

## 11. ACOUSTIC ENVIRONMENT

This section describes and summarizes an assessment of the effects of the Project on the acoustic environment. Specifically, environmental effects relevant to human noise receptors are assessed.

Acoustic values can be described in terms of noise or sound. Noise is defined as unwanted sound; however, the terms noise and sound are often used interchangeably.

An introduction to key concepts used in the assessment of outdoor acoustics is provided below:

- “**Noise**” or “**noise levels**” refers to the levels that can be heard or measured at a Point of Reception (POR).
- A noise “**receptor**” or POR is a location where an assessment, measurements or predictions of noise levels are made.
- The “**level**” of a noise is expressed on a logarithmic scale, in units called decibels (dB). Since the scale is logarithmic, a noise that is twice the noise level as another will be three decibels (3 dB) higher. “**Sound pressure level**” is the physical quantity that is measured in the environment that describes sound waves quantitatively. It is a ratio of the absolute pressure relative to a reference (i.e., 20  $\mu$ Pa). This ratio of pressures is converted to a decibel scale (dB).
- Noise emissions and noise levels have an associated frequency. The human ear does not respond to all frequencies in the same way. Mid-range frequencies are most readily detected by the human ear, while low and high frequencies are harder to hear. Environmental noise levels used in this assessment are presented as “**A-weighted decibels**” (or dBA), which incorporates the frequency response of the human ear.
- The “**percentile noise level**”, designated  $L_n$ , is the noise level exceeded “n” percent of a specified time period and is measured in dBA. The  $L_{90}$ , for instance, is the noise level exceeded 90% of the time. It is a noise level index that commonly refers to the baseline noise level and is most often referenced in a rural setting.
- Outdoor noise is usually expressed as an “**equivalent noise level**” ( $L_{eq, T}$ ), which is a logarithmic average (i.e., energy average) of the measured or predicted noise levels over a given period of time (T). An equivalent noise level measured or predicted over the nighttime period would be referred to as  $L_{eq, night}$ .
- Environmental noise levels vary throughout the day and it is therefore important to distinguish between the time of day (i.e., daytime / nighttime). For the purposes of this assessment, the day is divided into two periods for which noise is evaluated. The “**daytime**” noise levels occur for the period from 07:00 (7 am) to 19:00 (7 pm). The “**nighttime**” noise levels occur for the period from 19:00 (7 pm) to 07:00 (7 am).

The assessment follows the general approach and concepts described in Section 5. The main steps in the assessment include:

- consideration of input from Indigenous communities, government representatives and agencies, other communities, property owners and people or groups interested in the Project during the ongoing consultation and engagement process;
- identification of information and data sources used in the assessment;
- identification and rationale for selection of criteria and indicators for the acoustic environment;
- establishment of temporal and spatial boundaries for the assessment of effects on these criteria;
- description of the existing environment to gain an understanding of baseline conditions for these criteria;
- identification and screening of effect pathways that could link Project activities to changes in these criteria;

- characterization of predicted net effects (after mitigation) of the Project on criteria (if required);
- assessment and determination of significance of cumulative effects from the Project and previous, existing and RFDs on criteria (if required);
- assessment of uncertainty in the effects predictions, indicating how uncertainties are addressed; and,
- identification of proposed monitoring or follow-up to confirm predictions and address uncertainty.

As outlined in Section 5.2.1, the assessment is structured around three assessment cases:

- Base Case;
- Project Case; and,
- Cumulative Effects Case.

## 11.1 Input from Consultation and Engagement

A concern regarding noise from construction activities was raised during consultation and engagement for the Project. This issue has been considered and addressed in this section of the EA Report. A detailed consultation and engagement record is provided in Appendices 2-III and 2-IX.

## 11.2 Information Sources

Information for the acoustic environment baseline was collected from review of the following sources:

- MOECC Model Municipal Noise Control By-Law Noise Pollution Control Guideline (NPC) Construction Equipment, Publication NPC-115 (NPC-115) (MOECC 1978);
- MOECC Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning, Publication NPC-300 (NPC-300) (MOECC 2013);
- Alberta Energy Regulator (AER) Directive 038: Noise Control (Energy and Utilities Board 2007);
- orthoimagery;
- CanVec geographic datasets; and,
- MNR's Land Information Ontario (LIO) geographic datasets.

