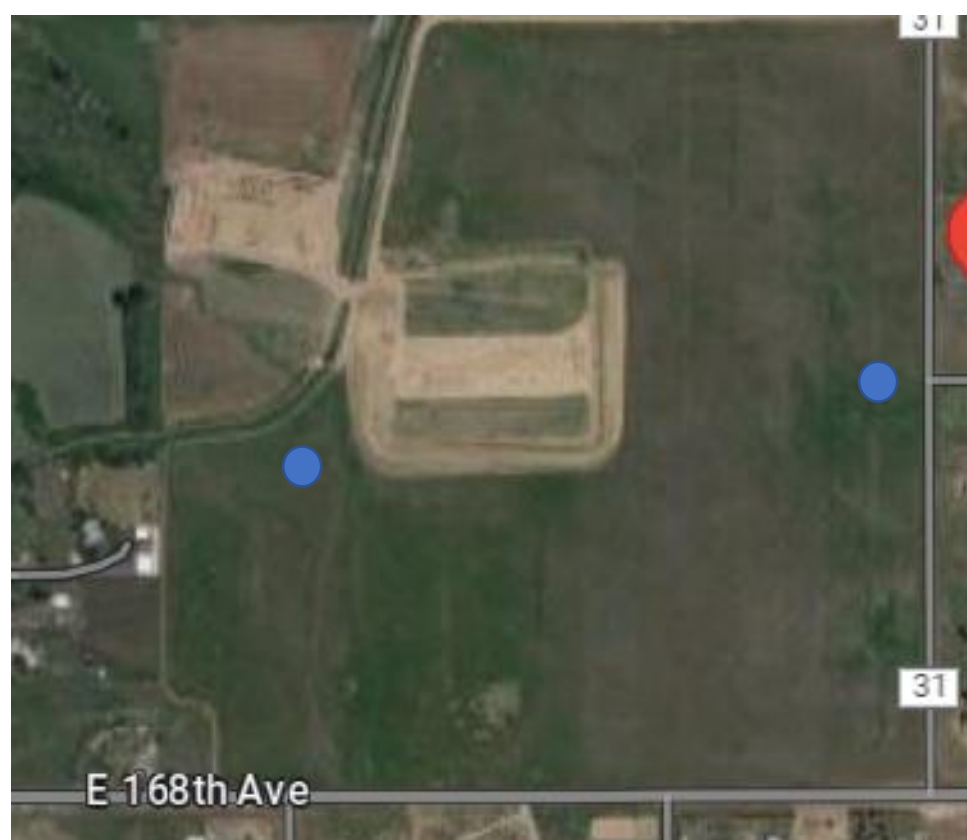


Monitoring Noise from Oil and Gas Development

Measurements

Ottensen Pad Monitoring Locations



Monitoring Device



Larson Davis NMS044

- Field-deployed noise monitoring equipment
- Solar panel powered

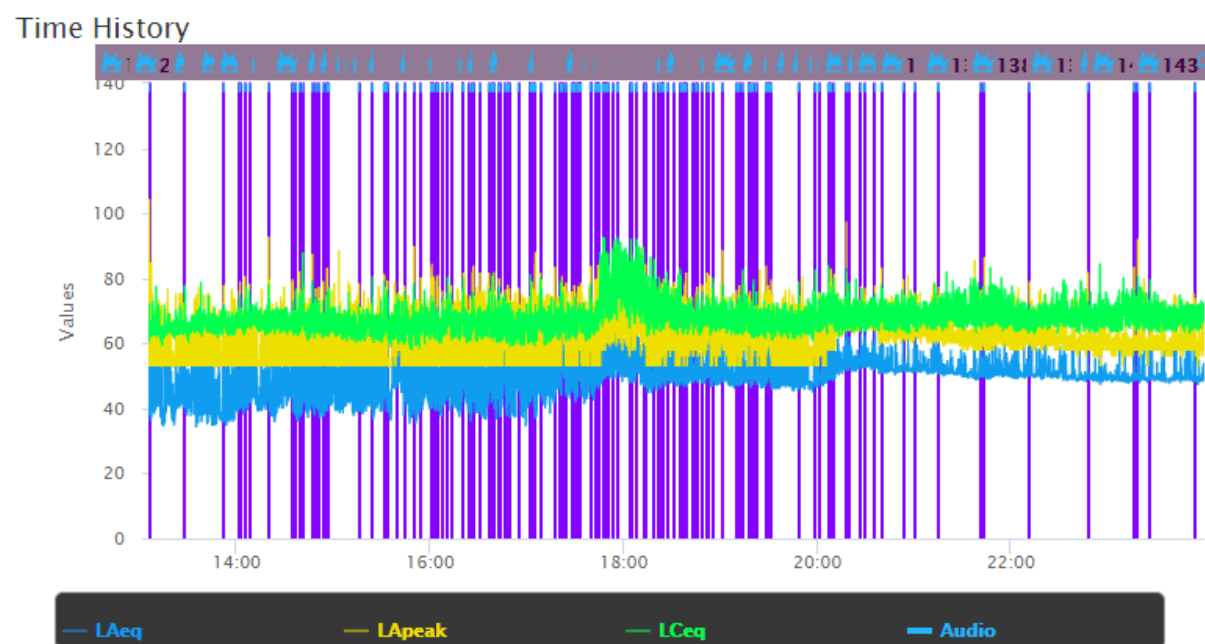
Measurements

- Continuous noise measurement
- 1-second intervals, dBA, dBC
- 1/3 Octave bands for noise character
- Triggered recording for review of noise sources

