COAL & ALLIED

Managed by Rio Tinto Coal Australia

Hunter Valley Operations

Monthly Environmental Report

January 2017

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CONTENTS

Figures

Tables

Revision History

Version No.	Person Responsible	Document Status	Date
1.0	**Environmental Advisor**	**Final**	**27/02/2017**

1.0 INTRODUCTION

This report has been compiled to provide a monthly summary of environmental monitoring results for Hunter Valley Operations (HVO) as described in the Hunter Valley Operations Online Communication Plan. This report includes all monitoring data collected for the period 1st January to 31st January 2017.

2.0 AIR QUALITY

2.1 Meteorological Monitoring

HVO maintains two meteorological stations; 'Corporate' and 'Cheshunt' (Refer to Figure 4: Air Quality Monitoring Location Plan).

2.1.1 Rainfall

Rainfall for the period is summarised in Table 1, the 2017 trend and historical trend are shown in Figure 1.

Table 1: Monthly Rainfall HVO

2017	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
January	26.6	26.6

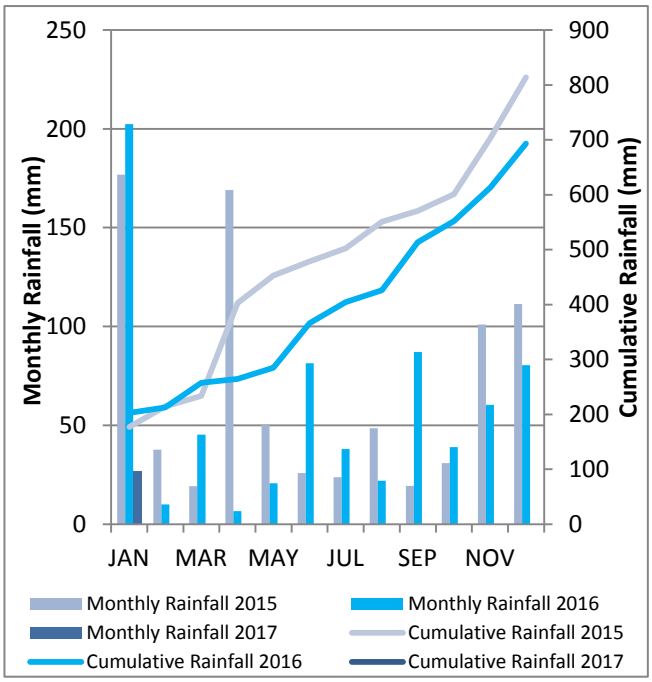

Figure 1: Year to Date Rainfall Summary 2017

2.1.2 Wind Speed and Direction

South-Easterly winds were dominant during January as shown in Figure 2 (HVO Corporate) and Figure 3 (HVO Cheshunt).

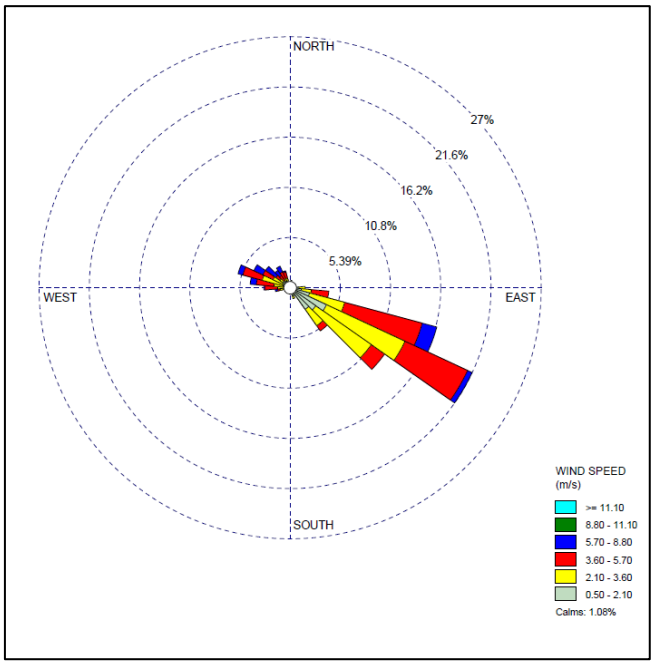

Figure 2: HVO Corporate Wind Rose – January 2017

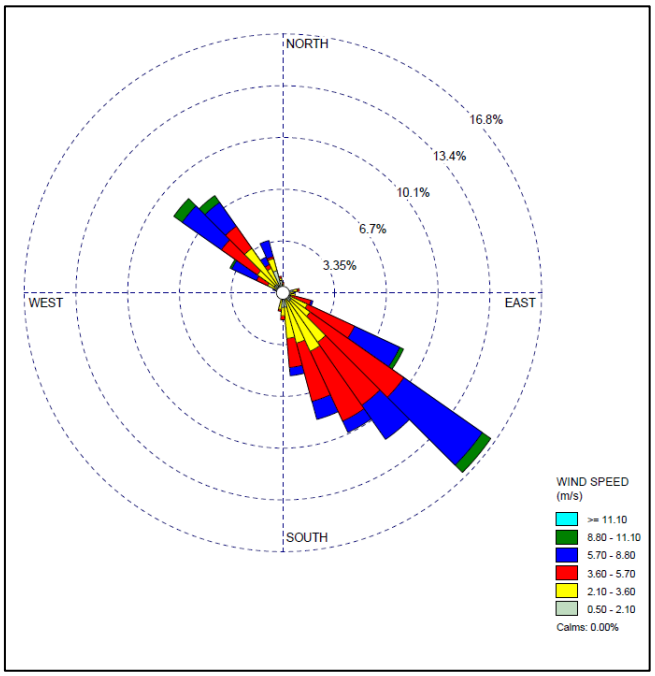

Figure 3: HVO Cheshunt Wind Rose – January 2017

Figure 4: Air Quality Monitoring Location Plan

2.2 Depositional Dust

To monitor regional air quality, HVO operates and maintains a network of nine depositional dust gauges, situated on private and mine owned land surrounding HVO.

Figure 5 displays insoluble solids results from depositional dust gauges during the reporting period compared against the year-to-date average and the annual impact assessment criteria.

During the reporting period the Warkworth monitor recorded a monthly result above the long term impact assessment criteria of 4.0 g/m^2 per month. The field notes associated with the Warkworth monitor confirm the presence of insects and vegetation. As such the result is considered contaminated and will be excluded from calculation of the annual average.