The review of orthoimagery and the CanVec and MNR's LIO geographic datasets was carried out to identify potential existing human PORs in the acoustic environment LSA (see Section 11.5.2). For the purposes of the EA, sufficient information was deemed to be available from the references listed above to assess the potential effects of the Project on the acoustic environment.

## 11.3 Criteria, Assessment Endpoints and Indicators

**Criteria** are components of the environment that are considered to have economic, social, biological, conservation, aesthetic or ethical value (Section 5.1). The acoustic environment is important to NextBridge, interested parties, and the general public as noise (i.e., unwanted sound) may result in annoyance to people.

**Assessment endpoints** represent the key properties of a criterion that should be protected (Section 5.1). Environmental noise levels vary over time and are described using an overall sound level known as the  $L_{eq}$ , or energy equivalent sound level. The  $L_{eq}$  is the equivalent continuous sound level, which in a stated period of time, and at a stated location, has the same energy as the time varying noise level. It is common practice to measure  $L_{eq}$  sound levels in order to obtain a representative average sound level. The assessment endpoints for the acoustic environment criterion are noise emissions during the construction phase that will be perceived at potential PORs as less than twice as loud (i.e., 10 dB increase) as baseline levels during the daytime period and noise emissions from the Project during the operation phase are within their respective noise level limits at potential PORs. This is consistent with ISO 1996-1:2003(E) which indicates that in quiet rural settings, the expectation for “peace and quiet” may be up to 10 dB (ISO 2003).

**Indicators** represent attributes of the environment that can be used to characterize changes to criteria and the assessment endpoint in a meaningful way. The indicators for the acoustic environment are defined as follows:

- **Change in Daytime Equivalent Noise Level ( $L_{eq, day}$ ):** a logarithmic average of the measured or predicted noise levels over the daytime period (07:00 to 19:00). It is expressed on an “A-weighted decibel” scale which incorporates the response of the human ear, in dBA.
- **Change in Nighttime Equivalent Noise Level ( $L_{eq, night}$ ):** a logarithmic average of the measured or predicted noise levels over the nighttime period (19:00 to 07:00). It is expressed on an “A-weighted decibel” scale which incorporates the response of the human ear, in dBA.
- **Project related One-hour Equivalent Noise Level ( $L_{eq, 1-hour (day, night)}$ ):** a logarithmic average of the measured or predicted noise levels over any one-hour period (e.g., 00:00 to 01:00). It is expressed on an “A-weighted decibel” scale which incorporates the response of the human ear, in dBA.

The criterion, assessment endpoint and indicators selected for the assessment of Project effects on the acoustic environment, and the rationale for their selection, are provided in Table 11-1.

**Table 11-1: Acoustic Environment Criteria, Indicators and Assessment Endpoint**

Criteria	Rationale	Indicators	Assessment Endpoint
Acoustic environment	<ul style="list-style-type: none"> <li>■ Project activities have the potential to affect existing noise levels</li> <li>■ Noise guidelines are provided by the MOECC</li> <li>■ Noise may result in annoyance to people</li> </ul>	<ul style="list-style-type: none"> <li>■ Project construction-related change in daytime equivalent noise level (<math>L_{eq, day}</math>)</li> <li>■ Project construction-related change in nighttime equivalent noise level (<math>L_{eq, night}</math>)</li> <li>■ Project operation-related one-hour equivalent noise level (<math>L_{eq, 1-hour (day, night)}</math>)</li> </ul>	<ul style="list-style-type: none"> <li>■ Noise emissions during the construction phase that will be perceived at potential PORs are less than twice as loud as baseline levels during the daytime period</li> <li>■ Noise emissions from the Project during the operation phase are within their respective noise level limits at potential PORs</li> </ul>

## 11.4 Assessment Boundaries

### 11.4.1 Temporal Boundaries

The Project is planned to occur during two phases (Section 5.2.1):

- **construction phase:** the period from the start of construction to the start of operation (approximately two years); and,
- **operation phase:** encompasses operation and maintenance activities throughout the life of the Project, which is anticipated to be indefinite.

