

HUNTER VALLEY OPERATIONS



Monthly Environmental Monitoring Report November 2021

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1 Introduction

This report has been compiled to provide a monthly summary of environmental monitoring results for Hunter Valley Operations (HVO). This report includes all monitoring data collected for the period 1st to 30th November 2021 (the 'Reporting Period').

2 Air Quality

2.1 Meteorological Monitoring

HVO maintains two meteorological stations: 'HVO Corporate' and 'Cheshunt' (refer to **Figure 4**).

2.1.1 Rainfall

Rainfall for the period is summarised in **Table 1**. The 2019, 2020 and 2021 trends are shown in **Figure 1**.

Table 1 - Rainfall data for the reporting period

2021	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
January	50.6	50.6
February	166.4	157.0
March	178.0	335.0
April	12.8	347.8
May	28.2	376
June	60.2	436.2
July	22.8	459.0
August	38.0	497.0
September	26.0	523.0
October	56.2	579.2
November	226.0	805.2

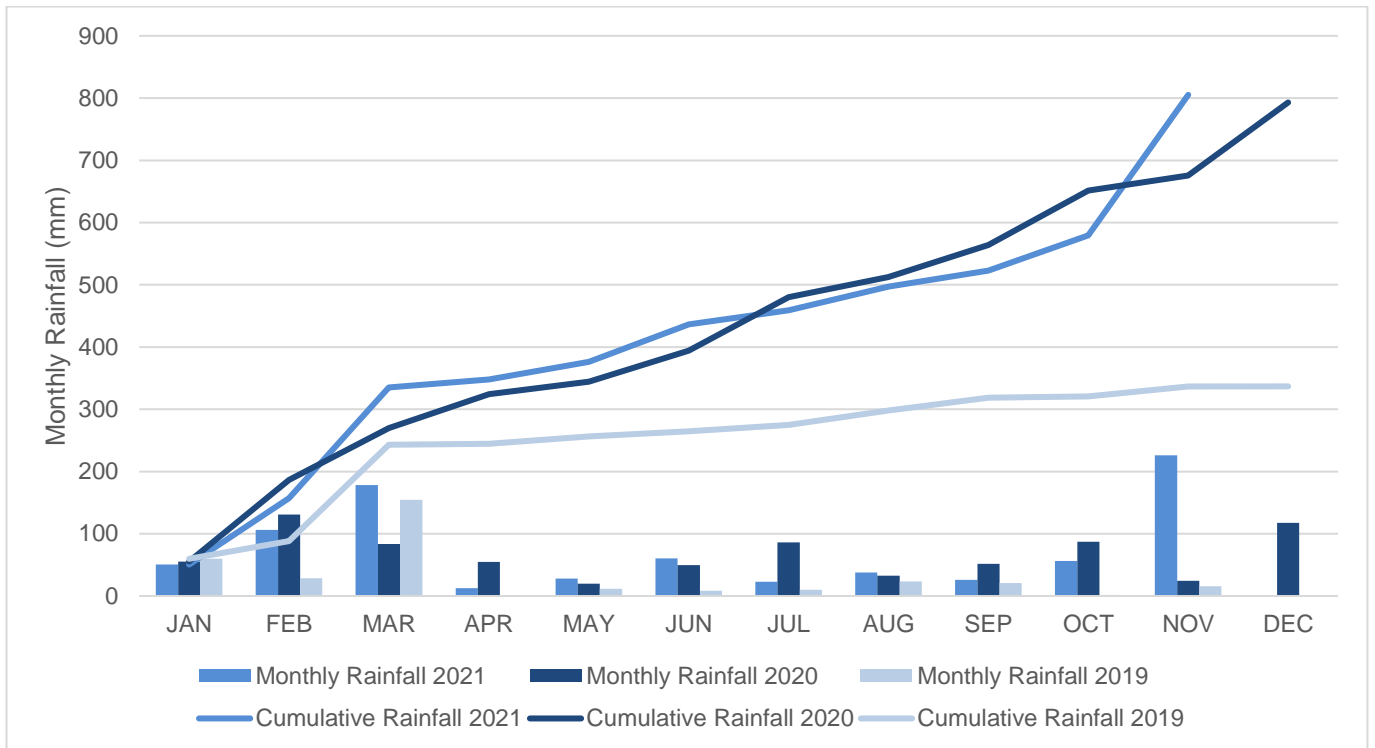


Figure 1 - Rainfall Summary 2021

2.1.2 Wind Speed and Direction

South easterly winds were prevailing during the reporting period as shown in **Figure 2** (HVO Corporate) and **Figure 3** (HVO Cheshunt).