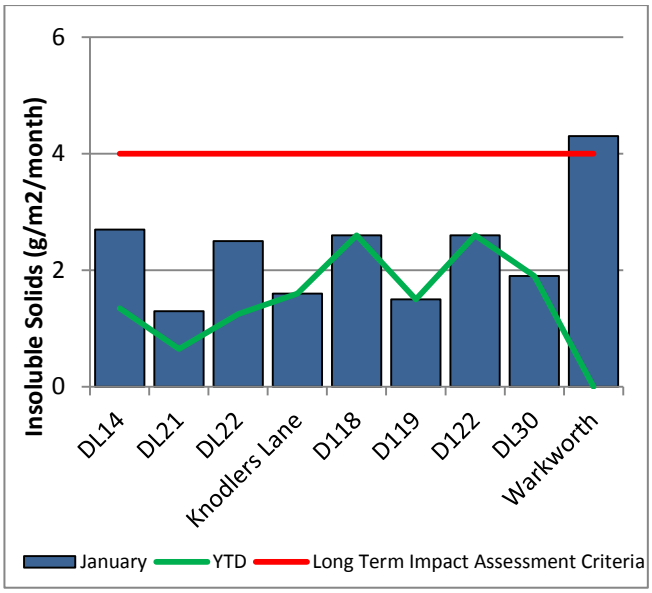

Figure 5: Depositional Dust Results – January 2017

2.3 Suspended Particulates

Suspended particulates are measured by a network of High Volume Air Samplers (HVAS) measuring Total Suspended Particulates (TSP) and Particulate Matter <10µm (PM_{10}). The location of these monitors can be found in Figure 4. Each HVAS was run for 24 hours on a six-day cycle in accordance with EPA requirements.

2.3.1 HVAS PM_{10} Results

Figure 6 shows individual PM_{10} results at each monitoring station against the short term impact assessment criteria of 50µg/m^3.

On 18/01/2017 four HVAS PM_{10} units recorded results greater than the short term (24hr) PM_{10} impact assessment criteria; Long Point (135 µg/m^3), Knodlers Lane (51 µg/m^3), Cheshunt East (64 µg/m^3) and Glider Club (64 µg/m^3).

Investigation indicates that the Long Point HVAS failed to collect valid samples on the 18th January due to local livestock impacting the monitor. The proximity of the monitor to livestock is being increased, through the relocation of a nearby chook yard and also a demountable horse yard away from the monitor. Investigation indicates that that the likely HVO contribution to the results at Knodlers Lane, Cheshunt East and Gliding Club on the 18th January is less than 75%. Accordingly, no further action is required.

On 24/01/2017 three HVAS PM_{10} units recorded results greater than the short term (24hr) PM_{10} impact assessment criteria; Long Point (89 µg/m^3), Cheshunt East (51 µg/m^3) and Gliding Club (73 µg/m^3).

Investigation indicates that the Long Point HVAS failed to collect valid samples on the 24th January due to local livestock impacting the monitor. Preliminary investigation indicates that HVO was outside the main arc of influence for the Cheshunt East and Gliding Club monitoring locations, on the 24th January. Accordingly, no further action is required.

On 30/01/2017 two HVAS PM_{10} units recorded results greater than the short term (24hr) PM_{10} impact assessment criteria; Cheshunt East (54 µg/m^3) and Gliding Club (71 µg/m^3).

Investigation indicates that that the likely HVO contribution to the results at Cheshunt East and Gliding Club on the 30th January is less than 75%. Accordingly, no further action is required.

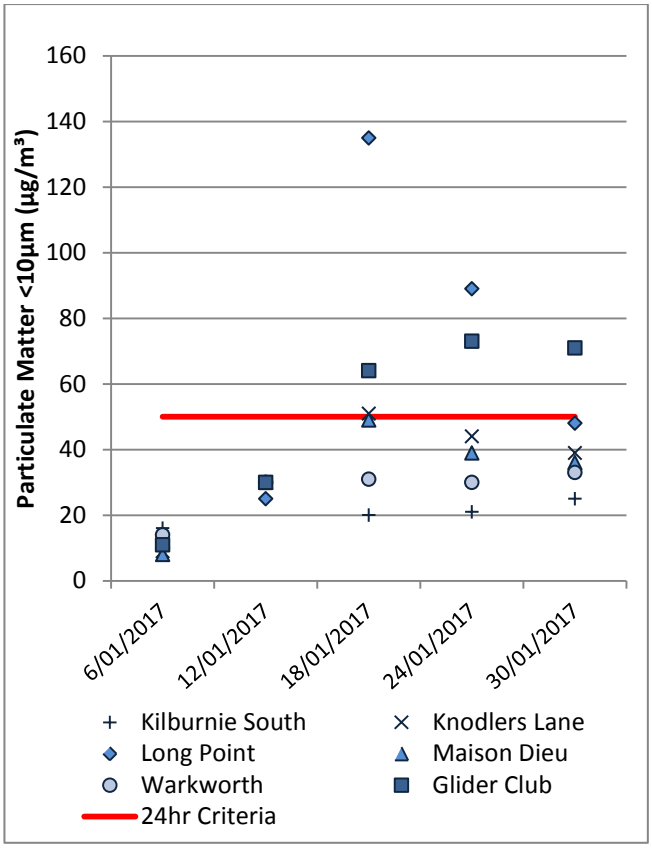

Figure 6: Individual PM_{10} Results – January 2017

Figure 7 shows the annual average PM_{10} results. During the reporting period, all PM_{10} results were below the long term impact assessment criteria.

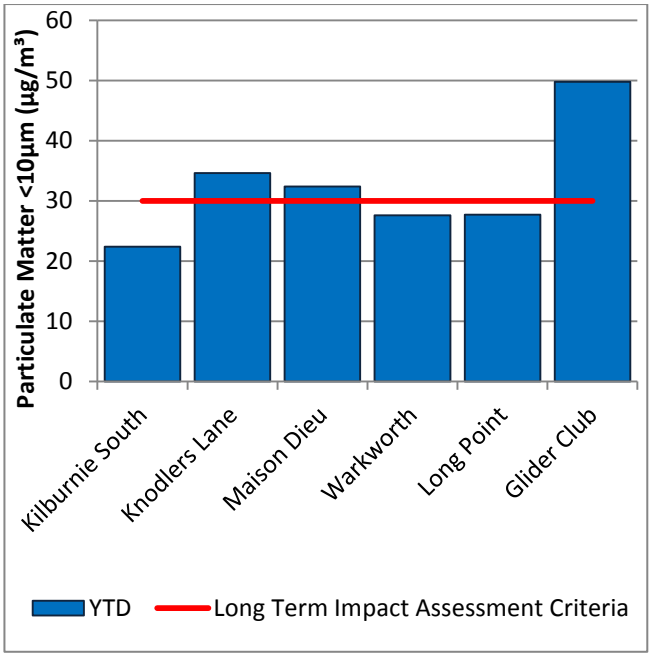

Figure 7: Year To Date Average PM_{10} – January 2017

2.3.2 TSP Results

Figure 8 shows the annual average TSP results compared against the long term impact assessment criteria of 90µg/m³.