The assessment of Project effects on the acoustic environment considers effects that occur during both the construction and operation phases. These periods are sufficient to capture the effects of the Project. Project effects on the acoustic environment are expected to be the greatest during the construction phase. Project construction will involve various construction activities occurring during the daytime period typically for up to 12 hours per day, at times simultaneously, over a span of two years. For preliminary construction planning purposes, the preferred route ROW has been divided into six sections ranging from approximately 45 to 100 km in length, each with its own crew of workers to complete each construction activity. It is expected that construction activities will be completed sequentially and cover approximately 200 m to 6 km length each day, depending on the specific construction activity. During the operation phase, it is possible that the transmission line may be audible at times due to corona discharge, typically during adverse weather conditions such as rain, fog and wet snow (Foreman and Onderwater 2003).

### 11.4.2 Spatial Boundaries

Spatial boundaries for the assessment are provided in Table 11-2.

**Table 11-2: Acoustic Environment Spatial Boundaries**

Spatial Boundaries	Area (ha)	Description	Rationale
Project footprint	4,832	The Project footprint is the preferred route ROW, laydown yards, storage yards, construction camps, temporary construction easements and new access roads	Designed to capture the potential direct effects of the physical footprint of the Project
Acoustic Environment Local Study Area	178,451	Extends approximately 1.5 km from the preferred route ROW boundary and approximately 500 m from the boundary of construction camps, laydown yards, storage yards and access roads	The approximately 1.5 km setback to define the acoustic environment LSA is based on professional judgement and guidance provided by AER Directive 038: Noise Control Directive (Directive 038) (EUB 2007) for noise assessments in Alberta, as no similar guidelines have been established in Ontario. Since noise attenuates with distance, potential noise effects from the Project are expected to be the highest in the acoustic environment LSA, and any measureable noise effects due to the Project are predicted to be generally limited to the acoustic environment LSA. In the area beyond the acoustic environment LSA, noise emissions from Project activities is expected to further attenuate, resulting in a negligible contribution; therefore, a separate acoustic environment RSA was not specifically defined.

## 11.5 Description of the Existing Environment (Base Case)

This section provides a summary of the existing acoustic environment as determined through desktop review.

### 11.5.1 Baseline Data Collection Methods

A desktop review was completed to identify baseline conditions in the acoustic environment LSA. Baseline conditions of the acoustic environment were determined to characterize the existing acoustic environment and identify potential PORs in the vicinity of the Project. A search for publicly available studies confirmed that limited information regarding existing baseline noise levels in the acoustic environment LSA is available. Upon review of the information sources identified in Section 11.2, a desktop level analysis of the orthoimagery and spatial data from the MNRF's LIO database was carried forward as being most representative of the acoustic environment. This information was used to determine baseline conditions in the acoustic environment LSA, specifically the presence of potential PORs and expected existing baseline noise levels.

### 11.5.2 Baseline Conditions

The potential PORs in the acoustic environment LSA were identified in general accordance with the MOECC NPC-300 noise guideline (MOECC 2013). The NPC-300 guideline defines PORs as sensitive land uses with human activity, including dwellings, campsites or campgrounds, sensitive institutional uses (e.g., educational, nursery, hospital, healthcare, community centre, place of worship or detention centre), or sensitive commercial uses (e.g., hotel or motel). The MNRF LIO spatial dataset identifies existing structures, specifically the MNRF layer "Building\_As\_Symbol". These structures have been conservatively considered as "potential" PORs, but it is anticipated that most of these structures will not qualify as PORs as defined by the MOECC. The quantity of existing structures mapped in this layer, within given distances to the Project footprint in the acoustic environment LSA, is summarized in Table 11-3. Therefore, it is possible these existing structures are PORs representative of the existing noise sensitive land uses and if required, will need to be verified through additional investigations which may include ground-truthing.

**Table 11-3: Summary of Structure Distance to the Boundary of the Project Footprint<sup>(a)</sup>**

<b>Distances</b>	<b>Number of Potential Structures<sup>(c)</sup></b>
In Project footprint <sup>(b)</sup>	10
0 to 50 m	140
50 to 100 m	151
100 to 250 m	542
250 to 500 m	1130
500 to 1000 m	2273
1000 to 1500 m	1530
<b>Total</b>	<b>5776</b>

a) The Project footprint is the preferred route ROW, construction camps, laydown areas, staging yards and access roads.

b) Structures in the Project footprint will be purchased and no longer assessed.

c) Structures as defined in MNRF LIO layer "Building\_As\_Symbol" (MNRF 2016).

