



OceanaGold New Zealand Ltd
Fourth Quarter 2021 - Summary Report
Noise Levels in Waihi

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1. Summary

Compliance against the consented noise limit(s) and New Zealand Standards was achieved during the fourth quarter of 2021. Two mean corrected noise level (MCNL) assessments were made during the period; one assessment had all three readings in category three meteorological conditions, the second assessment had one reading in category four meteorological conditions and the remaining readings in category three.

Seven single compliance readings were made during the quarter. Two single corrected measurement levels (SCML) were taken in suitable met conditions and all were compliant.

Adverse wind conditions (>3 m/s), as recorded at the Kenny St meteorological station, occurred on four of the monitoring occasions. Follow up monitoring in suitable meteorological conditions was not possible during the period due to continued wind speeds >3 m/s, however SCML measurements were well below consented limited.

Seven measurements were made of surface-related activities (e.g. ventilation) supporting underground operations. Day-time measurements were compliant with noise restrictions and returned levels ranging from 40 to 45 dB; the dominating noises were traffic, birds and an excavator. Together, these readings returned a MCNL of 43 dB. Night-time measurements of stockpiling and processing operations recorded levels between 31 and 36 dB.

2. Introduction

This report provides a summary of noise measurements and assessments undertaken by OceanaGold (NZ) Ltd Waihi Operations (OceanaGold) for the fourth quarter of 2021. The report is prepared to comply with the requirements of five consents:

- Hauraki District Council (HDC) Land Use Consent (LUC) for Project Martha (LUC 202.2018.857.1, condition 26A) OceanaGold is required to submit quarterly summary reports to Council on representative noise levels.
- Under the Noise Conditions of the LUC for the Favona Underground Mine (No. 85.050.326.E, condition 9) a summary report is required at the end of each 3-month period from commencement to completion of work.
- Under the Noise Conditions of the LUC for the Trio Underground Mine (RC-15774, condition 6d) a summary report is required at the end of each 3-month period from commencement to completion of work.
- Under the Noise Conditions of the LUC for the Correnso Underground Mine (RC-202.2012, condition 11d) a summary report is required at the end of each 3-month period from commencement to completion of work.

For exploration drilling operations, the conditions set out in section 8.3.1 of the Hauraki District Plan apply. Any monitoring of these activities is also included in this report.

3. Methodology

Sound measurements and assessments by OceanaGold comply with the consent conditions and the New Zealand Standards *NZS 6801:2008 Acoustics - Measurement of Environmental Sound and 6802:2008 Acoustics - Environmental Noise*.

Compliance noise is measured for a minimum of 15 minutes as required under the consent conditions. Compliance readings cannot always be made on every site visit or check due to excessive wind conditions (i.e. greater than 5 m/s).

Monitoring checks are made in response to complaints whenever necessary; initially to verify the noise level and subsequently (if necessary) to determine the effectiveness of any mitigating actions and/or the effect of changing wind conditions (changing wind strength or direction influences noise transmission between the mine and the receiver).

OceanaGold uses noise monitoring procedures to ensure conformance to the above standards and consent conditions, and to support noise mitigation protocols documented in the site Noise Management Plan. The noise mitigation protocols require review of wind conditions that could potentially result in noise levels

generating complaints. Monitoring has shown that wind speeds over 3 m/s (as measured at the OceanaGold meteorological station at Kenny St) are likely to increase mine noise downwind of an activity to levels that generate complaints. When such wind conditions occur, OceanaGold implements mitigating actions to reduce noise levels where practicable. During periods when high frequency sounds such as birds, cicadas and crickets become the controlling noise, a filter can be applied to noise measurements to exclude four and eight kHz (kilo-hertz) and enable analysis of the lower frequency noise levels (i.e. those usually associated with mine operations).

Wind has a significant influence on sound propagation. Sound measurement and assessment must take the effect of wind into account. Sound measurements are taken in conditions ranging from nil wind up to 5 m/s at the receiver (*NZS 6801:2008 Acoustics - Measurement of Environmental Sound*). Wind greater than 5 m/s is generally unacceptable for monitoring due to wind noise effects in the nearby environment (e.g. trees) and on the microphone.

Downwind, wind speeds of 3 - 5 m/s are considered marginal due to propagation of sound by wind from source to receiver. Conditions like those for which the compliance limits are set generally occur when wind speeds are less than 3 m/s (*Hegley, 2003: Evidence of Nevil Hegley – Favona Underground Project 2003 Final – 11/11/03*).

Wind speeds are recorded at the OceanaGold met station. These wind readings are assumed to represent the general wind conditions across Waihi and at the noise source (e.g. the mine).

Other meteorological factors influencing the overall sound environment include solar radiation, cloud cover, sunrise and sunset times, wind direction and the direction from source to receiver. These factors were also measured to derive a meteorological stability rating at the time of monitoring. Meteorological stability categories of 4 (neutral) or 5 (slightly positive) are considered suitable meteorological influences on sound propagation and are used to determine noise compliance (*NZS 6801:2008 Acoustics - Measurement of Environmental Sound* (HDC LUC 97/98-105, Condition 3.8 (e))).

4. Results

4.1. General

Monitoring activity for the period is shown in Table 1.