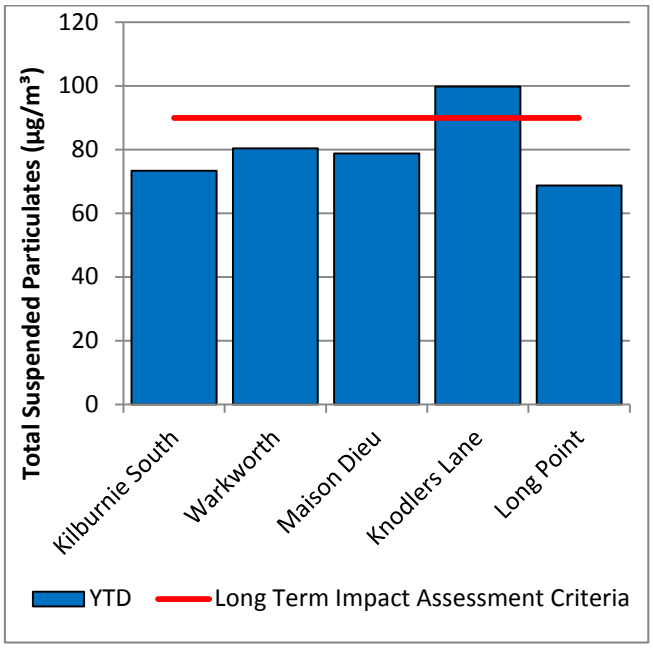

Figure 8: Year To Date Average Total Suspended Particulates - January 2017

2.3.3 Real Time PM_{10} Results

Hunter Valley Operations maintains a network of real time PM_{10} monitors. The real time air quality monitoring stations continuously log information and transmit data to a central database, generating alarms when particulate matter levels exceed internal trigger limits. Results from real time PM_{10} monitoring are used as a reactive measure to guide mining operations to ensure compliance with the relevant conditions of the project approval.

Results for real time dust sampling are shown in Figure 9, including the daily 24 hour average PM_{10} result and the 24 hour YTD PM_{10} average. There were two results recorded which exceeded the short term (24hr) criteria in the approvals. A measurement of 51.4µg/m³ was recorded at the Knodlers Lane TEOM location and a measurement of 62.1µg/m³ was recorded at the Maison Dieu TEOM location on the 11th January.

An investigation was undertaken to assess air quality and meteorological conditions on the day, and to assess the maximum potential HVO contribution to the measured result. The investigation determined that HVO's maximum potential contribution to measured levels at Knodlers Lane is estimated at less than 40% and at

Maison Dieu ie estimated at less than 50% of the measured results on the day.

Data was not available on the 20th January (Warkworth) due to technical issues.

2.3.4 Real Time Alarms for Air Quality

During January, the real time monitoring system generated 75 automated air quality related alarms. 26 alarms were related to adverse weather conditions and 49 alarms related to PM_{10}.