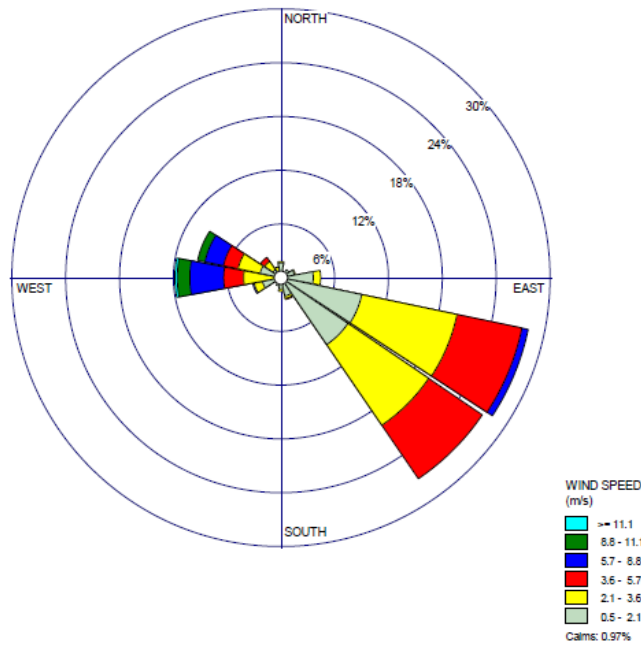


Figure 2 - HVO Corporate Wind Rose for the Reporting Period

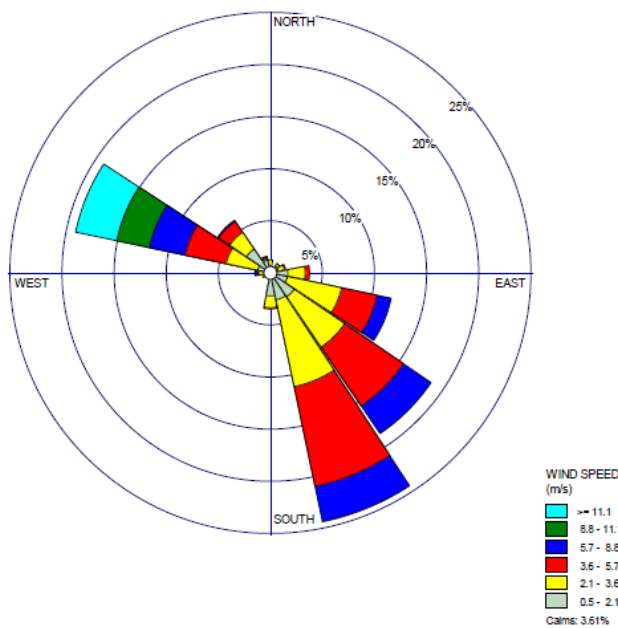


Figure 3 - HVO Cheshunt Wind Rose for the Reporting Period

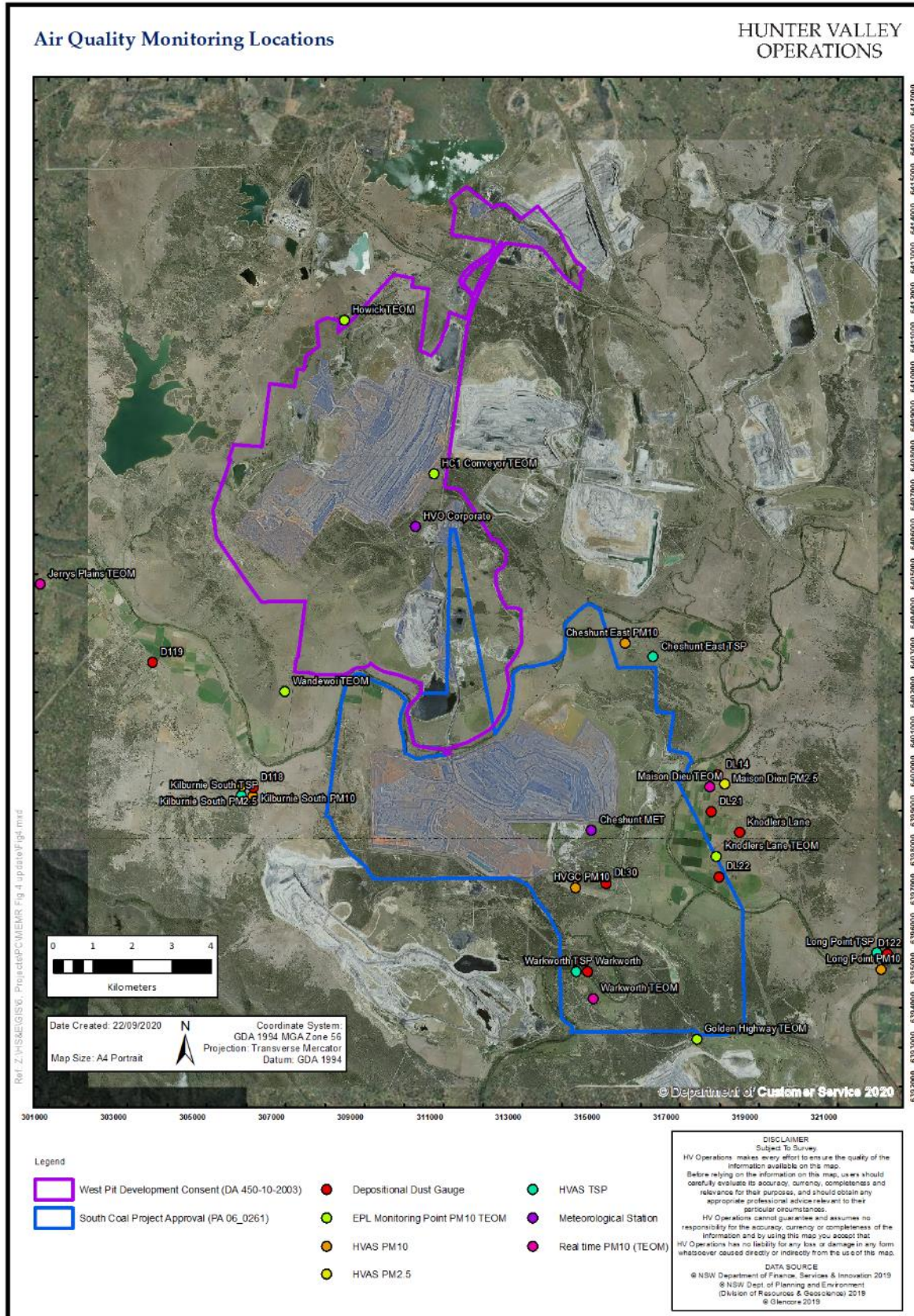


Figure 4 - Air Quality Monitoring Location Plan

2.2 Depositional Dust

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

Figure 5 displays insoluble solids results from depositional dust gauges during the reporting period compared against the annual impact assessment criteria. Any monthly results deemed to be contaminated (due to presence of bird droppings, insects, etc.) are not displayed. An assessment of HVO’s contribution against the long-term impact assessment criteria will be provided in the 2021 Annual Review.

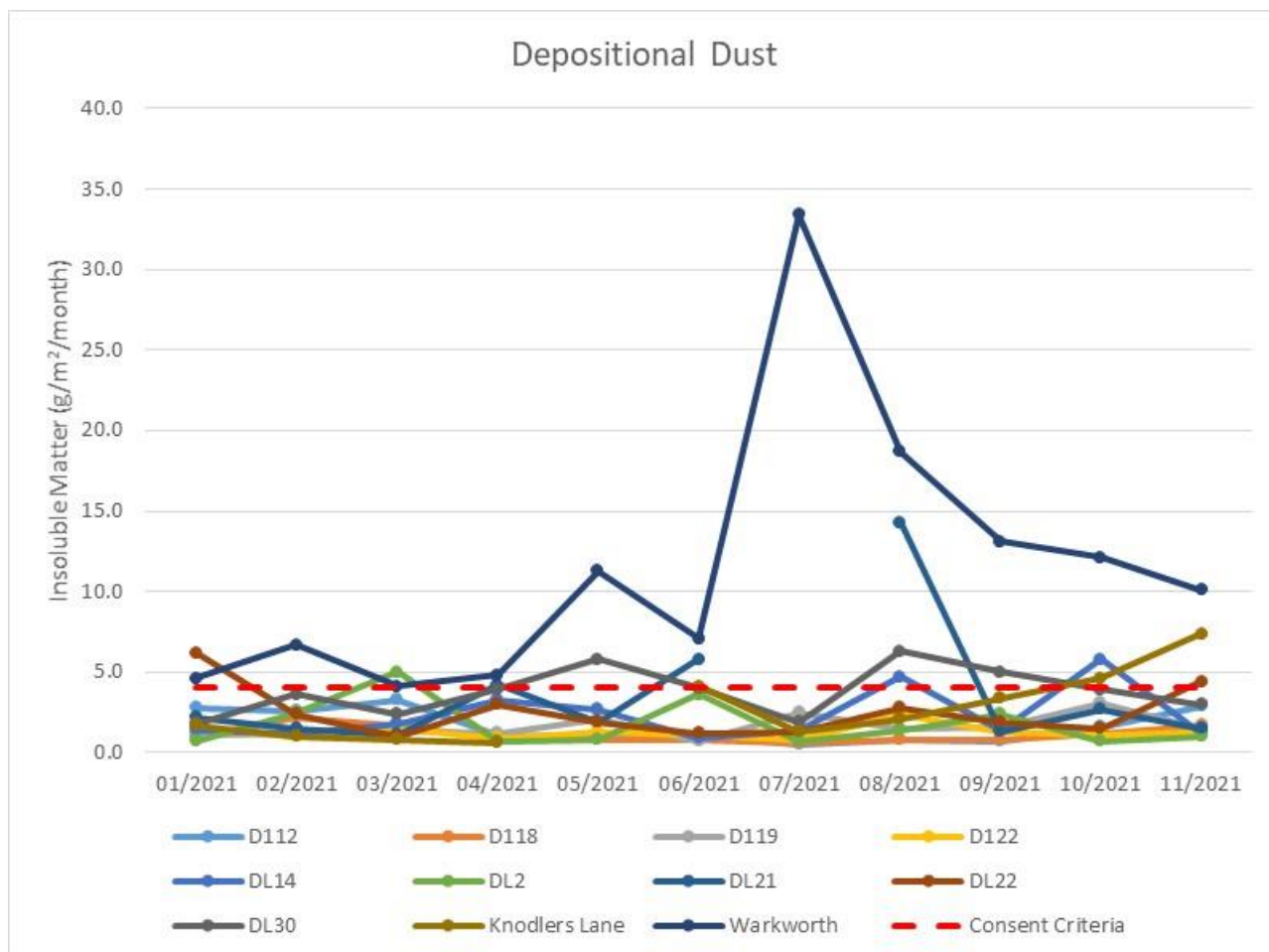


Figure 5 - Depositional Dust Results for the Reporting Period

2.3 Suspended Particles

Suspended particles are measured by a network of High Volume Air Samplers (HVAS) measuring Total Suspended Particulates (TSP) and Particulate Matter <10µm (PM₁₀). The Kilburnie South and Maison Dieu HVAS also monitor Particulate Matter <2.5µm (PM_{2.5}). The location of these monitors can be seen in Figure 4. Each HVAS runs for 24-hours on a six-day cycle.

2.3.1 HVAS PM₁₀ Results

2.3.1.1 Performance against short term impact assessment criteria

Figure 6 shows individual PM₁₁ results at each monitoring station against the short-term impact assessment criteria of 50µg/m³. No exceedances were recorded. Note that due to technical issues at the Kilburnie South HVAS, data from the adjacent United Wambo Joint Venture TEOM was used to supplement the data set.

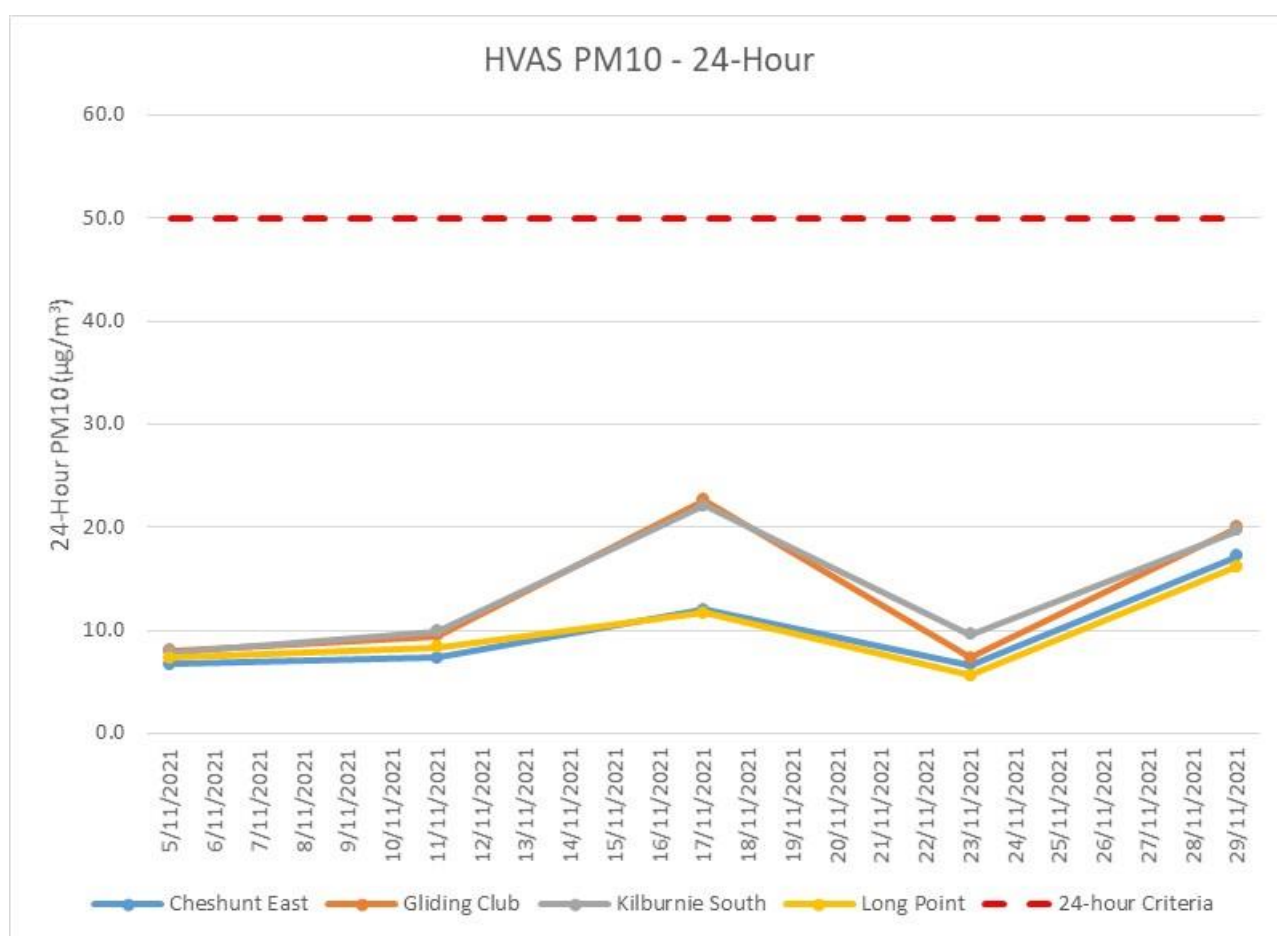


Figure 6 - Individual PM₁₀ Results for the Reporting Period

2.3.1.2 Performance against long term impact assessment criteria

Figure 7 shows the year to date annual average PM₁₀ results. All monitors were below the relevant long term impact assessment criteria during the reporting period. An assessment of HVO’s contribution against the long-term impact assessment criteria will be provided in the 2021 Annual Review.