Table 1: Noise monitoring activity

	Number of days checked	Number of days measured	Number of checks (compliance & other)	Number of complaint days	Number of complaint checks
October	0	0	0	0	0
November	0	0	0	0	0
December	3	3	7	0	0
QR Total	3	3	7	0	0

Note: the complaint monitoring referred to above relates to follow-up monitoring from the previous quarter.

4.2. Wind

Adverse wind conditions occurred at the met station four times (4/7) during the monitoring occasions (see Table 2). While it is the general prevailing wind condition as measured at the met station that primarily affects noise propagation, measurements may be made under adverse conditions if the wind at the receiver or at street level is generally more favourable for monitoring. Even then, representative noise measurements of mining activities are not always possible due to wind noise.

Table 2: Percentage of monitoring time average wind speeds greater or equal to 3 m/s

	Receiver	Met Station
October	0%	0%
November	0%	0%
December	0%	57%
QR Total	0%	57%

29% (2/7) of the compliance measurements made in the reporting period were in suitable met conditions (as measured at the met station). Other conditions (wind direction, solar radiation, and cloud cover) also influence suitable met assessments. Monitoring in suitable met conditions occurred during a smaller number of occasions during this reporting period as the last reporting period (6) due to higher winds during this reporting period.

4.3. Compliance

No mine dominated SCML exceeded compliance levels in suitable met conditions during the reporting period (see Table 3).

Table 3: Summary of Single Corrected Measured Levels (SCML)

	Total SCML calculations	Mine-dominated SCML over (limit + 5 dB)	SCML in suitable met	Mine-dominated SCML over in suitable met
October	0	0	0	0
November	0	0	0	0
December	7	0	2	0
QR Total	7	0	2	0

Two MCNL assessments were made during the quarter. Neither assessment had all contributing measurements in suitable met conditions (see Table 4), however both were well within the MCNL limit.

Table 4: Summary of Mean Corrected Noise Levels (MCNL)

	Total MCNL calculations	Marginal MCNL	MCNL 5 dB over limit	MCNL in suitable met	MCNL over limit in suitable met
October	0	0	0	0	0
November	0	0	0	0	0
December	2	0	0	0	0
QR Total	2	0	0	0	0

4.4. Complaints

There were no complaints in relation to mining-related noise (Figure 1) during the reporting period (note: blast related issues are documented in the quarterly vibration report).

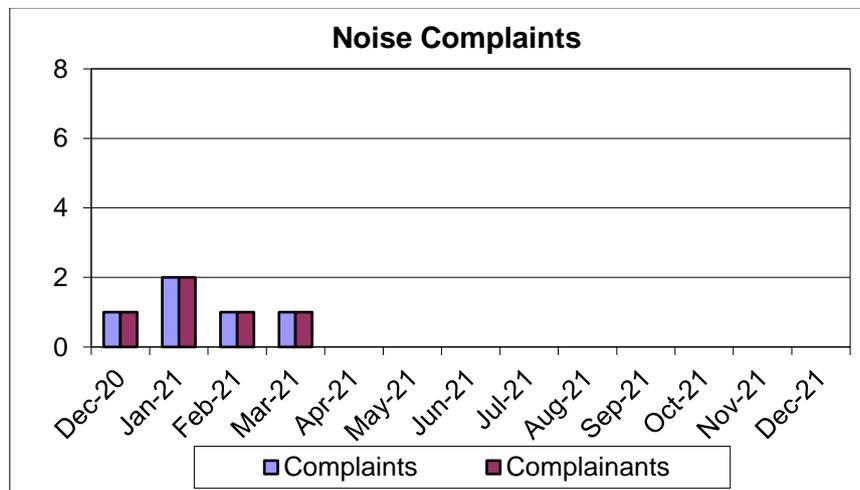


Figure 1: Noise complaint history

4.5. Operations Assessment

4.5.1. Martha Pit

No significant works were conducted in the pit during the quarter. The pit is essentially in 'lock-down' with only essential maintenance (drainage, weed control, and security) and low-impact geotechnical monitoring being undertaken.

4.5.2. Mill

The Mill resumed processing operations in October 2020. Night-time activities at the Mill were below night-time noise limits with levels ranging between 31 and 36 dB (MCNL 33 dB). The controlling sounds for these readings were generally cicadas and wind.

4.5.3. Underground Operations

Three compliance measurements were made of surface-related activities (e.g. stockpiling and ventilation) supporting underground operations during the quarter:

- All daytime measurements (monitoring the Trio Vent Shaft) were compliant; levels ranged from 40 to 45 dB. The dominant sounds were traffic and birds.

4.5.4. Exploration/Drilling

Near-mine exploration drilling during the quarter continued in a diminished capacity in various locations: underground and above the Rex orebody in Waihi township. Drilling near to private residences has been kept to daytime-only, recognising the activity is unlikely to comply with night-time noise restrictions. No noise related complaints have been received as a result of this drilling.

5. Mitigation

5.1. Mine & Exploration

Commitment to the management and mitigation of mine noise was sustained during the reporting period. In accordance with the Noise Management Plan (noise mitigation), no yellow assessments or red assessments were determined during the quarter.