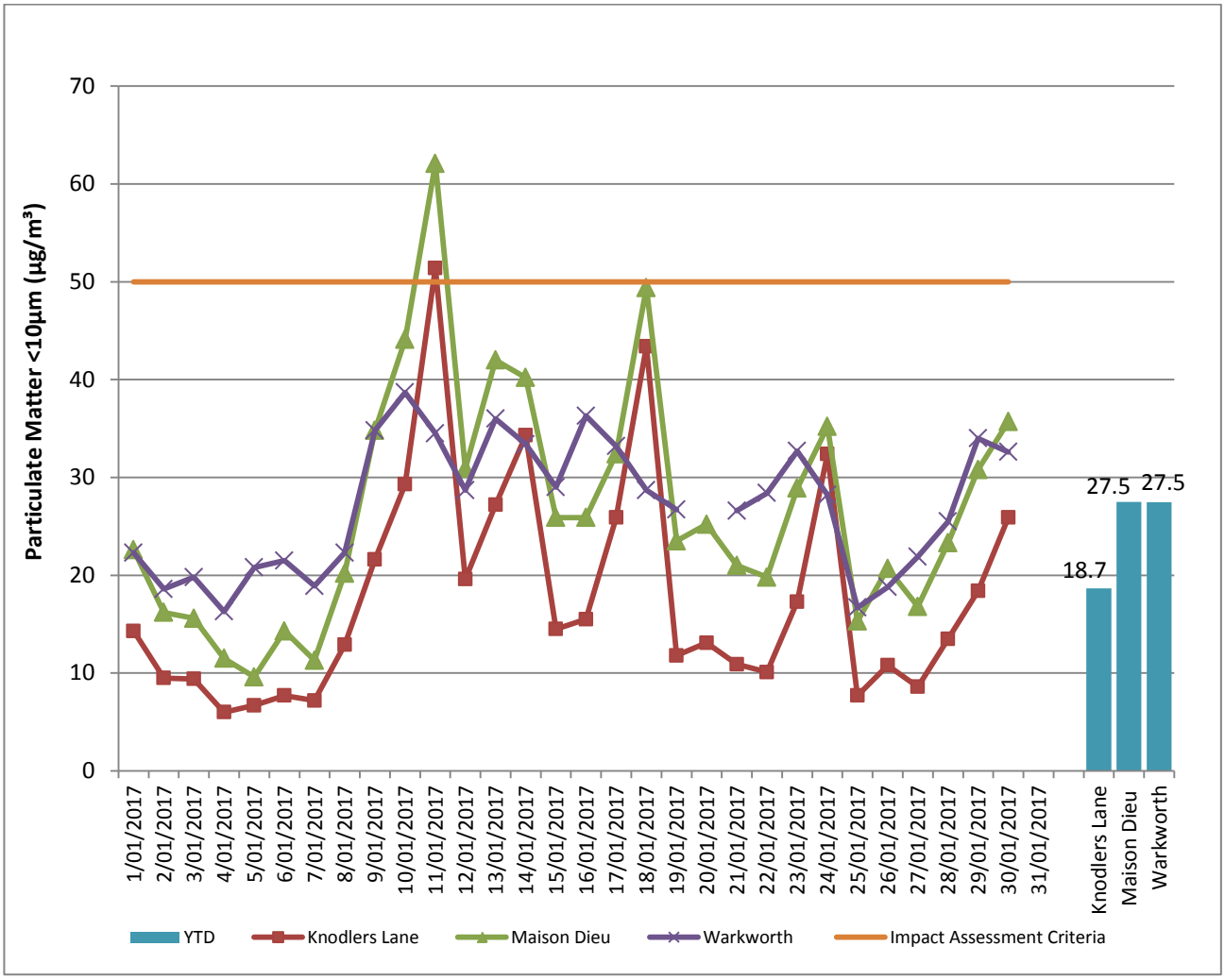

Figure 9: Real Time PM_{10} 24hr average and YTD Average – January 2017

3.0 WATER QUALITY

HVO maintains a network of surface water and groundwater monitoring sites.

Surface water courses are sampled on a quarterly sampling regime. Water quality is evaluated through the parameters of pH, Electrical Conductivity (EC) and Total Suspended Solids (TSS).

3.1.1 Surface Water

Results of monitoring on Site Dams and the Hunter River as well as other natural tributaries are provided on a quarterly basis, results will appear in the March 2017 report.

3.1.2 Site Water Use

Under water allocation licences issued by the NSW Office Of Water, HVO is permitted to extract water from the Hunter River. During the reporting period, HVO did not extract any water from the Hunter River.

3.1.3 HRSTS Discharge

HVO participates in the Hunter River Salinity Trading Scheme (HRSTS), allowing discharge from licensed discharge points Dam 11N (to Farrell's Creek), Lake James (to the Hunter River) and Parnell's Dam (to Parnell's Creek). Discharges can only take place subject to HRSTS regulations.

During the reporting period no water was discharged under the HRSTS.

3.2.1 Groundwater Monitoring Results

Groundwater monitoring is undertaken on a quarterly basis in accordance with the HVO Water Management Plan and Ground Water Monitoring Programme. Results of groundwater monitoring are reported quarterly and as such will be reported in the March 2017 monthly report.

4.0 BLAST MONITORING

HVO have a network of five blast monitoring units. These are located at nearby privately owned residences and function as regulatory compliance monitors. The location of these monitors can be found in Figure 15.

During January, 27 blasts were initiated at HVO. Figure 10 through to Figure 14 show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in Table 2.

Table 2: Blasting Limits

Airblast Overpressure (dB(L))	Comments
115	5% of the total number of blasts in a 12 month period
120	0%
Ground Vibration (mm/s)	**Comments**
5	5% of the total number of blasts in a 12 month period
10	0%

During the reporting period one blast exceeded the 115 dB(L) threshold for airblast overpressure. A blast recorded on the 31st January at 2:12pm, recorded an elevated airblast overpressure reading of 115.8dB(L) at the Maison Dieu blast monitoring location. No blasts exceeded the 5mm/s criterion for ground vibration.

