

## Report Series K: Noise

This environmental data release, Noise, is the 11th in the Pebble Partnership's Pre-Permitting Environmental and Socio-Economic Data Report series. The purpose of the Pebble noise study is to describe baseline noise levels and characterize the existing noise environment in and around the communities of Iliamna, Newhalen, Nondalton and Pedro Bay. The report also provides a brief introduction on the science of acoustics to help the reader better understand study results.

Since 2004, the Pebble Partnership has retained independent environmental consultant Michael Minor and Associates to conduct noise studies throughout the Pebble Project study area. The study area was characterized by a series of on-site inspections and noise measurements designed to meet U.S. Environmental Protection Agency requirements. These data describe the existing noise environment and will provide a baseline for comparison against predicted noise associated with Pebble Project development and operations.

### Background

Human response to noise is subjective and can vary greatly from person to person. Factors that can affect individual response include loudness, frequency, amount of background noise present before an intruding noise, and the nature of the work or activity (e.g., sleeping) that noise affects.

Sound is defined as any pressure variation that the human ear can detect.

Air pressure variation for this study is measured on the logarithmic decibel (dB) scale which provides a representative measure of how the human ear reacts to air pressure. A 10 decibel (dBA) change in noise level is judged by most people as a doubling of sound. The smallest change in noise level that a human ear can perceive is about 3 dBA; increases of 5 dBA or more are usually noticeable. Normal conversation ranges between 44 and 65 dBA when the people speaking are three to six feet apart.

Noise levels in a quiet rural area at night are typically between 32 and 35 dBA. Nighttime noise levels in quiet urban settings range from 40 to 50 dBA. Noise levels during the day in a noisy urban area are frequently as high as 70 to 80 dBA. Noise levels above 110 dBA become intolerable and painful, while levels higher than 80 dBA over continuous periods can result in hearing loss. Constant noises tend to be less noticeable than irregular or periodic noises.

### Pebble Noise Studies

Noise monitoring was performed using short-term and long-term methods. All noise measurements were taken in accordance with the American National Standards Institute (ANSI) procedures for community noise measurements. Measurement locations were at least five feet from any solid structure to prevent acoustical reflections and were at a height of five feet above the ground as required by ANSI standards.



MI Noise Monitoring Site—North Newhalen River Road

**Overall, the measured noise levels in all four communities and along the connecting roadways are very similar to noise data collected in other parts of Alaska, and are in the range expected for rural areas with low population.**

Ambient noise levels were measured at 15 locations in the study area: three locations in Iliamna, two in Newhalen, one near the post office and medical building between Iliamna and Newhalen, one by the Iliamna airport, two north of the airport along Newhalen River Road, four in Pedro Bay, and two in Nondalton. Land uses in these areas include residential, commercial, and light industrial, as well as undeveloped lands.

Overall, the measured noise levels in all four communities and along the connecting roadways are very similar to noise data collected in other parts of Alaska, and are in the range expected for rural areas with low population. Major noise sources included floatplanes, fixed-wing aircraft, helicopters, vehicle traffic including snow machines during winter and ATVs during summer, general construction and maintenance, residential and community activities, birds and wind. Some of the highest noise levels measured were takeoffs by floatplanes, which ranged from 90 to over 100 dBA  $L_{max}$  along the waterfront in Iliamna.

Noise Source or Activity	Sound Level (dBA)	Subjective Impression	Relative Loudness (human judgment of different sound levels)
Jet aircraft takeoff from carrier (50 feet)	140	Threshold of pain	64 times as loud
50-horse power siren (100 feet)	130		32 times as loud
Loud rock concert near stage, Jet takeoff (200 feet)	120	Uncomfortably loud	16 times as loud
Float plane takeoff (100 feet)	110		8 times as loud
Jet takeoff (2,000 feet)	100	Very loud	4 times as loud
Heavy truck or motorcycle (25 feet)	90		2 times as loud
Garbage disposal (2 feet) Pneumatic drill (50 feet)	80	Moderately loud	Reference loudness
Vacuum cleaner (10 feet), Passenger car at 65 mph (25 feet)	70		1/2 as loud
Typical office environment	60		1/4 as loud
Light auto traffic (100 feet)	50	Quiet	1/8 as loud
Bedroom or quiet living room Bird calls	40		1/16 as loud
Quiet library, soft whisper (15 feet)	30	Very quiet	
High quality recording studio	20		
Acoustic Test Chamber	10	Just audible	
	0	Threshold of hearing	

Sources: Beranek (1988) and U.S. EPA (1971).

*\*Preliminary data only. Do not cite or quote.*

The Noise data report, released as part of the Pebble Partnership's Pre-Permitting Environmental & Socio- Economic Data Report Series, is available online at [www.pebblepartnership.com](http://www.pebblepartnership.com).