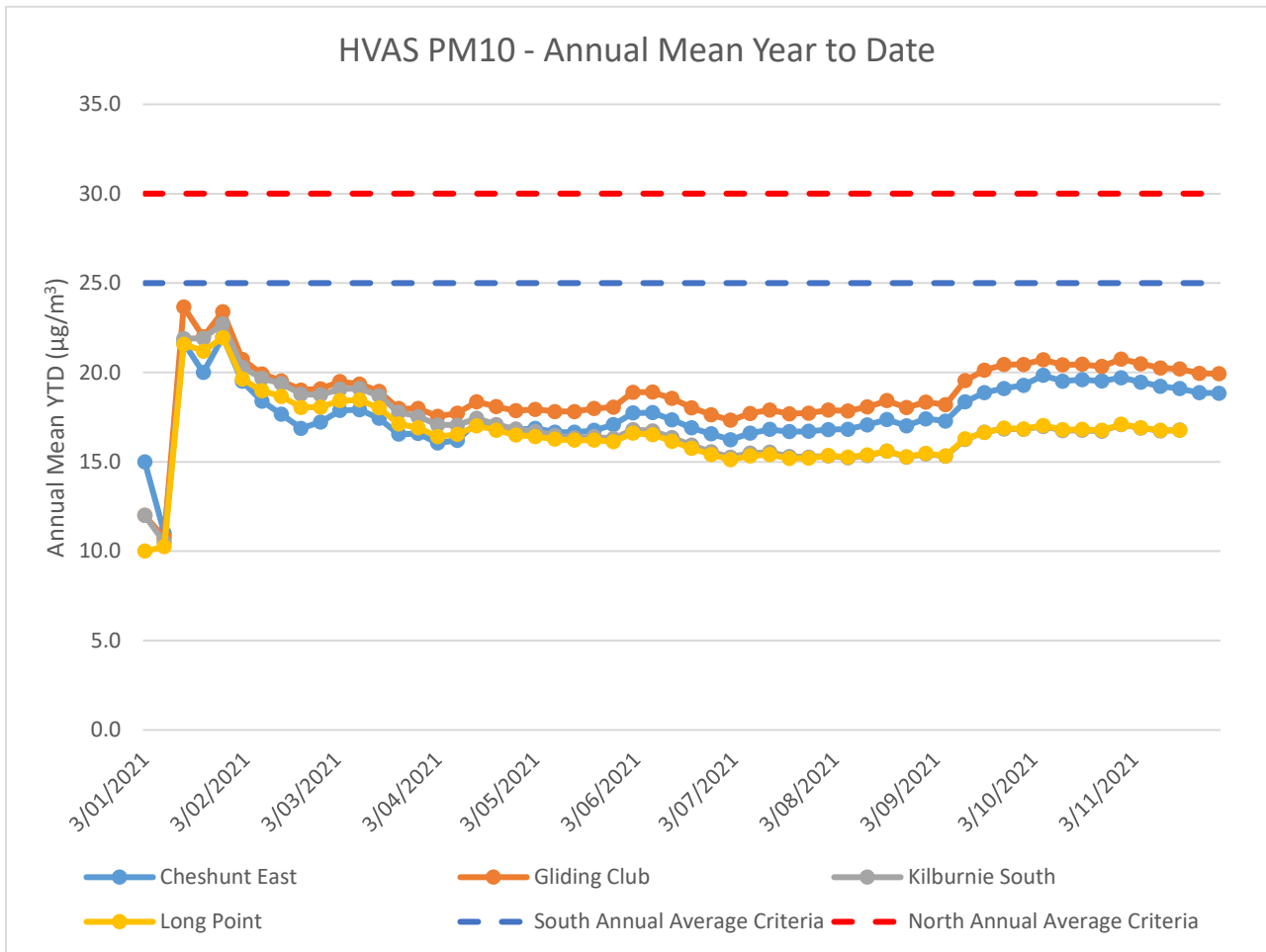


Figure 7 - Year to Date Average PM₁₀ as at end of the Reporting Period

2.3.2 HVAS PM_{2.5} Results

HVO monitors PM_{2.5} at two HVAS locations, Kilburnie South and Maison Dieu.

2.3.2.1 Performance against short term impact assessment criteria

Figure 8 shows individual PM_{2.5} results at each monitoring station against the HVO South short-term impact assessment criteria of 25µg/m³.

All monitors were below the relevant short-term impact assessment criteria during the reporting period.

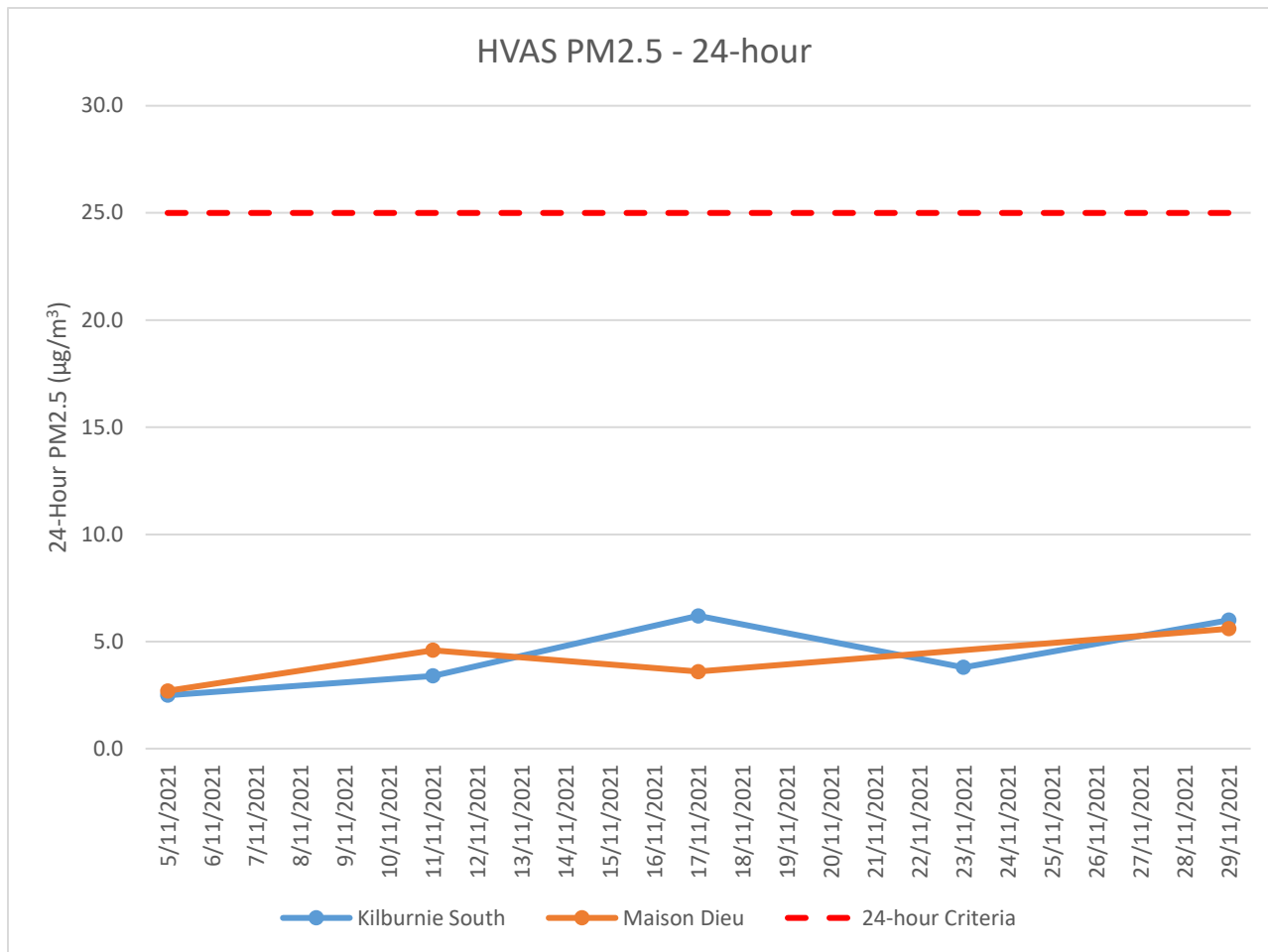


Figure 8 - Individual PM_{2.5} Results for the Reporting Period

2.3.2.2 Performance against long term impact assessment criteria

Figure 9 shows the year to date annual average PM_{2.5} results. During the reporting period, the Maison Dieu monitor annual average year to date was above the PM_{2.5} Annual Rolling Mean criteria of 8µg/m³.