4.1 Blast Monitoring Results

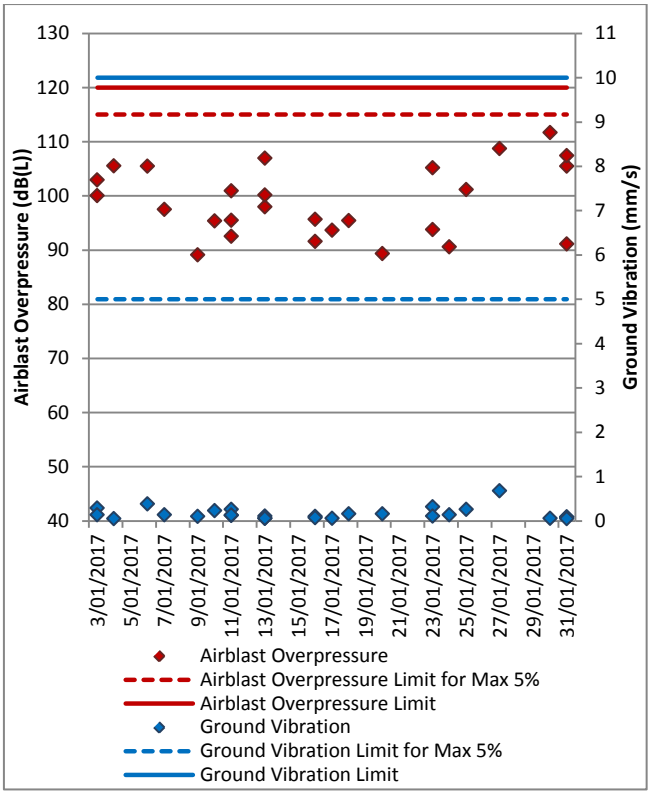

Figure 10: Moses Crossing Blast Monitoring Results – January 2017

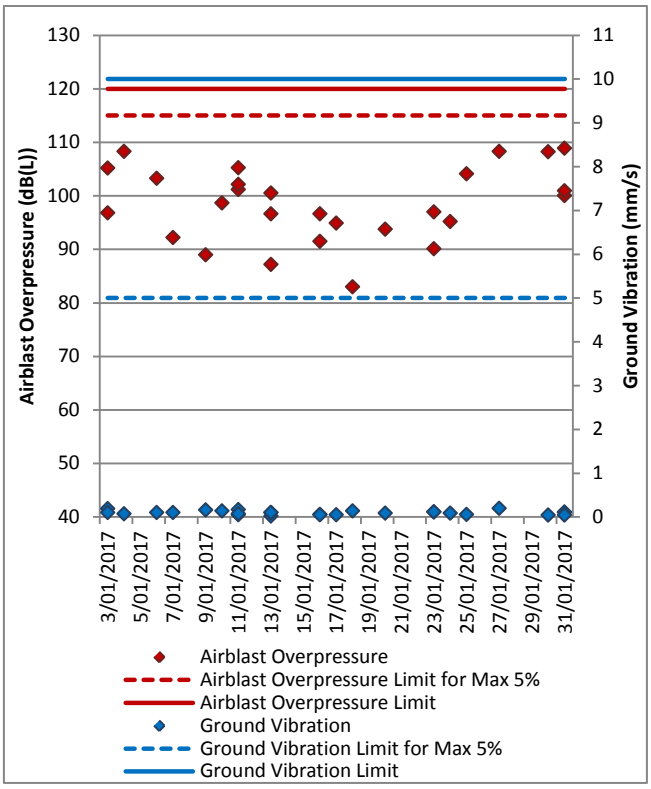

Figure 11: Jerrys Plains Blast Monitoring Results – January 2017

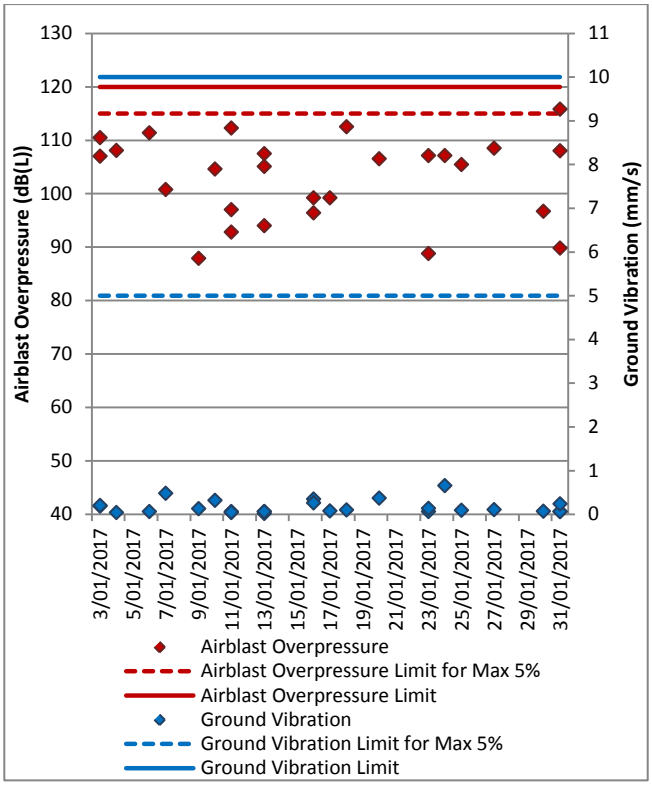

Figure 12: Maison Dieu Blast Monitoring Results - January 2017

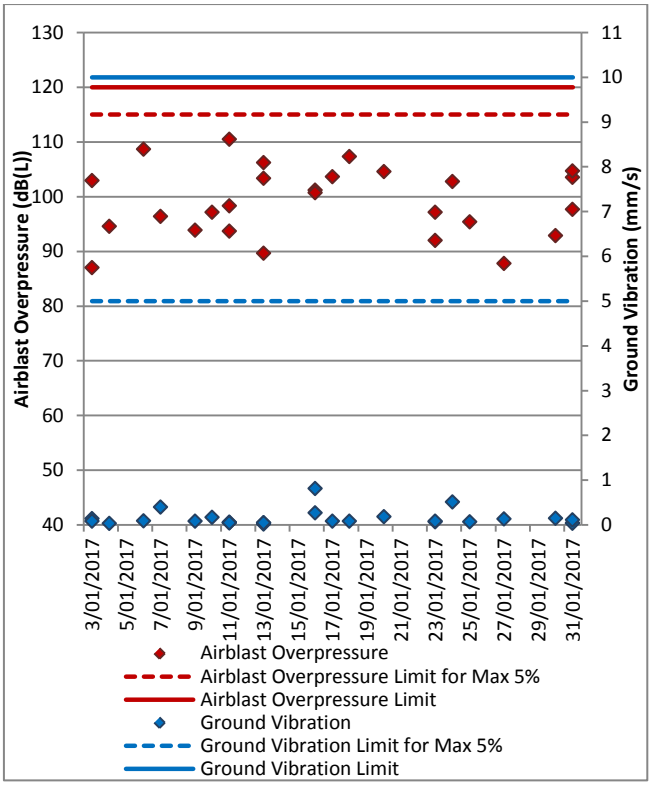

Figure 14: Knodlers Lane Blast Monitoring Results – January 2017

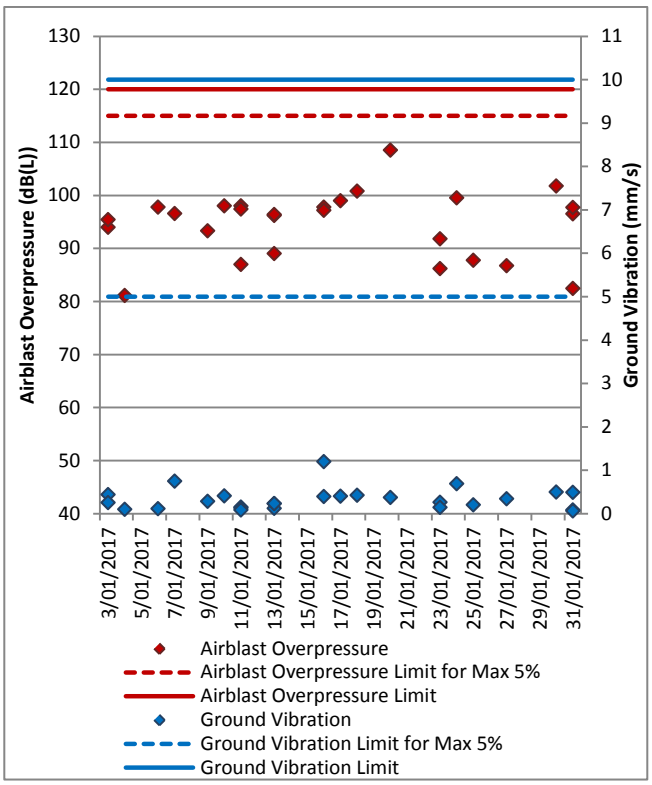

Figure 13: Warkworth Blast Monitoring Results - January 2017

Figure 15: Blast Monitoring Location Plan

5.0 NOISE

Routine attended noise monitoring is carried out at defined locations around HVO as described in the HVO Noise Monitoring Programme. The purpose of the noise surveys is to quantify and describe the acoustic environment around the site and compare results with specified limits. Unattended monitoring (real time noise monitoring) also occurs at five sites surrounding HVO. The attended noise monitoring locations are displayed in Figure 16.

