to, or enhances, wildlife movement.

The assessment of the direct wildlife impacts within the MGEC site from construction and operation activity is presented in Section 5.10.2 and included the loss of habitat for various animals presently utilizing this parcel of land. Deer, hare, squirrels, a variety of birds and various raptors were observed to use the MGEC site in the baseline study, primarily for foraging. Impacts to vegetation and ecosystem communities from construction and operation include the loss of 8.62 ha of habitat associated with the proposed site clearing. Impacts to aquatic vegetation on the MGEC site from construction and operation are expected to be nil as no watercourses exist onsite.

MGELP proposes to implement the following mitigation measures to minimize the effects on wildlife, which were taken into consideration for the cumulative effects assessment (Summarized in Section 10):

- A minimum 15-m buffer will be left around the northern part of the site where the ash landfill will be located. This will leave most of the higher value habitat in the pine ecosystem (Appendix F, Figure F-6) along the eastern fringe of the site intact for use by wildlife;
- Wildlife/vegetation environmental mitigation measures will be incorporated in the following plans to provide project personnel with instructions on how to deal with various wildlife/vegetation related issues during construction:
 - Storm Water Management Plan (Appendix H);
 - Spill Prevention and Contingency Plan (Appendix L); and
 - Landscape Design and Restoration Plan (Appendix M).
- A field assessment will be prepared by a registered professional biologist prior to the initiation of clearing to confirm presence/absence of species that may have migrated onto the MGEC site, and to recommend means of removal/relocation to safer sites on adjacent property;
- Up to five nesting platforms will be constructed in areas of the MGEC site area left undisturbed from clearing and site preparation to accommodate birds displaced as a result of the construction and operation of the proposed MGEC project;
- The environmental monitor will conduct site inspections (frequency depending on construction activities underway) during the construction phase to assess and resolve unforeseen environmental issues that may arise with regard to biophysical effects of construction work;
- Vegetation used for landscaping of the site upon completion of construction activities will be indigenous to the Sub Boreal Spruce Subzone (Appendix M).

With the mitigation measures identified above, the construction and operation phases of the proposed plant are expected to result in minimal impacts to wildlife on the MGEC site. The MGEC is not expected to have any noticeable effects on wildlife in the wetland because of separation distance and proposed mitigation measures. The factors considered in the assessment of potential impacts are described in more detail in Section 5.10.2 of this

application. Although construction and operation of the proposed plant will result in a loss of 8.62 ha of vegetation and wildlife habitat, the site itself is thought to be not of crucial value due to the past development and existing disturbances. As well, the site is small and habitat of similar or higher value exists nearby that would remain available for wildlife.

The direct impacts and the planned measures planned to mitigate these impacts were taken into consideration for the assessment of potential cumulative effects. This was done by assessing the potential effects of the MGEC on VEC's to identify those that are cumulative in nature and in addition to effects already assessed.

Table 8.3-1 lists the VECs for wildlife and summarizes the assessment of the potential cumulative effects associated with the MGEC. Each of the identified potential cumulative effects was analyzed to assess its significance, taking into account the predicted effects of the MGEC discussed in Section 5 and the proposed mitigation measures summarized above. The potential cumulative effects of the MGEC on wildlife are concluded to be minimal.

8.3.5 Socio-economic

As no future projects were identified in Mackenzie that could act cumulatively with the MGEC in relation to socio-economic factors, the assessment in Section 7 represents the cumulative effects assessment and is summarized briefly below.

A wide range of socio-economic areas were considered including population, housing, health care, emergency services, employment and income, business opportunities, transportation, utilities, transportation and traffic and First Nations specific effects.

In all areas it was determined that the community and community services would be capable of accommodating the demand placed on them by the project. In terms of employment and business opportunities, it was determined that there would be an ongoing benefit to the study area during construction and operations. Further, it was determined that the MGEC would provide an ongoing benefit to the industries to which it sold steam as it would decrease their energy costs and, in turn, increase their competitiveness.

A potential impact was identified in the area of temporary accommodation in Mackenzie during construction. To help mitigate any negative impact, MGELP has committed to work with local accommodation suppliers to ensure that they benefit from the project during times of lower demand in the community but that rooms are available for community use during periods of higher demand (i.e., hockey tournaments). This will be accomplished by encouraging workers to stay at Camp Watters during busy times.