An assessment of HVO’s contribution against the long term impact assessment criteria will be provided in the 2021 Annual Review.

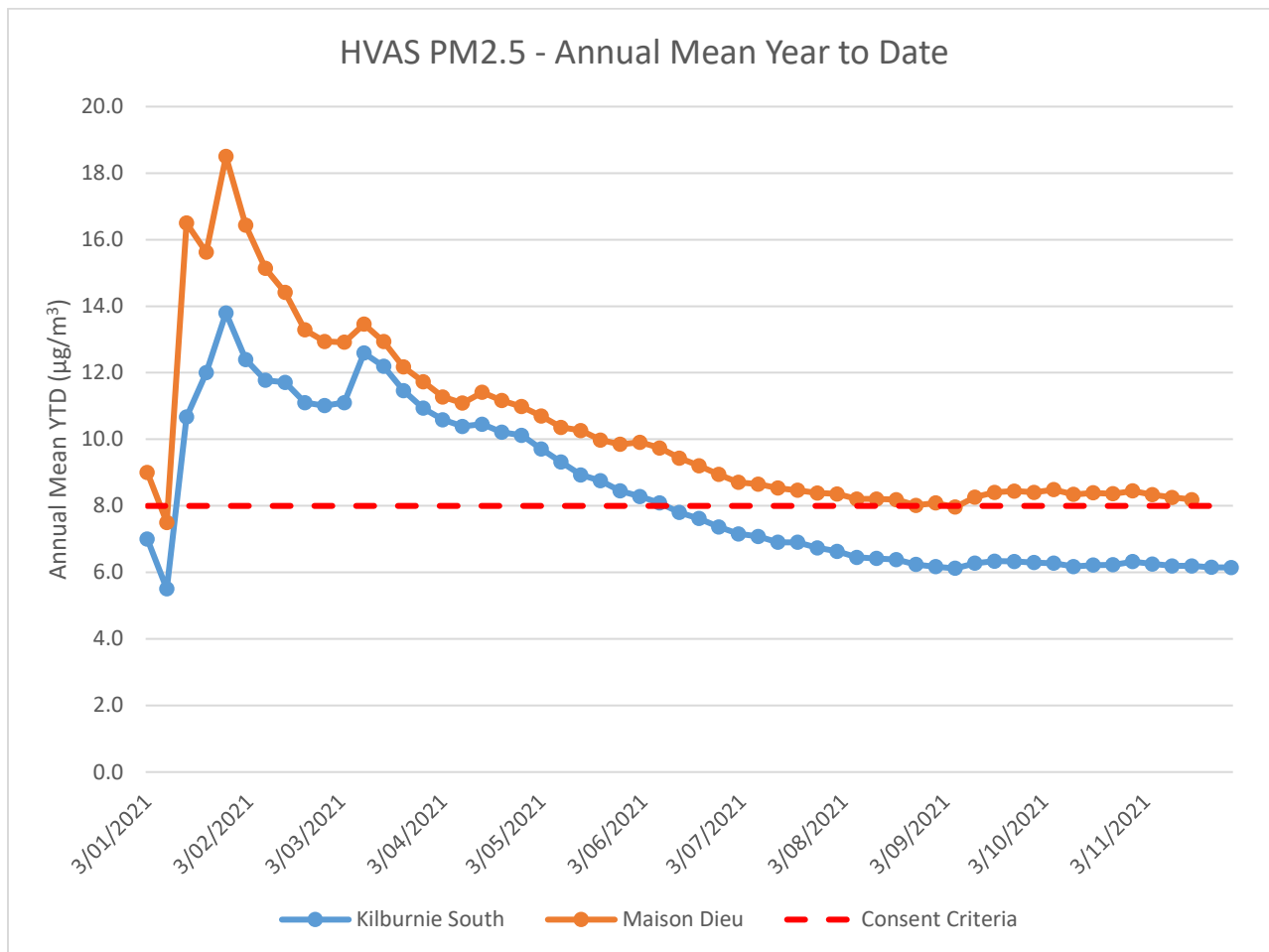


Figure 9 - Year to Date Average PM_{2.5} as at end of the Reporting Period

2.3.3 TSP Results

2.3.3.1 Performance against long term impact assessment criteria

Figure 10 shows the annual average TSP results compared against the long-term impact assessment criteria of 90µg/m³.

All monitors were below the relevant long-term impact assessment criteria during the reporting period.

An assessment of HVO’s contribution against the long-term impact assessment criteria will be provided in the 2021 Annual Review.

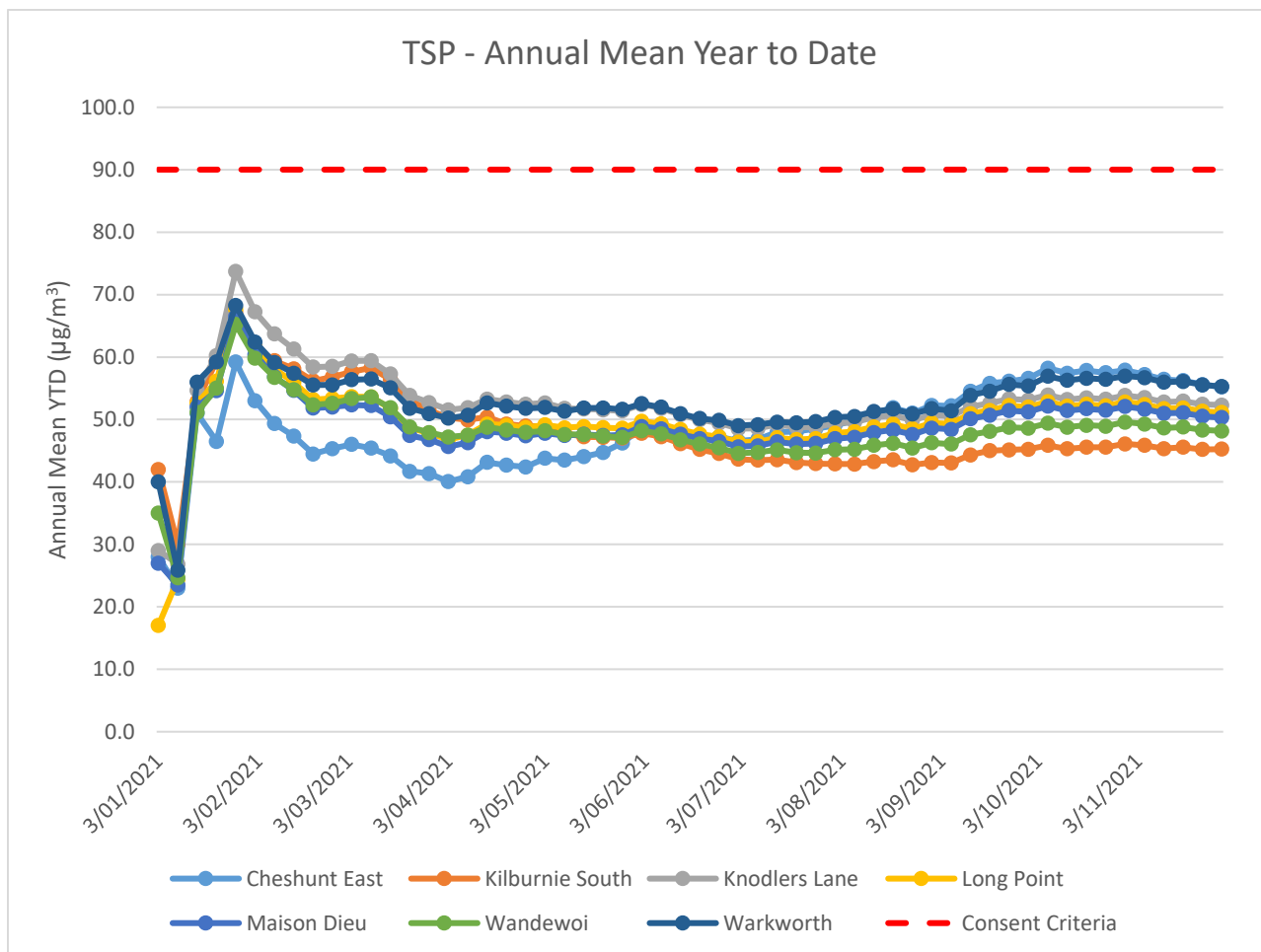


Figure 10 - Year to Date Average Total Suspended Particulates as at end of the Reporting Period

2.3.4 Real Time PM₁₀ Results

HVO maintains a network of real time PM₁₀ monitors. The real time air quality monitoring stations continuously record information and transmit data to a central database, generating alarms when particulate matter levels exceed internal trigger levels. Results from real time PM₁₀ monitoring are used as a reactive measure to guide mining operations to help achieve compliance with the relevant conditions of the project approval.

Figure 11 shows the daily 24-hour average PM₁₀ result from the real time monitoring sites which shows no exceedances reported for the period.