5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding HVO on the night of 9th of January 2017. Monitoring results are detailed in Table 3 to Table 8.

Table 3: $L_{Aeq,\ 15\ minute}$ HVO South - Impact Assessment Criteria – January 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO South L_{Aeq} dB[2,4]	Exceedance[3]
Knodlers Lane	9/01/2017 21:00	3	-1	37	No	IA	NA
Maison Dieu	9/01/2017 21:26	3.3	-1	37	No	IA	NA
Shearers Lane	9/01/2017 21:55	3.4	-1	41	No	IA	NA
Kilburnie South	9/01/2017 21:34	3.3	-1	36	No	35	NA
Jerrys Plains Village	9/01/2017 22:27	3.4	-1	35	No	NM	NA
Jerrys Plains East	9/01/2017 22:04	3.4	-1	35	No	NM	NA
Long Point Road	9/01/2017 21:00	3.5	-1	45	No	IA	NA
HVGC	9/01/2017 21:02	3	-1	55	No	NM	NA

Table 4: $L_{Aeq,\ 15\ minute}$ HVO South - Land Acquisition Criteria – January 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO South L_{Aeq} dB[2,4]	Exceedance[3]
Knodlers Lane	9/01/2017 21:00	3	-1	41	No	IA	NA
Maison Dieu	9/01/2017 21:26	3.3	-1	41	No	IA	NA
Shearers Lane	9/01/2017 21:55	3.4	-1	41	No	IA	NA
Kilburnie South	9/01/2017 21:34	3.3	-1	41	No	35	NA
Jerrys Plains Village	9/01/2017 22:27	3.4	-1	40	No	NM	NA
Jerrys Plains East	9/01/2017 22:04	3.4	-1	40	No	NM	NA
Long Point Road	9/01/2017 21:00	3.5	-1	40	No	IA	NA
HVGC	9/01/2017 21:02	3	-1	NA	No	NM	NA

Table 5: $L_{A1,\ 1minute}$ HVO South - Impact Assessment Criteria – January 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO South $L_{A1,\ 1min}$ dB[2,4]	Exceedance[3]
Knodlers Lane	9/01/2017 21:00	3	-1	45	No	IA	NA
Maison Dieu	9/01/2017 21:26	3.3	-1	45	No	IA	NA
Shearers Lane	9/01/2017 21:55	3.4	-1	45	No	IA	NA
Kilburnie South	9/01/2017 21:34	3.3	-1	45	No	41	NA
Jerrys Plains Village	9/01/2017 22:27	3.4	-1	45	No	NM	NA
Jerrys Plains East	9/01/2017 22:04	3.4	-1	45	No	NM	NA
Long Point Road	9/01/2017 21:00	3.5	-1	45	No	IA	NA
HVGC	9/01/2017 21:02	3	-1	NA	No	NM	NA

Notes
1. Noise emission limits apply for winds up to 3 metres per second (at a height of 10m), or vertical temperature gradients of up to 3 degrees/100m and wind speeds of up to 2 m/s (at a height of 10m);
2. Estimated or measured $L_{Aeq,15minute}$ dB attributed to HVO South Pit Area;
3. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;
4. Bolded results in red indicate exceedance of criteria;
5. Atmospheric data is sourced from the HVO Corporate weather station using logged met data;
6. Criterion may or may not apply due to rounding of meteorological data values

Table 6: $L_{Aeq,\ 15minute}$ HVO North – Impact Assessment Criteria – January 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO North L_{Aeq} dB[2,4]	Exceedance[3]
Knodlers Lane	9/01/2017 21:00	3	-1	35	Yes	IA	Nil
Maison Dieu	9/01/2017 21:26	3.3	-1	35	No	IA	NA
Shearers Lane	9/01/2017 21:55	3.4	-1	35	No	IA	NA
Kilburnie South	9/01/2017 21:34	3.3	-1	39	No	NM	NA
Jerrys Plains Village	9/01/2017 22:27	3.4	-1	36	No	30	NA
Jerrys Plains East	9/01/2017 22:04	3.4	-1	39	No	32	NA
Long Point Road	9/01/2017 21:00	3.5	-1	35	No	IA	NA
HVGC	9/01/2017 21:02	3	-1	NA	No	IA	NA

Table 7: $L_{Aeq,15minute}$ HVO North - Land Acquisition Criteria – January 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO North L_{Aeq} dB[2,4]	Exceedance[3]
Knodlers Lane	9/01/2017 21:00	3	-1	41	Yes	IA	Nil
Maison Dieu	9/01/2017 21:26	3.3	-1	41	No	IA	NA
Shearers Lane	9/01/2017 21:55	3.4	-1	41	No	IA	NA
Kilburnie South	9/01/2017 21:34	3.3	-1	41	No	NM	NA
Jerrys Plains Village	9/01/2017 22:27	3.4	-1	41	No	30	NA
Jerrys Plains East	9/01/2017 22:04	3.4	-1	41	No	32	NA
Long Point Road	9/01/2017 21:00	3.5	-1	41	No	IA	NA
HVGC	9/01/2017 21:02	3	-1	NA	No	IA	NA

Table 8: $L_{A1, 1Minute}$ HVO North - Impact Assessment Criteria – January 2017

Location	Date and Time	Wind Speed (m/s)[5]	VTG[5]	Criterion dB	Criterion Applies?[1,6]	HVO North $L_{A1, 1min}$ dB[2,4]	Exceedance[3]
Knodlers Lane	9/01/2017 21:00	3	-1	46	Yes	IA	Nil
Maison Dieu	9/01/2017 21:26	3.3	-1	46	No	IA	NA
Shearers Lane	9/01/2017 21:55	3.4	-1	46	No	IA	NA
Kilburnie South	9/01/2017 21:34	3.3	-1	46	No	NM	NA
Jerrys Plains Village	9/01/2017 22:27	3.4	-1	46	No	37	NA
Jerrys Plains East	9/01/2017 22:04	3.4	-1	46	No	42	NA
Long Point Road	9/01/2017 21:00	3.5	-1	46	No	IA	NA
HVGC	9/01/2017 21:02	3	-1	NA	No	IA	NA