The expected existing baseline noise levels in the acoustic environment LSA were described using the MOECC NPC-300 noise guideline. NPC-300 describes the expected acoustic environment at PORs based on a classification system. In accordance with this classification system, the MOECC prescribes noise limits for stationary noise sources based on periods of day (i.e., daytime, evening and/or nighttime) and relative location at

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the POR (i.e., plane of window and outdoor location). The plane of window is typically assessed as a second storey bedroom window, at a height of 4.5 m above grade. An outdoor location is assessed at a location within 30 m of a dwelling at a height of 1.5 m above grade. The classification system and respective noise limits for the different periods of day, at the plane of window and outdoor location of a POR, are summarized in Table 11-4 and Table 11-5 respectively.

**Table 11-4: Point of Reception Classification, Description and Exclusionary Noise Level Limit at the Plane of Window**

Class	Description	Exclusionary Noise Limit (dBA) <sup>(a)</sup>		
		Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)
1	Major population centre. Background sound level dominated by activities of people, usually road traffic.	50	50	45
2	Area with acoustical environment representative of both Class 1 and 3.	50	50	45
3	Rural area. Background sound level dominated by natural sounds having little or no road traffic.	45	40	40
4	New development areas where land use authority has formally confirmed Class 4 designation. Intended for new noise sensitive land uses near established stationary sources.	60	60	55

a) These exclusionary limits represent the minimum limit against which a stationary source is to be assessed. For sound from a stationary source, the sound level limit at a POR is the higher of the applicable exclusionary limit or background sound level.

**Table 11-5: Point of Reception Classification, Description and Exclusionary Noise Level Limit at the Outdoor Point of Reception Location**

Class	Description	Exclusionary Noise Limit (dBA) <sup>(a)</sup>		
		Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00) <sup>(b)</sup>
1	Major population centre. Background sound level dominated by activities of people, usually road traffic.	50	50	n/a
2	Area with acoustical environment representative of both Class 1 and 3.	50	45	n/a
3	Rural area. Background sound level dominated by natural sounds having little or no road traffic.	45	40	n/a
4	New development areas where land use authority has formally confirmed Class 4 designation. Intended for new noise sensitive land uses near established stationary sources.	55	55	n/a

a) These exclusionary limits represent the minimum limit against which a stationary source is to be assessed. For sound from a stationary source, the sound level limit at a POR is the higher of the applicable exclusionary limit or background sound level.

b) As described in NPC-300, in general, the outdoor points of reception will be protected during the nighttime as a consequence of complying with the plane of window sound level limits.

n/a = indicates that Exclusionary Noise Limits are not applicable.

A large number of the structures (i.e., potential PORs) identified in the acoustic environment LSA could potentially be affected by Project activities based on the above analysis. Upon review of orthoimagery and the MOECC NPC-300 classification system presented in Table 11-4, the acoustic environment LSA can be classified as being in a Class 3 area. Baseline sound levels in the acoustic environment LSA are expected to be dominated by some anthropogenic activities and sounds of nature. The MOECC NPC-300 prescribed noise level limits have been adopted to define the expected existing noise levels in the acoustic environment LSA. Therefore, in accordance with NPC-300, baseline noise levels at the PORs are expected to be approximately 45 dBA during the daytime period ( $L_{eq, day}$ ) and 40 dBA during the evening/nighttime periods ( $L_{eq, night}$ ).

## **11.6 Project-Environment Interactions and Pathway Analysis**

The linkages between Project components and activities and potential effects to the acoustic environment are identified and assessed through a pathway analysis (Section 5.4). Potential pathways for effects to the acoustic environment are presented in Table 11-6. Classification of effects pathways to the acoustic environment are also presented in Table 11-6, and detailed descriptions are provided in the subsequent sections.