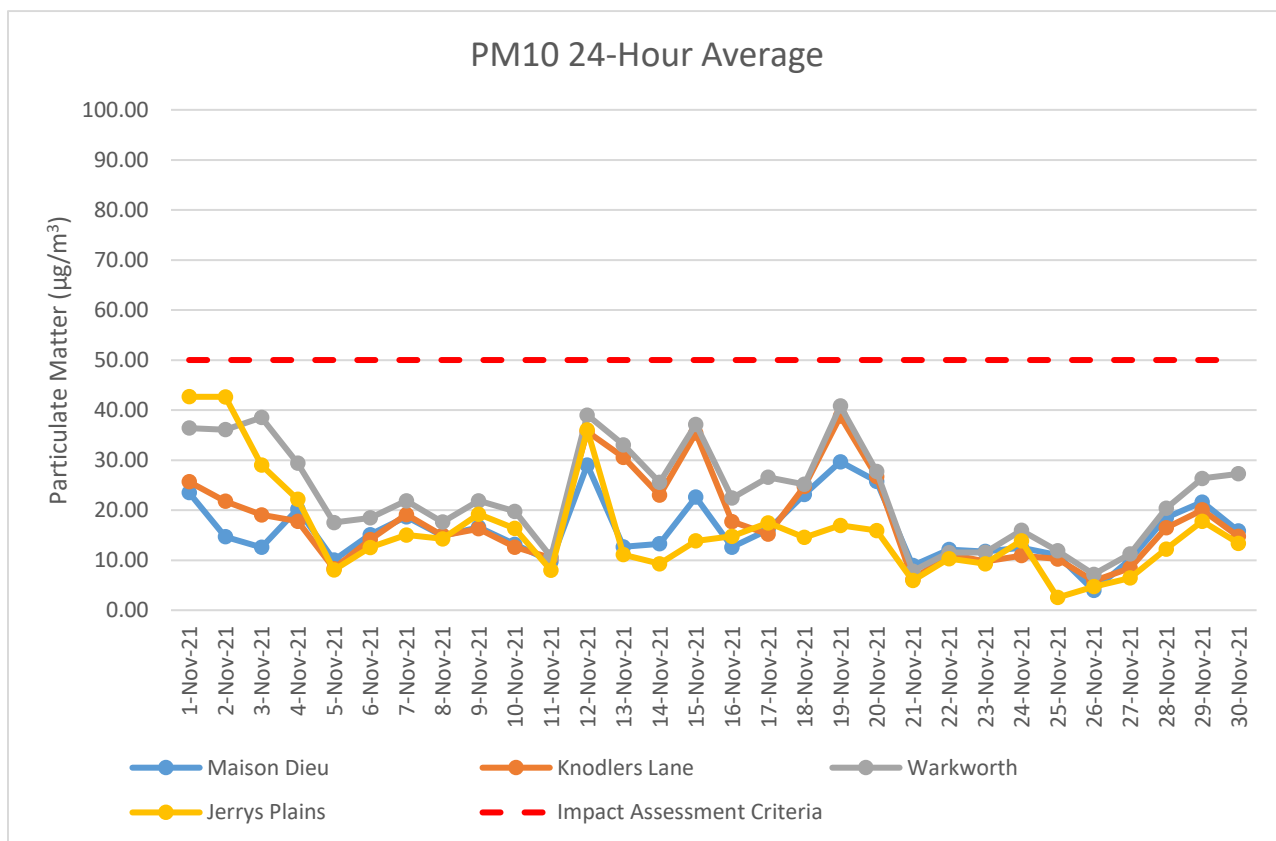


Figure 11 - Real Time PM₁₀ 24hr for the Reporting Period

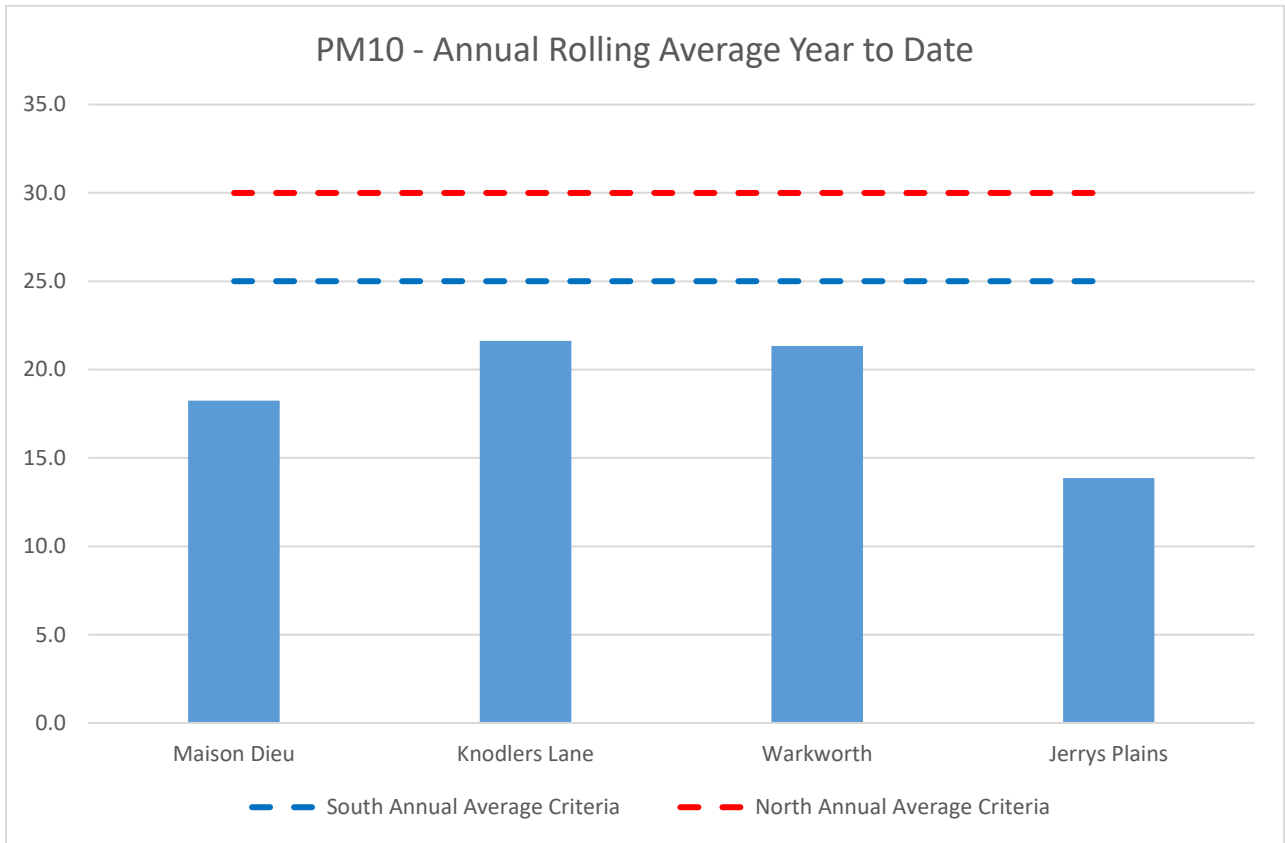


Figure 12 - Real Time PM₁₀ Annual Average October 2021

2.3.5 Real Time Alarms for Air Quality

The real time monitoring system generated 59 automated air quality related alarms during the reporting period. 40 alarms related to adverse weather conditions and 19 alarms related to dust conditions.

3 Water Quality

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

3.1 Surface Water

Surface watercourses are sampled on a quarterly sampling regime. Water quality is assessed through the parameters of pH, electrical conductivity (EC) and Total Suspended Solids (TSS). The location of surface water monitoring points across HVO are shown in **Figure 13**.

Results from monitoring on site dams, the Hunter River and other natural tributaries are provided on a quarterly basis. Results will be provided in the December 2021 Monthly Environmental Monitoring Report.