Notes
1. Noise emission limits apply for winds up to 3 metres per second (at a height of 10m), or vertical temperature gradients of up to 3 degrees/100m and wind speeds of up to 2 m/s (at a height of 10m);
2. Estimated or measured $L_{Aeq,15minute}$ dB attributed to HVO North Area;
3. NA in exceedance column means atmospheric conditions outside specified in approval and so criterion is not applicable;
4. Bolded results in red indicate exceedance of criteria;
5. Atmospheric data is sourced from the HVO Corporate weather station using logged met data;
6. Criterion may or may not apply due to rounding of meteorological data values

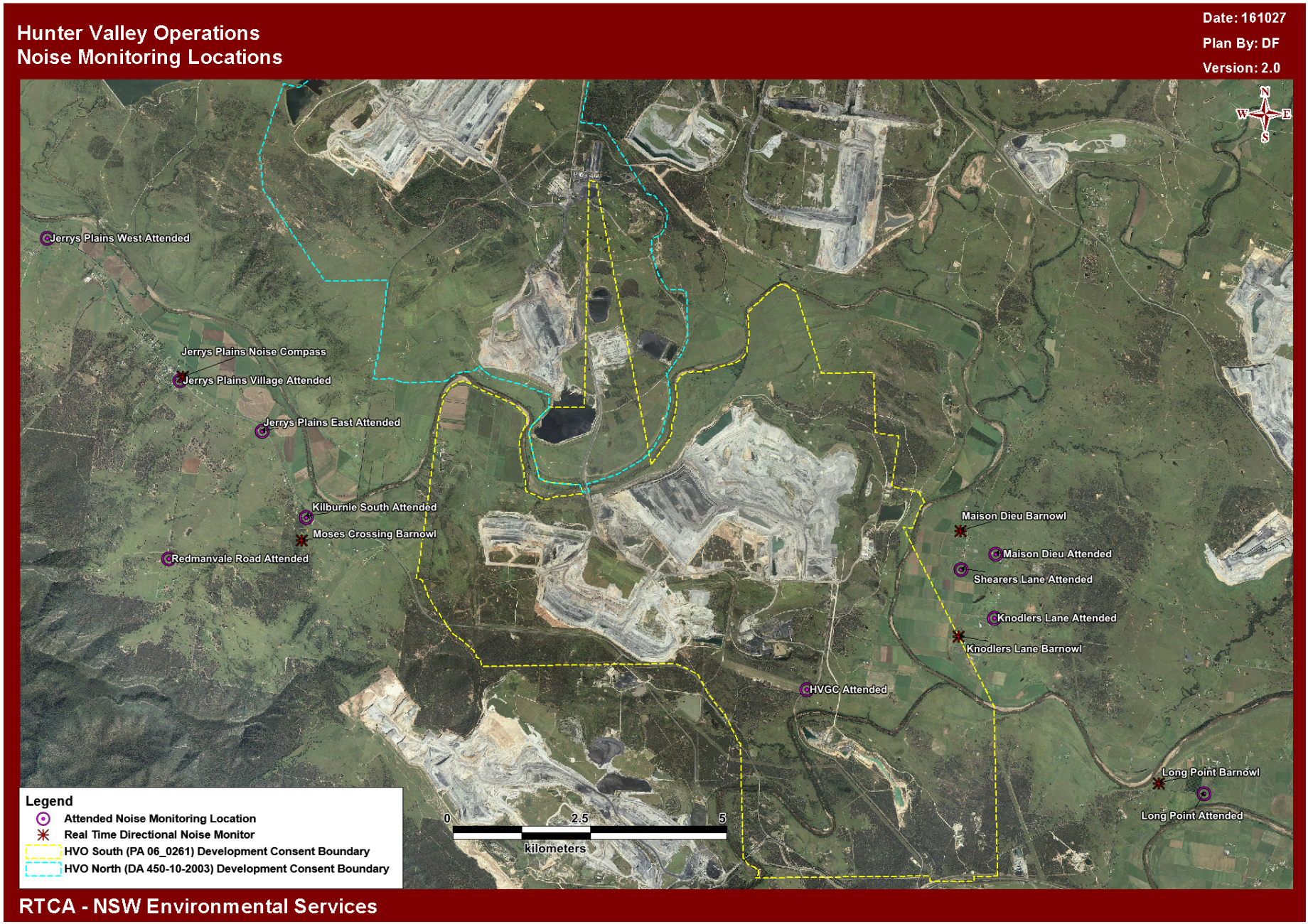

Figure 16: Noise Monitoring Location Plan

5.2 Real Time Noise Monitoring

HVO utilises a network of real-time directional noise monitors to manage noise impacts on a continuous basis. Noise alarms are in place at five monitoring locations (Knodlers Lane, Maison Dieu, Jerrys Plains, Moses Crossing, and Long Point), which alert HVO staff to elevated noise levels likely to be attributable to HVO. Noise alarms are investigated and responded to with the appropriate level of operational modification. Changes in response to a noise alarm can include replacing equipment with quieter (noise attenuated) units, changing or relocating tasks, and shutting down equipment.

HVO's Planning approvals stipulate noise criteria which must be met during the life of the development(s). The approvals however do not stipulate requirements or give guidance on noise affectation, or the frequency of any elevated noise event which would constitute noise affectation. Page 6 of the NSW Industrial Noise Policy (INP) comments that criteria "*seek to restrict the risk of people being highly annoyed to less than 10 percent, and to meet this for at least 90 percent of the time*".

For the purposes of assessing the effectiveness of the noise management system, HVO applies a similar approach with regard to the frequency of any elevated noise event. It should be noted that this assessment does not compliment or conflict with attended noise monitoring detailed in Section 6.1, and that real time monitoring data includes non-mine noise sources such as dogs, cows, or more commonly, road traffic.

6.0 OPERATIONAL DOWNTIME

During January, a total of 456.7 hours of equipment downtime was logged in response to real time monitoring and visual inspections for environmental reasons such as dust, noise and meteorological conditions. Operational downtime by equipment type is shown in Figure 17.

