Project Profile

Project Name:	Low Frequency Noise and Meteorological Condition Validation Study
Project Number:	QOL-2022-02
Proponent:	Patching Associates Acoustical Engineering Ltd.
Funding Envelope:	Operations—Local issues
Timeframe:	January 3, 2022 to December 31, 2022

Project objectives

The objectives of this study are twofold:

1. identify and validate new methods for diagnosing and understanding meteorological sound propagation conditions and low frequency noise risk that are not effectively covered off with current guidelines or best practices. This includes investigation processes for distant noise sources beyond 1500m as well as consideration of variable weather conditions.
2. provide opportunities for local contractors to gain experience in the field of acoustics and to evaluate the applicability of new lower cost sensors technology; both of which will reduce barriers for operators to gather more data on their operations and mitigation efforts.

Project Description

This project aims to assess and recommend improved methods for predicting and measuring low frequency noise in northeast B.C. as well as establishing a framework for operators to factor varying weather conditions into their mitigation and stakeholder engagement efforts.

Experience in northeast B.C. finds that, even with the current guidelines and best practices, quality of life concerns around noise persists, sometimes beyond 1500m. Specifically, intermittent low frequency noise concerns occur in some areas, even when noise levels are within existing guidelines and best practices. Experience in northeast B.C. also points to high variability in noise impacts under a range of meteorological conditions. While this variability is well known qualitatively, the current best practices do not provide mechanisms to quantify, and by extension plan, for the observed variability.

Methodologies outlined in current noise guidelines rely on international standards to measure and model noise emissions. Current published accuracy for the most often used environmental modeling standard are limited beyond 1000m due to meteorological variations and are focused on worst case downwind propagation. Current requirements for noise monitoring equipment result in costly, highly precise, noise monitoring studies focused on demonstrating regulatory compliance, reducing emphasis on more practical noise source identification. These limitations create uncertainty for noise mitigation design as well as noise complaint investigation because low frequency noise sources are often

intermittent and difficult to corelate to specific sources and can be several kilometers from the complaint.

Project approach

The project will involve the following four phases:

1. Literature review and monitoring program design:
    - Selecting facilities and validation study areas.
    - Analyzing and acquiring lower cost sensors.
    - Drafting the field monitoring plan for winter and summer studies.
2. Winter field validation study:
    - Conducting winter noise monitoring for 6-8 weeks.
3. Summer field validation study:
    - Conducting summer noise monitoring for 6-8 weeks.
4. Final reporting and recommendations.

Project deliverables

The deliverables from this project include the following:

1. Final report—containing the following:
    - Results of validation studies, including upwind and downwind validation and guidelines for use in planning and designing facilities.
    - Recommended process for complaint investigations that fall outside current guidelines, including opportunities and recommended applicability to use new lower cost sensors and methods.