



Noise Summary Report

Fourth Quarter 2022

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1. Summary

Compliance against the consented noise limit(s) and New Zealand Standards was achieved during the fourth quarter of 2022. Three mean corrected noise level (MCNL) assessments were made during the period; one of these had all three readings taken in suitable meteorological conditions.

Ten single compliance readings were made during the quarter. Four 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 six of the ten monitoring occasions.

Ten measurements were made of surface-related activities (e.g. stockpiling and ventilation) supporting underground operations, and all were compliant with noise restrictions. Daytime measurements returned levels ranging from 41.2 to 47.1 dB; the dominating noise was birds. Together, these readings returned MCNL's of 43.6 and 44.2 dB. Night-time measurements recorded levels between 40.1 and 43.4 dB; the noises were not mine dominant as the controlling noises were crickets and light rain. These readings returned a MCNL of 41.4 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 2022. 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	1	0
November	1	1	6	0	0
December	5	5	14	0	0
QR Total	6	6	20	1	0

4.2. Wind

Adverse wind conditions (>3 m/s) at the met station occurred on six (6/10) of the compliance 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. Periods of high wind strengths above 5 m/s were not experienced during monitoring this period.

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

	Receiver	Met Station
October	0%	0%
November	0%	100%
December	0%	43%
QR Total	0%	60%

40% (4/10) of the compliance measurements made in the reporting period were in suitable met conditions (as measured at the met station). Adverse wind conditions can influence suitable met assessments, as well as other factors including wind direction, solar radiation, and cloud cover. Monitoring in suitable met conditions occurred less during this reporting period compared to the last (86%) due to higher wind speeds 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 readings	Mine dominated SCML over (limit + 5 dB)	SCML in suitable met	Mine dominated SCML over in suitable met
October	0	0	0	0
November	6	0	0	0
December	4	0	4	0
QR Total	10	0	4	0

Three MCNL assessments were made during the quarter. One of these had all contributing measurements in suitable met conditions (see Table 4) and was just outside the MCNL limit for night-time (41.4 dB), however the noises were not mine dominant. The other two MCNL assessments were well within limits and overall, full compliance was achieved for the period.

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	2	0	0	0	0
December	1	1	0	1	0
QR Total	3	1	0	1	0

4.4. Complaints

There was one noise complaint (Figure 1) and one concern raised during the reporting period, both related to the Skywork helicopter. Due to the short operational durations of the helicopter, no follow up noise checks were completed for the complaint.

(Note: blast related issues are documented in the quarterly vibration report).

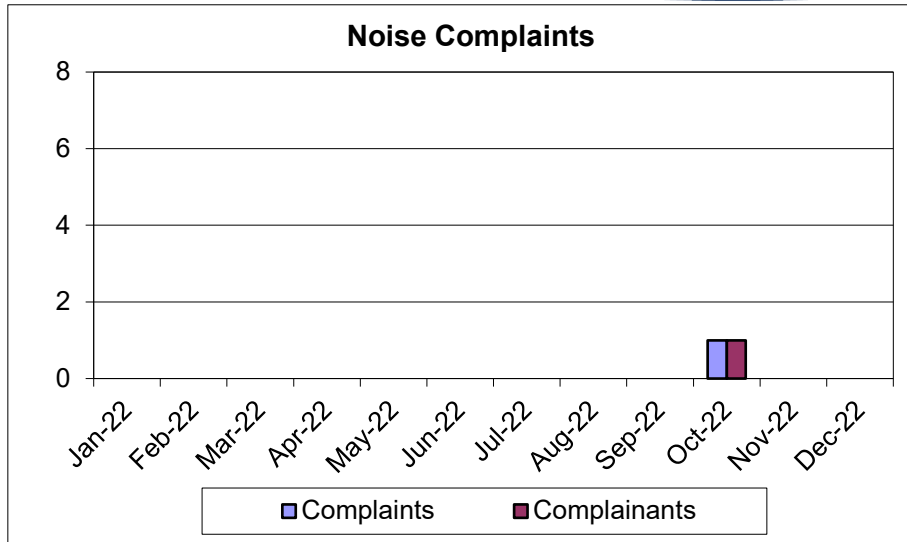


Figure 1. Noise complaints 2022.

4.5. Operations Assessment

4.5.1. Martha Pit

Exploration drilling from the surface of the pit occurred during the quarter, as well as work to replace earth cable along the conveyor. No noise complaints have been received in relation to this work. Four readings were taken as noise level checks relating to the work along the conveyor; all were within limits. No other significant works were conducted in the Martha Pit. 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/Processing

The mill has continued processing operations as usual during the quarter. Night-time activities at the mill were compliant with noise limits and levels ranged between 40.1 and 43.4 dB (MCNL 41.4 dB), with crickets being the dominating noise.

4.5.3. Underground Operations

Ten compliance measurements were made of surface-related activities (e.g. stockpiling and ventilation) supporting underground operations during the quarter. Daytime measurements from monitoring the Trio Vent Shaft were compliant; levels ranged from 42.8 to 44.2 dB (MCNL 43.6 dB).

4.5.4. Exploration/Drilling

Near-mine exploration drilling during the quarter continued in a diminished capacity underground and in the Martha Pit. A new piezometer was drilled north of the Martha Pit during the period and six readings were taken as noise level checks; all were within limits. 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 or red assessments were determined during the quarter.