



OceanaGold New Zealand Ltd

First 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 first quarter of 2021. Three mean corrected noise level (MCNL) assessments were made during the period; one had all contributory readings in suitable meteorological conditions as required by the measurement standards and all were within consent limits.

Nine 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 44% of the monitoring occasions.

One marginal reading was recorded in response to a noise-related complaint resulting in one yellow assessment. Four additional noise readings were conducted at this location, three of which returned compliant noise results, and one which was marginal but was recorded during adverse wind conditions. Subsequently noise compliance was achieved, reverting the assessment from yellow to green status. One measurement at another location at the end of the reporting period was identified as producing considerable noise during a routine check; this contributed to one red assessment being determined (as per the Noise Management Plan – Noise Mitigation) and mitigating actions put in place. Mitigating actions continued into the next quarter and the resolution will be addressed in the next reporting period.

Six single measurements were made of surface-related activities (e.g. stockpiling and ventilation) supporting underground operations. Day-time measurements were compliant with noise restrictions and returned levels ranging from 43 to 48 dB; the dominating noises were cicadas, traffic and birds. Night-time measurements of stockpiling and processing operations recorded levels between 32 and 43 dB. Together, these night readings returned a MCNL of 39 dB.

2. Introduction

This report provides a summary of noise measurements and assessments undertaken by OceanaGold (NZ) Ltd Waihi Operations (OceanaGold) for the first 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.
- Under the Noise Conditions of the LUC for the Martha Drill Drive Project (MDDP) (LUSE-202.2017.664.001, 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
January	2	2	7	0	0
February	1	1	1	1	1
March	4	4	8	2	4
QR Total	7	7	16	3	5

4.2. Wind

Adverse wind conditions occurred at the met station for 44% (4/9) of 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.

Periods of high wind strengths during this monitoring period were greater than in the previous quarter (14% adverse).

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

	Receiver	Met Station
January	0%	33%
February	0%	0%
March	0%	50%
QR Total	0%	44%

44% (4/9) 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 on four occasions during this reporting period, this result was the similar to the previous quarter.

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
January	3	0	1	0
February	0	0	0	0
March	6	0	3	0
QR Total	9	0	4	0

Three MCNL assessments were made during the quarter. One assessment had all contributing measurements in suitable met conditions (see Table 4); this measurement was compliant with the consented noise 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
January	1	0	0	0	0
February	0	0	0	0	0
March	2	1	0	1	0
QR Total	3	1	0	1	0

4.4. Complaints

There were four noise complaints received by two complainants during the reporting period. The first complainant had concerns related to unidentified noise which the complainant suspected to be mine-related (following on from the suspected generator noise outlined in the 2020 Q4 noise report). Responders to the complainant reported the sound inaudible and noise monitoring confirmed compliance within noise limits. Ongoing liaison is progressing with the complainant to investigate the issue.

The second complainant raised two complaints in relation to construction noise generated from the Tailings Storage Facility (TSF1a) crest raise. In response to the complaint, the following occurred: Environmental personnel conducted a continuous noise reading, and four additional single readings at the property to determine the influence of noise from TSF1a crest raise. One reading returned a marginal value of 53.9 dB but was recorded during adverse wind conditions. The other readings were below 50 dB, and the MCNL for the noise assessment was compliant (50 dB). In addition, an onsite inspection of the construction site was undertaken while operational, and staff reported that the sound did not appear out of the ordinary.

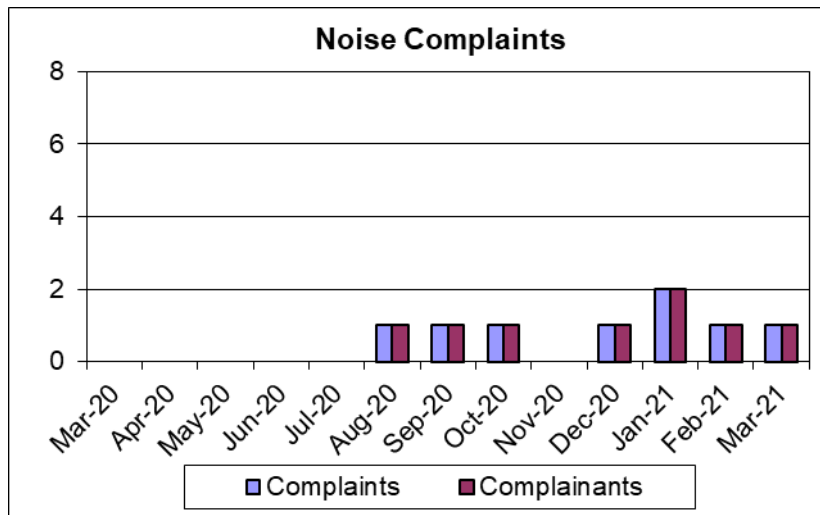


Figure 1: Noise complaint history

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 the exception of one reading, with levels ranging between 32 and 43 dB. The controlling sounds for these readings were generally trucks (Polishing Pond Stockpile works) and traffic noise, but the elevated night-time reading of 43 dB was the result of party/social gathering on Barry Road. Further night-time readings are now scheduled to commence monthly, to capture and identify any developing mine-related night-time noise during the next reporting period.

4.5.3. Underground Operations

Seven 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 43 to 48 dB. Future monitoring and active management will be continued to ensure compliance is maintained at this location. The dominant sounds were cicadas, traffic and birds.

4.5.4. Exploration/Drilling

Near-mine exploration and geotechnical drilling during the quarter continued in a diminished capacity in various locations: underground, and around the outside of the pit. Drilling near to private residences has been kept to daytime-only, recognising the activity is unlikely to comply with night-time noise restrictions. During a routine check of day-time drilling activities, one reading identified that the activity was producing considerable noise, albeit in adverse wind conditions and with several unrelated noise contributions. This occurred at the end of the quarter, contributing to one red assessment being determined (as per the Noise Management Plan – Noise Mitigation) and mitigating actions put in place. These mitigating actions have continued into the next quarter and the outcomes will be addressed during the next quarterly noise report. No night-time drilling was undertaken.

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), one yellow assessment

was resolved during the quarter and reverted to a green status. One red assessment was determined during the quarter and has had mitigation actions put in place (refer to section 4.5.4).