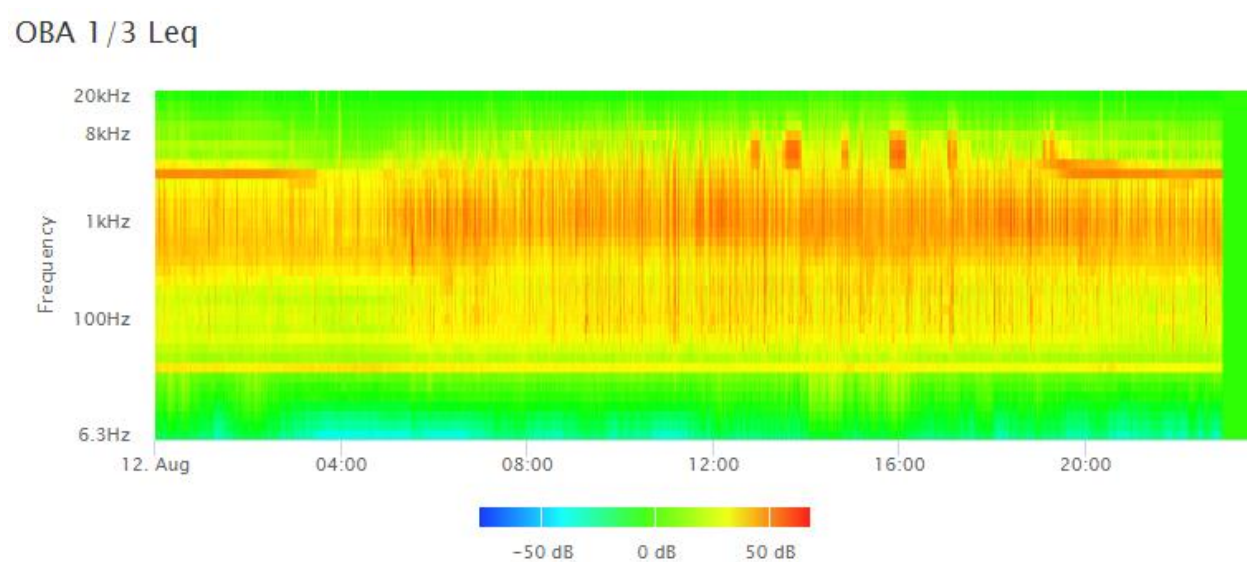
Example Data

Data collected 8/11-8/12/2023 during drilling operations, not wind corrected

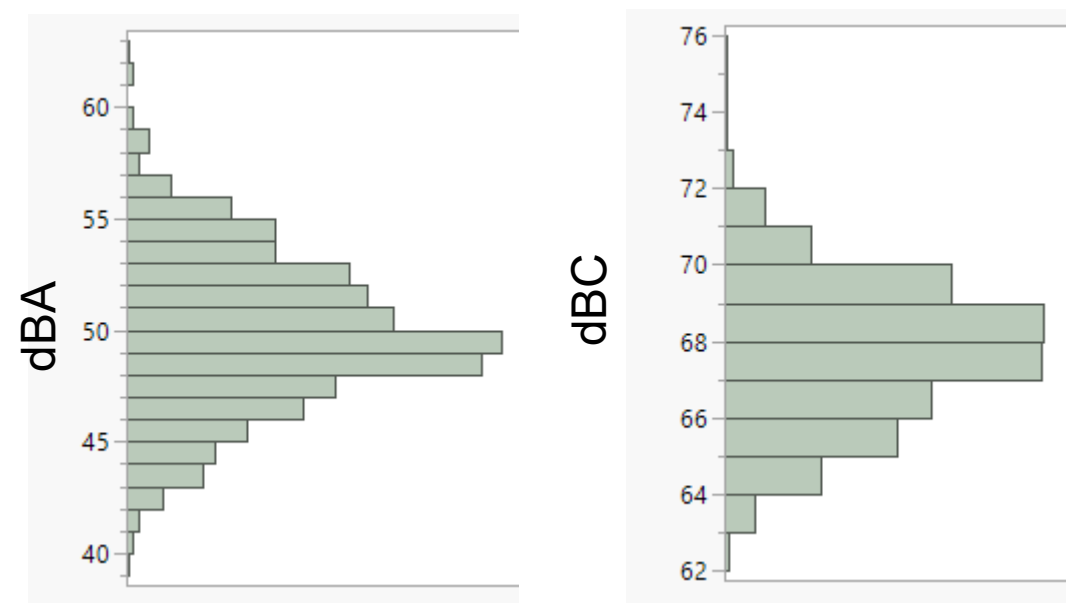