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**Table 11-6: Potential Effect Pathways for Effects to the Acoustic Environment**

Project Component or Activity	Effect Pathway	Pathway Duration	Mitigation	Pathway Type
<p>Project activities during the construction phase, including:</p> <ul style="list-style-type: none"> <li>■ surveying and flagging;</li> <li>■ clearing and grubbing;</li> <li>■ construction of infrastructure (e.g., access roads, bridges, laydown areas and temporary construction camps);</li> <li>■ staking of structure and guy anchor locations;</li> <li>■ geotechnical investigations;</li> <li>■ foundation installation;</li> <li>■ assembly and erection of transmission structures;</li> <li>■ conductor installation, including cable splicing;</li> <li>■ use of construction camp generators; and,</li> <li>■ clean-up and reclamation.</li> </ul>	<p>Noise emissions from construction activities could increase baseline sound levels at existing PORs</p>	<p>Temporary, with effects limited to construction</p>	<ul style="list-style-type: none"> <li>■ Near residential and recreational areas, parks or campsites, schedule noisy activities as directed by local municipal bylaws</li> <li>■ Comply with local municipal noise by-laws and the MOECC Model Municipal Noise Control Bylaw (i.e., NPC-115).</li> <li>■ Construction activities will occur during the daytime period from 07:00 to 19:00. In the event construction will occur beyond the daytime period, NextBridge will re-evaluate the potential project related effects and if required, review mitigation requirements.</li> <li>■ Ensure that noise abatement equipment on machinery is properly maintained and in good working order.</li> <li>■ Design routes to minimize reversing where possible, which is expected to reduce noise from backup beepers.</li> <li>■ Notify communities along the route of the planned construction schedule before the start of construction.</li> <li>■ Notify Indigenous communities of the overall construction schedule before the start of construction.</li> <li>■ Where reasonable and practical, vehicles and equipment will be turned off when not in use, unless weather and/or safety conditions dictate the need for them to remain turned on and in a safe operating condition.</li> <li>■ Address noise concerns as they arise through a noise complaint process.</li> <li>■ The Owner will develop the environmental and safety orientation program, to be implemented by the Contractor. The orientation program will include details on the expectation that noise levels will be minimized and maintained at minimal levels when working near residences.</li> <li>■ Operate equipment such that impulsive noises are minimized, where possible.</li> </ul>	<p>Secondary</p>
<p>Project activities during the operation phase, including:</p> <ul style="list-style-type: none"> <li>■ maintenance and inspection of conductors;</li> <li>■ maintenance of the preferred route ROW and permanent access roads; and,</li> <li>■ operation of the conductors.</li> </ul>	<p>Noise emissions from operation activities could increase baseline sound levels at existing PORs</p>	<p>Temporary, with effects limited to a short duration, and occurring periodically over the life of the Project</p>	<ul style="list-style-type: none"> <li>■ The electrical transmission line will be designed to minimize noise associated with corona discharge.</li> <li>■ Comply with local municipal noise by-laws and the MOECC Model Municipal Noise Control Bylaw (i.e., NPC-115).</li> <li>■ Maintenance activities will typically occur during the daytime period from 07:00 to 19:00. In the event maintenance will occur beyond the daytime period, NextBridge will re-evaluate the potential project related effects and if required, review mitigation requirements.</li> <li>■ Ensure that noise abatement equipment on machinery is properly maintained and in good working order</li> <li>■ Where reasonable and practical, vehicles and equipment will be turned off when not in use, unless weather and/or safety conditions dictate the need for them to remain turned on and in a safe operating condition.</li> <li>■ Address noise concerns as they arise through a noise complaint process</li> </ul>	<p>Secondary</p>

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## **11.6.1 Pathway Screening**

### **11.6.1.1 No Pathway**

There are structures (i.e., potential PORs) adjacent to the preferred route ROW, as close as within 50 m. Therefore, there are no identified pathways where the pathway would be removed by typical mitigation such that the Project would result in no measurable environmental change in the acoustic environment. Therefore, no “no pathways” are predicted for net effects to the acoustic environment. Subsequently, there is no further discussion of no pathways.

### **11.6.1.2 Secondary Pathways**

In some cases both a Project component or activity (i.e., source) and a pathway may exist, but the Project is assessed as resulting in a minor environmental change, with a negligible net effect on the acoustic environment relative to baseline levels, resulting in a secondary pathway. The pathways described in the following bullets were assessed as secondary and were not carried through to the net effects assessment.