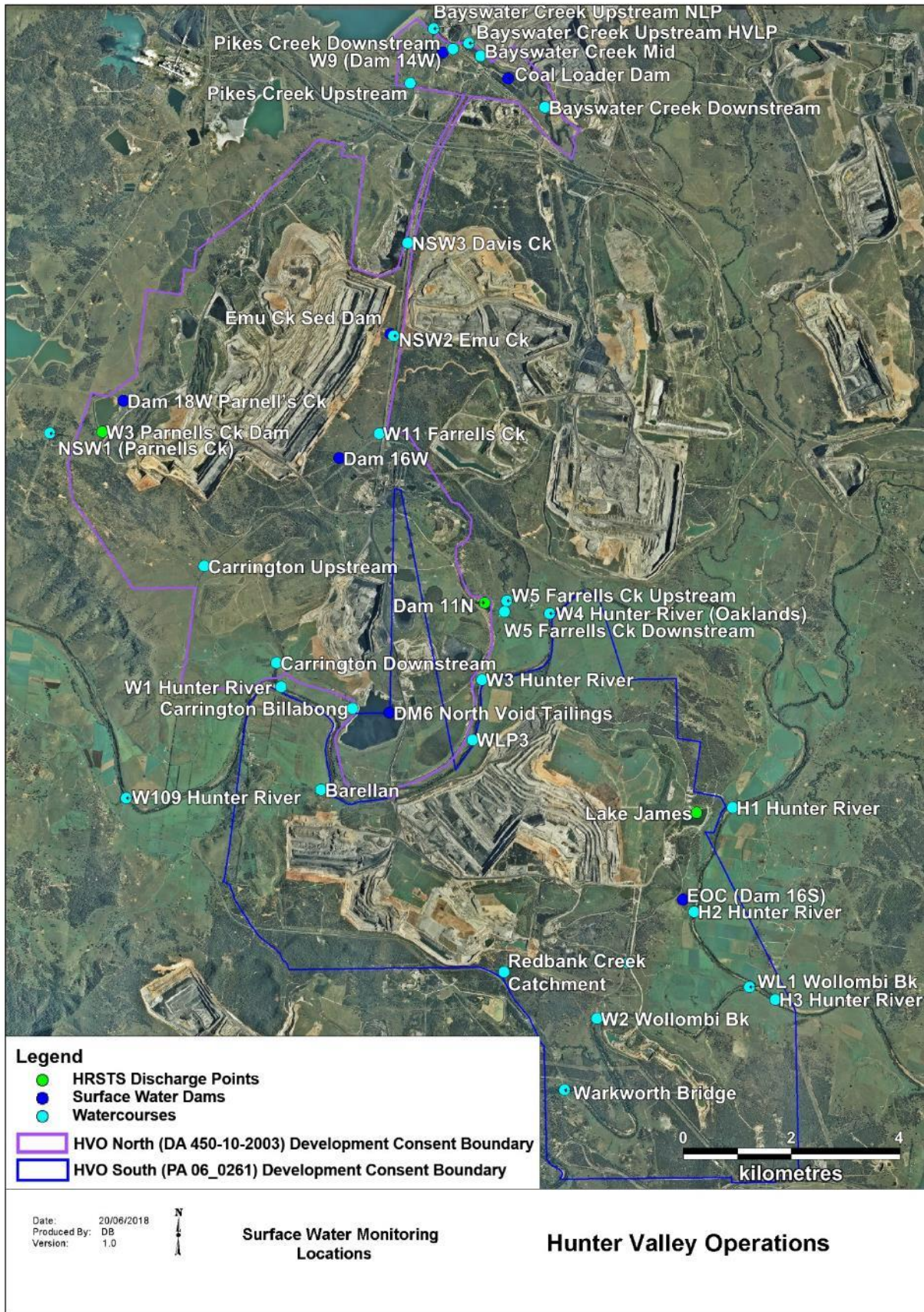


Figure 13 - HVO Surface Water Monitoring Locations

3.1.1 Surface Water Trigger Tracking

Internal trigger limits have been developed to assess monitoring data on an on-going basis and to highlight potentially adverse surface water impacts. The process for evaluating monitoring results against the internal triggers and subsequent responses are outlined in the HVO Water Management Plan.

Surface water trigger tracking results are provided on a quarterly basis; results will appear in the December 2021 report.

3.2 Site Water Use

HVO is permitted to extract water from the Hunter River under water allocation licenses issued by Water NSW.

HVO did not extract water from the Hunter River during the reporting period.

3.3 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.

HVO discharged 728.49 ML under the HRSTS during the reporting period.

3.4 Groundwater Monitoring Results

Groundwater monitoring is undertaken on a quarterly basis in accordance with the HVO Water Management Plan and Groundwater Monitoring Program. The location of groundwater monitoring points across HVO are show in **Figure 14**.

Groundwater monitoring results are provided on a quarterly basis. Results will be provided in the December 2021 Monthly Environmental Monitoring Report.

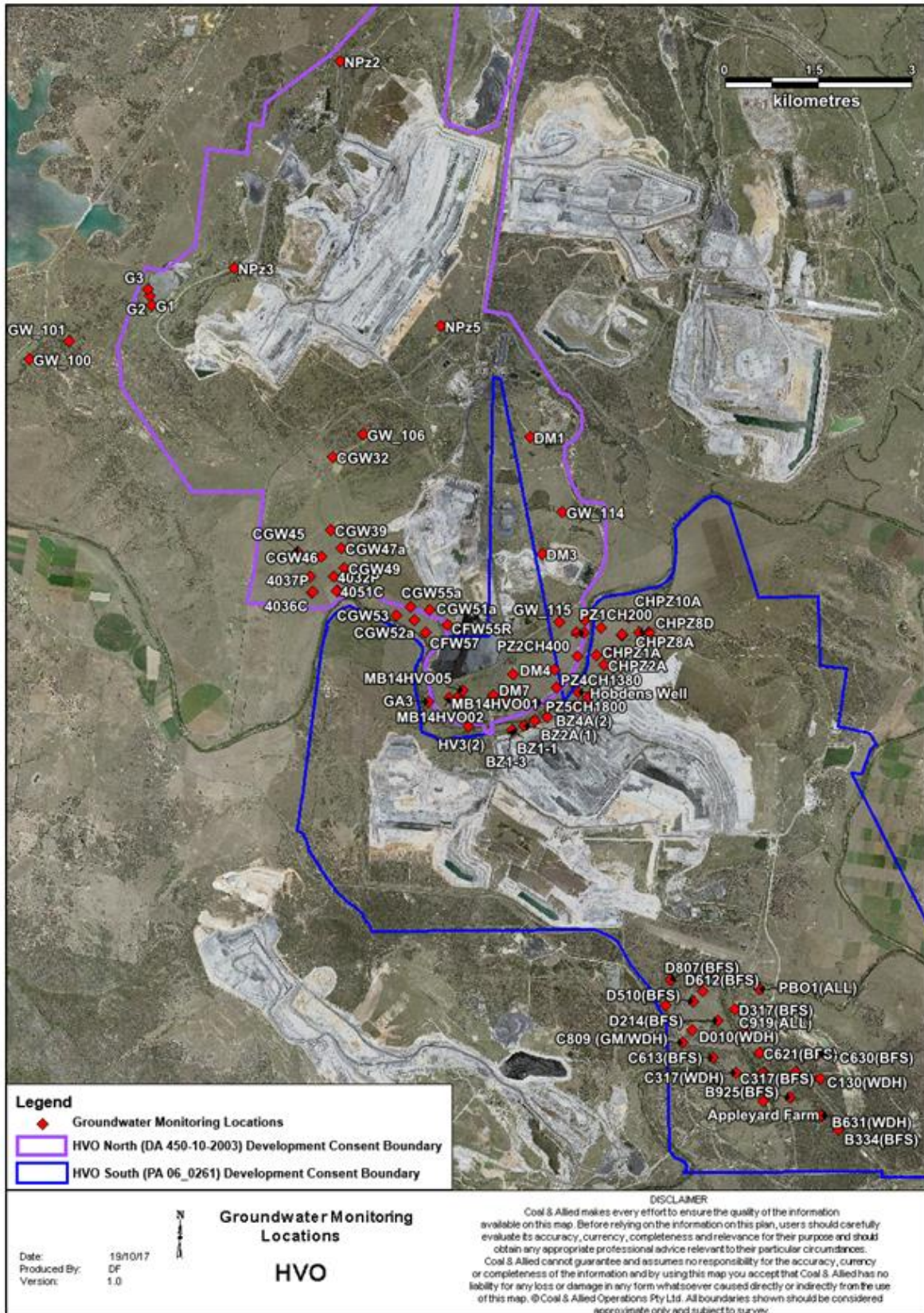


Figure 14 Groundwater monitoring Locations at HVO

3.4.1 Groundwater Trigger Tracking

Internal trigger limits have been developed to assess monitoring data on an on-going basis and to highlight potentially adverse groundwater impacts. The process for evaluating monitoring results against the internal triggers and subsequent responses is outlined in the HVO Water Management Plan.

Groundwater trigger tracking results are provided on a quarterly basis. Results will be provided in the December 2021 Monthly Environmental Monitoring Report.

4 Blasting

HVO maintains a network of blast monitoring units located at nearby privately owned residences and function as regulatory compliance monitors. The location of these monitors can be found in **Figure 15**. Blasting criteria for HVO are summarised in **Table 2**.

Table 2 - Blasting Criteria

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

4.1 Blast Monitoring Results

Twenty-two (22) blasts were initiated at HVO during the reporting period. Blast monitoring results for the period are shown in **Table 3** and **Table 4**.

Table 3 - Overpressure Blast Monitoring Results for the reporting period

Date and Time	Moses Crossing (dB)	Jerrys Plains Village (dB)	Maison Dieu (dB)	Warkworth (dB)	Knodlers Lane (dB)
1/11/2021 11:58	93.87	82.91	85.73	90.86	86.06
1/11/2021 11:59	87.02	80.8	79.72	88.07	82.97
1/11/2021 12:59	97.03	91.81	95.9	100.51	99.36
4/11/2021 13:24	84.7	84.87	88.12	91.54	89.78
4/11/2021 13:26	88.56	92.88	88.78	88.21	90.63
5/11/2021 13:06	89.86	84.05	83.22	80.94	88.71
6/11/2021 13:01	92.97	81.29	92.81	97.35	94.92
6/11/2021 13:03	86.71	79.36	95.9	101.15	94.82
8/11/2021 10:07	86.89	89.35	80.6	91.88	80.12
9/11/2021 10:00	89.87	86.53	81.82	91.23	86.45
10/11/2021 13:18	95.66	102.87	88.85	100.09	98.5
11/11/2021 13:06	91.78	95.08	99.14	97.11	102.48
16/11/2021 9:39	94.27	99.1	104.42	92.59	101.72
16/11/2021 13:09	99.2	105.86	90.27	84.04	92.51
16/11/2021 13:10	97.58	98.24	85.03	97.01	91.72
18/11/2021 12:58	87.59	101.61	98.15	98.21	101.1
18/11/2021 12:58	89.48	91.41	97.84	97.64	100.44
19/11/2021 13:01	86.86	85.59	93.15	96.6	98.28
20/11/2021 12:51	89.04	89.02	104.02	90.14	104.91
22/11/2021 13:08	106.86	94.21	102.62	95.25	109.34
25/11/2021 12:56	88.75	88.19	97.03	99.78	98.39
30/11/2021 13:05	79.26	91.2	86.62	81.81	99.28