Average Noise Levels in dBA and dBC (8/11)



Noise Frequency Levels (8/12)



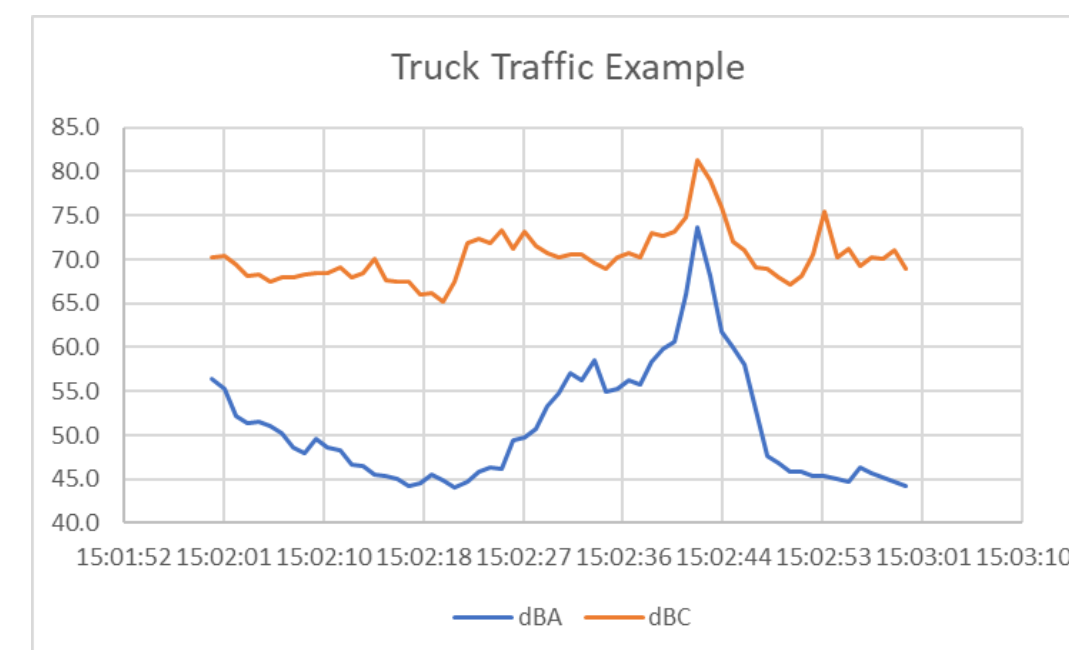
Distribution of One-Minute Average Noise Levels (8/12)