- **Noise emissions from construction activities could increase baseline sound levels at existing PORs**

The Project construction phase will involve various construction activities occurring during the daytime period, up to 12 hours (07:00 to 19:00) per day, at times simultaneously, over a span of approximately two years for the entire length of the preferred route. For preliminary construction planning purposes, the preferred route has been divided into six sections ranging from approximately 45 km to 100 km in length, each with its own crew of workers to complete each construction activity. It is expected that construction activities will be completed sequentially and cover approximately 200 m to 6 km each day, depending on the specific construction activity.

Refer to Section 4.3.1 for an overview of construction activities. Construction activities will be sequentially staggered and, therefore, will not take place concurrently at the same locations. Upon review of the preliminary construction plan for the Project, it was conservatively assumed that as a worst case, flagging and clearing, access road construction, staking, geotechnical investigations and installation of foundations could occur at the same time within an approximately 5 km stretch along the preferred route, with each activity occurring within separate, approximately 1 km segment. Corresponding equipment for these activities was used in combination with estimated sound pressure levels (dBA) at 15 m away from the working equipment to estimate overall noise emissions as a result of Project construction. The actual noise level due to construction equipment will be dependent on its proximity to a POR. This construction scenario is summarized in Table 11-7.

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**Table 11-7: Estimated Noise Emissions from Representative Construction Scenario**

Construction Equipment	Total Quantity	Estimated Sound Pressure Level at 15 m <sup>(a,b)</sup> (dBA)	Construction Activities Simultaneously Operating Across Representative 5 km Length of Preferred Corridor				
			Flagging and Clearing	Access	Staking	Geotechnical Investigation	Foundations
Grader	2	85	Not used	Used	Not used	Not used	Not used
Dump	3	84	Not used	Used	Not used	Not used	Not used
Dozer	3	85	Not used	Used	Not used	Not used	Not used
Excavator	3	85	Not used	Used	Not used	Not used	Not used
Feller	5	85	Used	Used	Not used	Not used	Not used
Skidder	5	85	Used	Used	Not used	Not used	Not used
Processor	5	85	Used	Used	Not used	Not used	Not used
Flatbed	7	84	Not used	Used	Not used	Not used	Used
Drill Rig	1	85	Not used	Not used	Not used	Used	Not used
Small Drill Rig	5	85	Not used	Not used	Not used	Not used	Used
Large Drill Rig	1	85	Not used	Not used	Not used	Not used	Used
Crane	1	85	Not used	Not used	Not used	Not used	Used
Pier Driller	1	85	Not used	Not used	Not used	Not used	Used
Backhoe	2	80	Not used	Not used	Not used	Not used	Used
Forklift	3	80	Not used	Not used	Not used	Not used	Used
Helicopter	1	105	Not used	Not used	Not used	Not used	Used

a) US Department of Transportation 2006.

b) Golder database of similar equipment.

Potential effects on the acoustic environment during construction are anticipated to be greater than during operation. These effects are expected to vary based on type of construction activity and proximity to PORs, but for typical transmission line construction noise effects are expected to be greatest during installation of foundations and cable splicing. It is anticipated that approximately six to ten tower foundations will be installed per segment per day. It is expected that any one location would be exposed to elevated noise levels relative to baseline for the installation of foundations for three to four days as construction progresses.

Cable splicing may use an implosion method that requires the use of explosives which generate an impulsive noise event. This results in a compression force to splice two lengths of conductor together. It is estimated that six conductor splices may occur approximately every 6 km along the preferred route. Once cable splicing is completed at a location, there will be no additional impulsive noise events associated with cable splicing. Due to the sound characteristic expected with cable splicing (i.e., impulsive), nearby affected communities will be notified about the splicing schedule (Pasini 2006). In jurisdictions where noise levels are expected to be elevated for a limited time, notification will be provided (e.g., by mail). Based on the infrequent nature of this activity and its short duration, the net effects associated with splicing are anticipated to be negligible.

Based on the description of the construction activities above, baseline noise levels can be expected to increase, on occasion, near PORs. The change in the acoustic environment due to construction activities is expected to result in a change that may be perceived as being nearly twice as loud when compared to existing levels (i.e., increase of approximately 10 dB) during the daytime period. Construction noise will be temporary in nature and localized within the acoustic environment LSA. Given the staged construction plan, PORs will not be continuously exposed to construction activities that result in an increase in baseline sound levels during the entire construction phase. Due to the staged nature of construction activities, increased noise levels are expected to vary as the

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proximity of PORs differs along the preferred route ROW. The range in increased noise levels associated with construction activities will depend primarily on the number and type of noise sources and their proximity to the PORs.