Table 4 - Ground Vibration Blast Monitoring Results for the reporting period

Date and Time	Moses Crossing (mm/s)	Jerrys Plains Village (mm/s)	Maison Dieu (mm/s)	Warkworth (mm/s)	Knodlers Lane (mm/s)
1/11/2021 11:58	0.13	0.04	0.07	0.13	0.08
1/11/2021 11:59	0.24	0.08	0.08	0.39	0.13
1/11/2021 12:59	0.22	0.08	0.1	0.85	0.15
4/11/2021 13:24	0.12	0.05	0.09	0.56	0.11
4/11/2021 13:26	0.22	0.12	0.09	0.19	0.13
5/11/2021 13:06	0.16	0.03	0.05	0.11	0.09
6/11/2021 13:01	0.1	0.05	0.12	0.22	0.14
6/11/2021 13:03	0.1	0.05	0.06	0.16	0.17
8/11/2021 10:07	0.12	0.17	0.08	0.55	0.09
9/11/2021 10:00	0.11	0.03	0.04	0.14	0.08
10/11/2021 13:18	0.1	0.02	0.05	1.06	0.08
11/11/2021 13:06	0.16	0.1	0.13	1.26	0.15
16/11/2021 9:39	0.21	0.09	0.29	0.32	0.16
16/11/2021 13:09	0.13	0.07	0.08	0.31	0.09
16/11/2021 13:10	0.16	0.08	0.1	0.12	0.09
18/11/2021 12:58	0.18	0.1	0.2	0.4	0.22
18/11/2021 12:58	0.15	0.09	0.17	0.56	0.28
19/11/2021 13:01	0.11	0.03	0.14	0.65	0.15
20/11/2021 12:51	0.15	0.13	0.08	0.53	0.11
22/11/2021 13:08	0.1	0.02	0.05	0.3	0.08
25/11/2021 12:56	0.17	0.06	0.27	0.57	0.26
30/11/2021 13:05	0.12	0.06	0.05	0.21	0.08

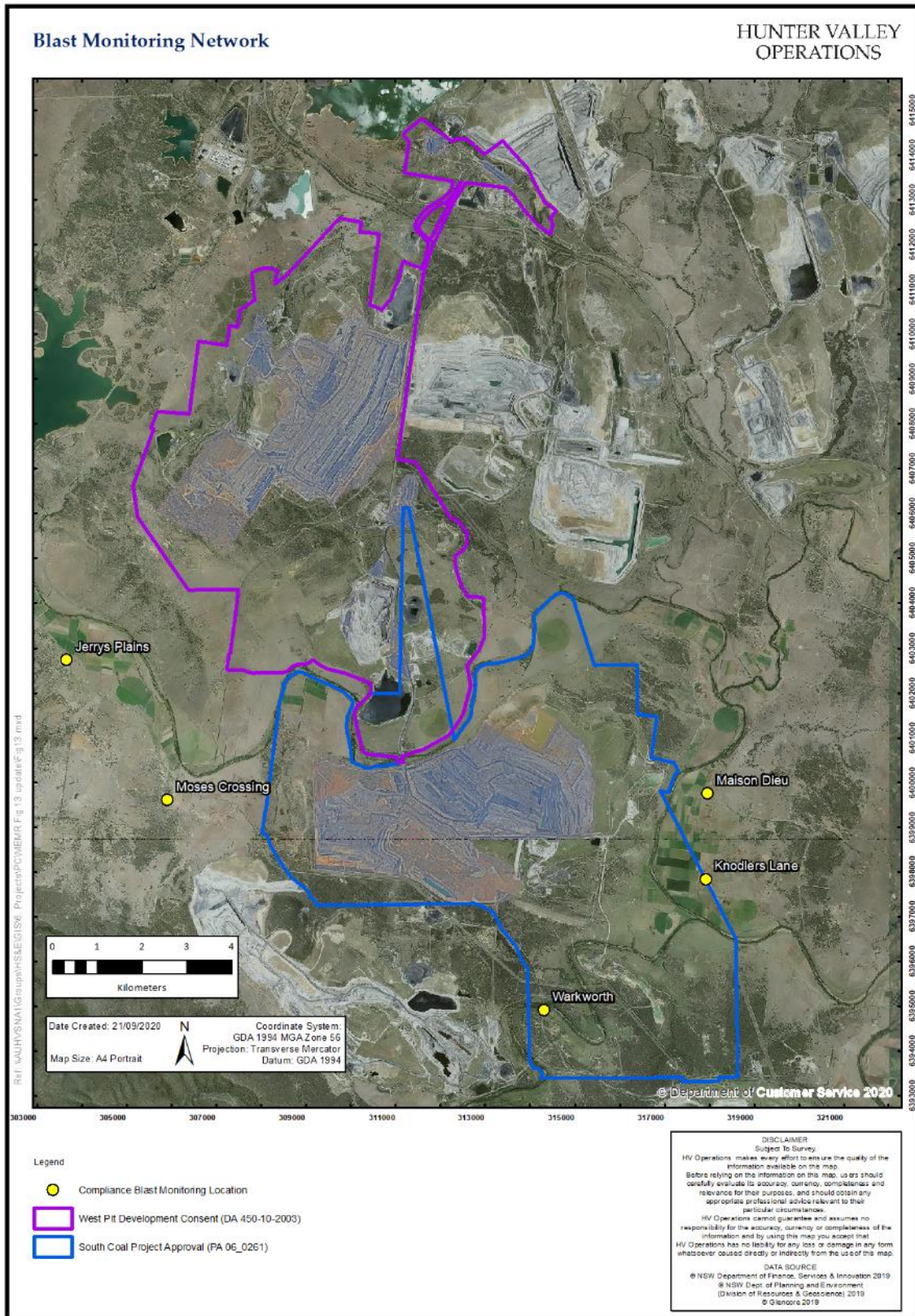


Figure 15 - Blast Monitoring Location Plan

5 Noise

Routine attended noise monitoring occurs at defined locations around HVO, as described in the HVO Noise Monitoring Program. The noise monitoring aims to quantify and describe the acoustic environment around the site and compare results with specified limits. The attended noise monitoring locations are displayed in **Figure 16**.

5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations around HVO during the night period of 9/10 and 29/30 November 2021

Monitoring results are detailed in **Table 5** to **Table 9**.

Table 5 - LAeq,15minute HVO North Against Impact Assessment Criteria for the Reporting Period

Location	Date and Time	Wind Speed (m/s) ¹	Stability Class	Criterion (A)	Criterion Applies ²	HVO North LAeq ^{3,4,5,6}	Exceedance ^{4,5}
Shearers Lane	29/11/2021 21:00	1.7	E	35	Yes	IA	Nil
Knodlers Lane	29/11/2021 21:41	1.3	E	35	Yes	IA	Nil
Maison Dieu	29/11/2021 21:21	2	D	35	Yes	IA	Nil
Long Point (Dights Crossing)	29/11/2021 22:31	2.1	E	35	Yes	IA	Nil
Kilburnie South	29/11/2021 23:20	2	D	39	Yes	IA	Nil
Jerrys Plains East	29/11/2021 22:56	1.7	E	39	Yes	30	Nil
Jerrys Plains Village	29/11/2021 21:22	2	D	40	Yes	32	Nil
Jerrys Plains West	29/11/2021 21:00	1.7	E	40	Yes	31	Nil
HVGC	29/11/2021 23:48	2.2	D	Nil	Yes	NM	Nil
Kilburnie South	9/11/2021 21:00	3.6	D	39	Yes	IA	NA
Jerrys Plains East	9/11/2021 21:25	3.2	D	39	Yes	36	NA
Jerrys Plains Village	9/11/2021 21:59	3.3	D	40	Yes	34	NA

1. Atmospheric data is sourced from the HVO Corporate AWS using logged meteorological data;

2. Noise criteria apply under all meteorological conditions except during periods of rain or hail, wind speeds greater than 3 m/s measured at 10 metres above ground level, or temperature inversion conditions greater than 3°C/100m (G stability class);

3. Site-only LAeq 15 minute attributed to HVO North Pit Area, including modifying factors if applicable;

4. Bold results in red indicate exceedance of criterion;

5. NA in criterion column indicates no criterion is applicable at this location. NA in exceedance column means atmospheric conditions outside specified in approval therefore criterion not applicable;

Table 6 - LAeq,15minute HVO North Against Land Acquisition Criteria for the Reporting Period

Location	Date and Time	Wind Speed (m/s) ¹	Stability Class	Criterion (A)	Criterion Applies ²	HVO North LAeq ^{3,4,6}	Exceedance ^{4,5}
Shearers Lane	29/11/2021 21:00	1.7	E	41	Yes	IA	Nil
Knodlers Lane	29/11/2021 21:41	1.3	E	41	Yes	IA	Nil
Maison Dieu	29/11/2021 21:21	2	D	41	Yes	IA	Nil
Long Point (Dights Crossing)	29/11/2021 22:31	2.1	E	41	Yes	IA	Nil
Kilburnie South	29/11/2021 23:20	2	D	41	Yes	IA	Nil
Jerrys Plains East	29/11/2021 22:56	1.7	E	41	Yes	30	Nil
Jerrys Plains Village	29/11/2021 21:22	2	D	41	Yes	32	Nil
Jerrys Plains West	29/11/2021 21:00	1.7	E	41	Yes	31	Nil
HVGC	29/11/2021 23:48	2.2	D	NA	Yes	NM	Nil
Kilburnie South	9/11/2021 21:00	3.6	D	41	No	IA	NA
Jerrys Plains East	9/11/2021 21:25	3.2	D	41	No	36	NA
Jerrys Plains Village	9/11/2021 21:59	3.3	D	41	No	34	NA

1. Atmospheric data is sourced from the HVO Corporate AWS using logged meteorological data;

2. Noise criteria apply under all meteorological conditions except during periods of rain or hail, wind speeds greater than 3 m/s measured at 10 metres above ground level, or temperature inversion conditions greater than 3°C/100m (G stability class);

3. Site-only LAeq,15minute attributed to HVO North Pit Area, including modifying factors if applicable;

4. Bold results in red indicate exceedance of criterion; and

5. NA in criterion column indicates no criterion is applicable at this location. NA in exceedance column means atmospheric conditions outside specified in approval, therefore criterion was not applicable.