Table 8.3-2 Assessment of Potential Cumulative Effects for Wildlife

VEC	Hypothetical Cumulative Effect	Assessment and Conclusion
Waterfowl Raptors	The MGEC may increase sensory disturbances and result in wildlife movement away from the wetland habitat.	<ul style="list-style-type: none"> • The noise level at the south end of the wetland is predicted to increase by only 3 dBA. An increase of this amount is typically not noticeable. • Noise levels offsite will be less than 65 dBA, which is a typical limit for industrial/commercial areas. • The type and magnitude of noises from equipment and traffic with MGEC will be similar to baseline conditions. • Conclusion: Cumulative effect will be minimal.
Passerines Woodpeckers	<ul style="list-style-type: none"> • The MGEC may increase sensory disturbances and result in wildlife movement away from the wetland habitat. • Cumulative habitat loss/fragmentation may result in decreases to the overall population in the immediate area affected by development. 	<ul style="list-style-type: none"> • Disturbance from plant and traffic noise will be minimal for the reasons indicated for waterfowl and raptors above. • The proposed mitigation will minimize potential effects. • The habitat loss will be of low quality and equal or better habitat is available nearby. • Conclusion: Cumulative effects will be minimal.
Short-eared Owl, Barn Swallow, Sandhill Crane	<ul style="list-style-type: none"> • The MGEC may increase sensory disturbances and result in the loss of habitat opportunities in the immediate area affected by development. • Cumulative habitat loss/fragmentation may result in decreases to the overall population in the immediate area affected by development. 	<ul style="list-style-type: none"> • Disturbance from plant and traffic noise will be minimal for the reasons indicated for waterfowl and raptors above. • The proposed mitigation will minimize potential effects. • The habitat loss will be of low quality and equal or better habitat is available nearby. • Conclusion: Cumulative effects will be minimal.
Mammals	<ul style="list-style-type: none"> • The MGEC may increase sensory disturbances and result in wildlife movement away from existing foraging habitat. • Cumulative habitat loss/fragmentation may result in decreases to overall populations in the immediate area affected by development. 	<ul style="list-style-type: none"> • Disturbance from plant and traffic noise will be minimal for the reasons indicated for waterfowl and raptors above. • The proposed mitigation will minimize potential effects. • The habitat loss will be of low quality and equal or better habitat is available nearby. • Conclusion: Cumulative effects will be minimal.
Amphibians and Reptiles	• The MGEC may decrease water quality in the wetland, resulting in a loss of favourable habitat (amphibians).	<ul style="list-style-type: none"> • Water quality will be similar to baseline conditions and meet permit conditions at the outlet. • The flow from the MGEC will help sustain the water flow in the wetland, which would otherwise decline substantially with the shut down of the Pope & Talbot power boiler. • Conclusion: Cumulative effects will be minimal.

8.4 SUMMARY

Table 8.4-1 summarizes the conclusions from the cumulative effects assessment using the same methods applied for the direct environmental effects. The definitions of the terms used to classify the environmental effects are presented in Section 5.1.2.

It is concluded that construction and operation of the MGEC will have no significant adverse cumulative effects, though because of the reduction in emissions from beehive burners located in the region, a significant cumulative benefit to air quality is expected to occur.

Table 8.4-1 Summary of Cumulative Effects Assessment, Mitigation and Monitoring for the MGEC

Issue/VEC	Residual Impact Assessment Indicators						
	Geographic Extent	Direction	Magnitude	Duration & Frequency	Reversibility	Significance	Confidence
AIR QUALITY MGEC emissions							
Nitrogen Dioxide	Sub-Regional	Negative	Low	Long-term; Continuous	Reversible	Not significant	Good
Sulphur Dioxide	Sub-Regional	Neutral	Low	Long-term; Continuous	Reversible	Not significant	Good
Carbon Monoxide	Sub-Regional	Negative	Low	Long-term; Continuous	Reversible	Not significant	Good
Particulate Matter (PM ₁₀ & PM _{2.5})	Sub-Regional	Positive	Low	Long-term; Continuous	Reversible	Not significant	Good
AIR QUALITY Regional beehive burner emissions							
Nitrogen Dioxide	Regional	Positive	Medium	Long-term; Intermittent	Reversible	Significant*	Fair
Sulphur Dioxide	Regional	Positive	Medium	Long-term; Intermittent	Reversible	Significant	Fair
Carbon Monoxide	Regional	Positive	Medium	Long-term; Intermittent	Reversible	Significant	Fair
Particulate Matter (PM ₁₀ & PM _{2.5})	Regional	Positive	Medium	Long-term; Intermittent	Reversible	Significant	Fair
GREENHOUSE GAS Emissions	Provincial-Global	Positive	Low-Medium	Long-term; Continuous	Reversible	Not significant	Good
NOISE Operating Noise	Local	Negative	Low	Long-term; Continuous	Reversible	Not significant	Good
WILDLIFE & VEGETATION Construction & operation	Local	Negative to Neutral	Minimal	Long-term; Continuous	Reversible	Not significant	Fair
SOCIO-ECONOMIC Temporary Housing during Construction	Local	Negative to Neutral	Minimal	Short-term, intermittent	Reversible	Not significant	Good

* Applies to the benefit of reduced exposure to air pollutants.