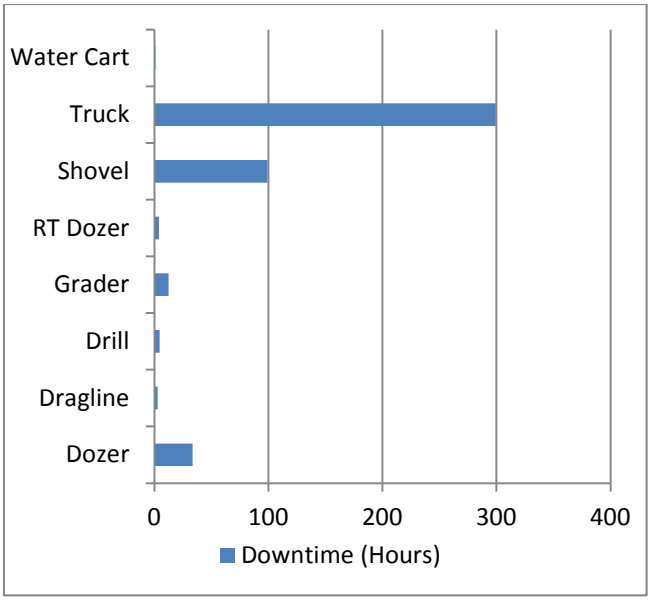

Figure 17: Operational Downtime by Equipment Type – January 2017

7.0 REHABILITATION

Good areas of early stage rehabilitation have been carried over from 2016 to allow ongoing work over coming months including 35.8ha of dumps released for rehabilitation, 15.8ha of released area which has been bulk shaped to the MOP landform, and 5.1ha which has been topsoiled and composted in preparation for seeding. Limited rehabilitation works were undertaken during January with 1ha of new bulk shaping completed and 2.3ha topsoiled.

8.0 COMPLAINTS

Two complaints were received during the reporting period. Details of complaints received YTD are shown in Figure 19 below.

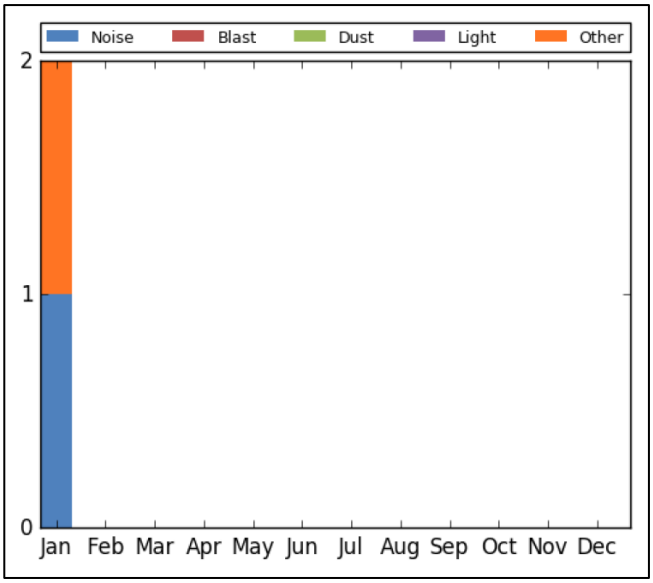

Figure 18: Complaints Graph – January 2017

9.0 ENVIRONMENTAL INCIDENTS

During the reporting period there were no reportable environmental incidents.

Appendix A: Meteorological Data

Table 9: Meteorological Data - HVO Corporate Meteorological Station – January 2017

Date	Air Temperature Maximum (°C)	Air Temperature Minimum (°C)	Relative Humidity Maximum (%)	Relative Humidity Minimum (%)	Solar Radiation Maximum (W/Sq. M)	Wind Direction Average (°)	Wind Speed Average (m/sec)	Rainfall(mm)
1/01/2017 0:00	28.8	20.1	100.0	59.3	1301	114.8	2.3	2.6
2/01/2017 0:00	27.7	17.9	100.0	51.2	1419	142.3	3.1	14.4
3/01/2017 0:00	27.2	15.3	90.8	37.7	1494	118.2	3.3	0.0
4/01/2017 0:00	26.1	15.1	93.7	39.4	1597	115.1	3.4	0.0
5/01/2017 0:00	29.3	15.4	100.0	42.1	1487	123.5	3.5	0.0
6/01/2017 0:00	29.6	16.7	100.0	38.9	1448	117.3	3.8	0.0
7/01/2017 0:00	31.3	16.1	93.5	26.6	1345	119.1	3.1	0.0
8/01/2017 0:00	35.5	13.5	97.6	12.5	1176	138.3	1.6	0.0
9/01/2017 0:00	38.8	17.5	81.9	8.8	1066	173.4	2.2	0.0
10/01/2017 0:00	38.2	17.9	81.4	8.4	1338	194.3	2.0	0.0
11/01/2017 0:00	38.6	25.4	57.4	14.2	1314	272.8	3.2	0.0
12/01/2017 0:00	32.4	19.7	84.7	38.6	1091	115.9	4.2	0.0
13/01/2017 0:00	42.4	20.9	82.8	14.1	1028	237.3	4.1	0.0
14/01/2017 0:00	38.1	21.2	78.4	24.4	1147	246.2	4.2	0.0
15/01/2017 0:00	26.1	16.8	99.8	48.5	812	110.8	4.0	0.0
16/01/2017 0:00	34.8	17.7	92.3	18.6	1174	132.5	2.4	0.0
17/01/2017 0:00	39.9	16.1	99.6	19.9	1289	248.5	3.1	0.0
18/01/2017 0:00	42.3	18.9	80.6	13.0	1110	244.3	5.5	0.0
19/01/2017 0:00	25.5	16.3	100.0	54.6	1314	121.7	3.7	0.2
20/01/2017 0:00	30.8	14.4	100.0	49.5	1467	242.3	3.3	8.2
21/01/2017 0:00	27.7	15.2	87.3	35.9	1379	121.0	3.3	0.0
22/01/2017 0:00	32.5	12.9	97.4	22.6	1090	118.0	2.8	0.0
23/01/2017 0:00	38.0	27.4	53.7	17.9	1062	243.5	2.1	0.0
24/01/2017 0:00	40.2	18.6	99.3	21.8	1573	231.1	6.1	0.2
25/01/2017 0:00	23.5	16.5	100.0	63.8	649	126.2	3.3	0.4
26/01/2017 0:00	25.7	16.9	100.0	70.3	449	119.2	2.1	0.2
27/01/2017 0:00	30.6	16.5	100.0	43.4	1382	126.2	3.2	0.4
28/01/2017 0:00	37.7	15.3	100.0	15.9	1036	160.7	1.7	0.0
29/01/2017 0:00	39.0	19.5	85.4	21.6	1214	153.1	1.7	0.0
30/01/2017 0:00	40.1	19.2	96.7	16.5	1306	252.9	3.3	0.0
31/01/2017 0:00	42.4	21.6	82.7	10.2	1386	250.5	4.5	0.0