The net effect of noise emissions from construction activities associated with the Project on daytime equivalent noise levels is considered to be negligible given the assessment results and effective implementation of the mitigation measures described in Table 11-6 and in the EPP (Appendix 4-II). There is no potential for a change in perceived noise levels during the nighttime period given that construction is anticipated to occur during the daytime period (i.e., 07:00 – 19:00). NextBridge will re-evaluate the potential Project related effects and if required, review mitigation requirements if construction will occur beyond the daytime period. There is no potential for an effect on the acoustic environment assessment endpoint (i.e. perceived noise levels will not be twice as loud during daytime and nighttime periods).

### ■ **Noise emissions from operation activities could increase the existing baseline levels at existing PORs**

Refer to Section 4.3.2 for an overview of operation activities. Operation activities with potential effects on the acoustic environment include the following:

- maintenance and inspection of electrical transmission lines;
- maintenance of the Project ROW and permanent access roads; and,
- operation of the electrical transmission line.

Noise emissions associated with operations activities are expected to be minimal. Noise sources and noise levels from maintenance of the preferred route ROW, permanent access roads and inspection activities during operation will be variable, expected to be limited to a short duration, and will occur periodically over the life of the Project. Expected noise sources include equipment for vegetation maintenance, road maintenance and transmission line maintenance. Pickup trucks, ATVs and helicopters will be used for maintenance inspections. The maintenance inspections may indicate that repairs require the use of heavier equipment such as backhoes or cranes. The sound power levels for heavier equipment are provided in Table 11-7 and were considered when assessing the potential noise levels during operation. The mitigation measures presented in Table 11-6 apply to these noise sources.

In addition to noise from maintenance equipment, the operation of the electrical transmission line may be audible at times due to corona discharge. This is typically most audible during adverse weather conditions such as rain, fog and wet snow (Foreman and Onderwater 2003). Designing the electrical transmission line to minimize power losses through the conductor is expected to minimize noise associated with corona discharge.

The net effect of noise emissions from operation activities associated with the Project on daytime and nighttime one-hour equivalent noise levels ( $L_{eq, 1-hour (day, night)}$ ) is predicted to be negligible based on the analysis above and effective implementation of the mitigation measures described in Table 11-6 and in the EPP (Appendix 4-II). There is no potential for an effect on the acoustic environment assessment endpoint (i.e. noise emissions from the Project during the operation phase are within their respective noise level limits at PORs).

### **11.6.1.3 Primary Pathways**

No primary effect pathways were identified for the acoustic environment. Subsequently, there is no further assessment or characterization of net effects, including determination of significance (Section 5.4.3).

## **11.7 Project Effects Assessment (Project Case)**

No primary effect pathways were identified for the acoustic environment as a result of the Project (refer to Section 11.6.1). No further assessment or characterization of net effects, including determination of significance, is required.

## **11.8 Cumulative Effects Assessment (Cumulative Effects Case)**

No primary effect pathways were identified for the acoustic environment as a result of the Project (refer to Section 11.6.1). Consequently, the acoustic environment criterion is not carried forward for assessment of cumulative effects.

## **11.9 Confidence in the Assessment**

The confidence in the effects assessment for the acoustic environment is moderate, considering that the mitigation described in the EPP (Appendix 4-II) is based on accepted and proven best management practices that are well-understood and have been applied to transmission line projects throughout North America. Uncertainty in the assessment has been further reduced by making conservative assumptions, planned implementation of known effective mitigation and monitoring measures, and available adaptive management measures to address unforeseen circumstances should they arise.

## **11.10 Follow-up, Inspection and Monitoring Programs**

No follow-up or inspection programs will be required for the acoustic environment.

## **11.11 Information Passed on to Other Components**

Results of the acoustic environment assessment were reviewed and incorporated into the following components of the EA:

- Wildlife and Wildlife Habitat (Section 14);
- Socio-Economics (Section 18); and,
- Human Health (Section 21).