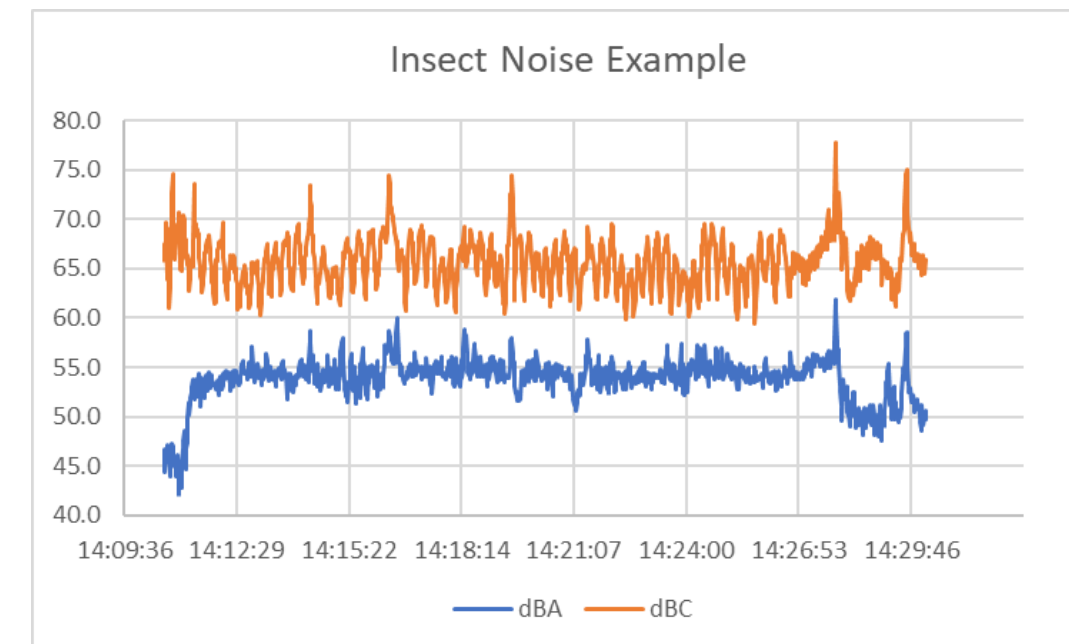
24-Hour Summary (8/12)

Description	Level
Leq: average level over monitoring period (dBA)	51.2 dBA
Leq: average level over monitoring period (dBC)	68.0 dBC
Leq-Day: Average sound pressure level (7 AM - 7 PM)	51.7 dBA
Leq-Night: Average sound pressure level (7 PM - 7 AM)	50.3 dBA
Ldn: Day-night average sound level	57.0 dBA
L10: Noise level exceeded 10% of the time	54.4 dBA
Lpeak: Peak noise level measured (A-weighted)	92.3 dBA
Lpeak: Peak noise level measured (C-weighted)	96.0 dBA

Example of Noise from Truck Traffic (8/12)



Example of Noise from Insects (8/12)



Future Directions

- Wind correction (> 5 mph)
- Identification of specific noise types and sources via recordings
- Identify background levels
- Additional noise metrics excluding truck traffic
- Compare levels to other oil and gas operations