Table 7 - LA1,1minute HVO North Against Impact Assessment Criteria for the Reporting Period

Location	Date and Time	Wind Speed (m/s) ¹	Stability Class	Criterion (A)	Criterion Applies ²	HVO North L _{Aeq} ^{3,4,6}	Exceedance ^{4,5}
Shearers Lane	29/11/2021 21:00	1.7	E	46	Yes	IA	Nil
Knodlers Lane	29/11/2021 21:41	1.3	E	46	Yes	IA	Nil
Maison Dieu	29/11/2021 21:21	2	D	46	Yes	IA	Nil
Long Point (Dights Crossing)	29/11/2021 22:31	2.1	E	46	Yes	IA	Nil
Kilburnie South	29/11/2021 23:20	2	D	46	Yes	IA	Nil
Jerrys Plains East	29/11/2021 22:56	1.7	E	46	Yes	33	Nil
Jerrys Plains Village	29/11/2021 21:22	2	D	46	Yes	36	Nil
Jerrys Plains West	29/11/2021 21:00	1.7	E	46	Yes	34	Nil
HVGC	29/11/2021 23:48	2.2	D	NA	Yes	NM	Nil
Kilburnie South	9/11/2021 21:00	3.6	D	46	Yes	IA	Nil
Jerrys Plains East	9/11/2021 21:25	3.2	D	46	Yes	38	Nil
Jerrys Plains Village	9/11/2021 21:59	3.3	D	46	Yes	36	Nil

1. Atmospheric data is sourced from the HVO Corporate AWS using logged meteorological data;

2. Noise criteria apply under all meteorological conditions except during periods of rain or hail, wind speeds greater than 3 m/s measured at 10 metres above ground level, or temperature inversion conditions greater than 3°C/100m (G stability class);

3. Site-only LA1,1minute attributed to HVO North Pit Area;

4. Bold results in red indicate exceedance of criterion; and

5. NA in criterion column indicates no criterion is applicable at this location. NA in exceedance column means atmospheric conditions outside specified in approval, therefore criterion was not applicable.

Table 8 - LAeq,15minute HVO South Against Impact Assessment Criteria for the Reporting Period

Location	Date and Time	Wind Speed (m/s) ¹	Stability Class	Criterion (A)	Criterion Applies ²	HVO South LAeq ^{3,4,6}	Exceedance ^{4,5}
Shearers Lane	29/11/2021 21:00	2.8	E	41	Yes	IA	Nil
Knodlers Lane	29/11/2021 21:41	2.7	E	40	Yes	IA	Nil
Maison Dieu	29/11/2021 21:21	3	E	39	No	IA	NA
Long Point (Dights Crossing)	29/11/2021 22:31	3.1	E	37	No	34	NA
Kilburnie South	29/11/2021 23:20	2.6	D	39	Yes	30	Nil
Jerrys Plains East	29/11/2021 22:56	2.8	E	38	Yes	IA	Nil
Jerrys Plains Village	29/11/2021 21:22	3	E	38	No	IA	NA
Jerrys Plains West	29/11/2021 21:00	2.8	E	35	Yes	IA	Nil
HVGC	29/11/2021 23:48	2.5	E	55	Yes	NM	Nil

1. Atmospheric data is sourced from the HVO Cheshunt AWS using logged meteorological data;

2. Noise criteria apply under meteorological conditions of wind speeds up to 3 m/s measured at 10 metres above ground level and temperature inversion conditions of up to 3°C/100m (G stability class);

3. Site-only LAeq,15minute attributed to HVO South Pit Area, including modifying factors if applicable;

4. Bold results in red indicate exceedance of criterion; and

5. NA in criterion column indicates no criterion is applicable at this location. NA in exceedance column means atmospheric conditions outside specified in approval, therefore criterion was not applicable.

Table 9 - LA1, 1minute HVO South Against Impact Assessment Criteria for the Reporting Period

Location	Date and Time	Wind Speed (m/s) ¹	Stability Class	Criterion (A)	Criterion Applies ²	HVO South L _{Aeq} ^{3,4,6,7}	Exceedance ^{4,5}
Shearers Lane	29/11/2021 21:00	2.8	E	45	Yes	IA	Nil
Knodlers Lane	29/11/2021 21:41	2.7	E	45	Yes	IA	Nil
Maison Dieu	29/11/2021 21:21	3	E	45	No	IA	NA
Long Point (Dights Crossing)	29/11/2021 22:31	3.1	E	45	No	IA	NA
Kilburnie South	29/11/2021 23:20	2.6	D	45	Yes	44	Nil
Jerrys Plains East	29/11/2021 22:56	2.8	E	45	Yes	32	Nil
Jerrys Plains Village	29/11/2021 21:22	3	E	45	No	IA	NA
Jerrys Plains West	29/11/2021 21:00	2.8	E	45	Yes	IA	Nil
HVGC	29/11/2021 23:48	2.5	E	NA	Yes	NM	Nil

1. Atmospheric data is sourced from the HVO Cheshunt AWS using logged meteorological data;
2. Noise criteria apply under meteorological conditions of wind speeds up to 3 m/s measured at 10 metres above ground level and temperature inversion conditions of up to 3°C/100m (G stability class);
3. Site-only LA1, 1minute attributed to HVO South Pit Area;
4. Bold results in red indicate exceedance of criterion; and
5. NA in criterion column indicates no criterion is applicable at this location. NA in exceedance column means atmospheric conditions outside specified in approval, therefore criterion was not applicable.

5.2 Low Frequency Assessment

In accordance with the requirements of the EPA’s Noise Policy for Industry (NPfI), the applicability of the low frequency modification penalty has been assessed. No penalties were applied for monitoring undertaken through the reporting period. The assessments for the low frequency noise are shown in **Table 10** and **Table 11**.

Table 10 - Modifying Factor Assessment HVO North for the Reporting Period

Location	Date and Time	Measured HVO North L_{Aeq}	Criterion Applies?	Intermittency Modifying Factor?	Tonality Modifying Factor?	Frequency of Tonality ¹	Low-frequency Modifying Factor?	Maximum Exceedance of NPfI Reference Spectrum ^{1,2}	Total Penalty ²
Shearers Lane	29/11/2021 21:00	IA	Yes	No	No	NA	No	NA	Nil
Knodlers Lane	29/11/2021 21:41	IA	Yes	No	No	NA	No	NA	Nil
Maison Dieu	29/11/2021 21:21	IA	Yes	No	No	NA	No	NA	Nil
Long Point (Dights Crossing)	29/11/2021 22:31	IA	Yes	No	No	NA	No	NA	Nil
Kilburnie South	29/11/2021 23:20	IA	Yes	No	No	NA	No	NA	Nil
Jerrys Plains East	29/11/2021 22:56	30	Yes	No	No	NA	No	NA	Nil
Jerrys Plains Village	29/11/2021 21:22	32	Yes	No	No	NA	No	NA	Nil
Jerrys Plains West	29/11/2021 21:00	31	Yes	No	No	NA	No	NA	Nil
HVGC	29/11/2021 23:48	NM	Yes	No	No	NA	No	NA	Nil
Kilburnie South	9/11/2021 21:00	IA	Yes	No	No	NA	No	NA	Nil
Jerrys Plains East	9/11/2021 21:25	36	Yes	No	No	NA	No	NA	Nil
Jerrys Plains Village	9/11/2021 21:59	34	Yes	No	No	NA	No	NA	Nil

1. NA denotes 'not applicable'; and

2. Bold results indicate that application of NPfI modifying factor/s is required

Table 11 - Modifying Factor Assessment HVO South for the Reporting Period

Location	Date and Time	Measured HVO South L_{Aeq}	Criterion Applies?	Intermittency Modifying Factor?	Tonality Modifying Factor?	Frequency of Tonality ¹	Low-frequency Modifying Factor?	Maximum Exceedance of NPfI Reference Spectrum ^{1,2}	Total Penalty ²
Shearers Lane	29/11/2021 21:00	IA	Yes	No	No	NA	No	NA	Nil
Knodlers Lane	29/11/2021 21:41	IA	Yes	No	No	NA	No	NA	Nil
Maison Dieu	29/11/2021 21:21	IA	Yes	No	No	NA	No	NA	Nil
Long Point (Dights Crossing)	29/11/2021 22:31	IA	Yes	No	No	NA	No	NA	Nil
Kilburnie South	29/11/2021 23:20	34	Yes	No	No	NA	No	NA	Nil
Jerrys Plains East	29/11/2021 22:56	30	Yes	No	No	NA	No	NA	Nil
Jerrys Plains Village	29/11/2021 21:22	IA	Yes	No	No	NA	No	NA	Nil
Jerrys Plains West	29/11/2021 21:00	IA	Yes	No	No	NA	No	NA	Nil
HVGC	29/11/2021 23:48	NM	Yes	No	No	NA	No	NA	Nil

1. NA denotes 'not applicable'; and

2. Bold results indicate that application of NPfI modifying factor/s is required

5.3 Real Time Noise Monitoring

HVO utilises a network of real-time directional noise monitors to manage noise impacts on a continuous basis, shown in **Figure 16**. 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 that require investigation.

HVO investigates and responds to noise alarms with appropriate modification to operations. Changes in response to a noise alarm can include replacing equipment with alternative units, changing or relocating tasks, or shutting down equipment. It should be noted that this assessment does not compliment or conflict with attended noise monitoring detailed in **Section 5.1**. Real time monitoring data includes non-mine noise sources such as animals, road traffic and weather.

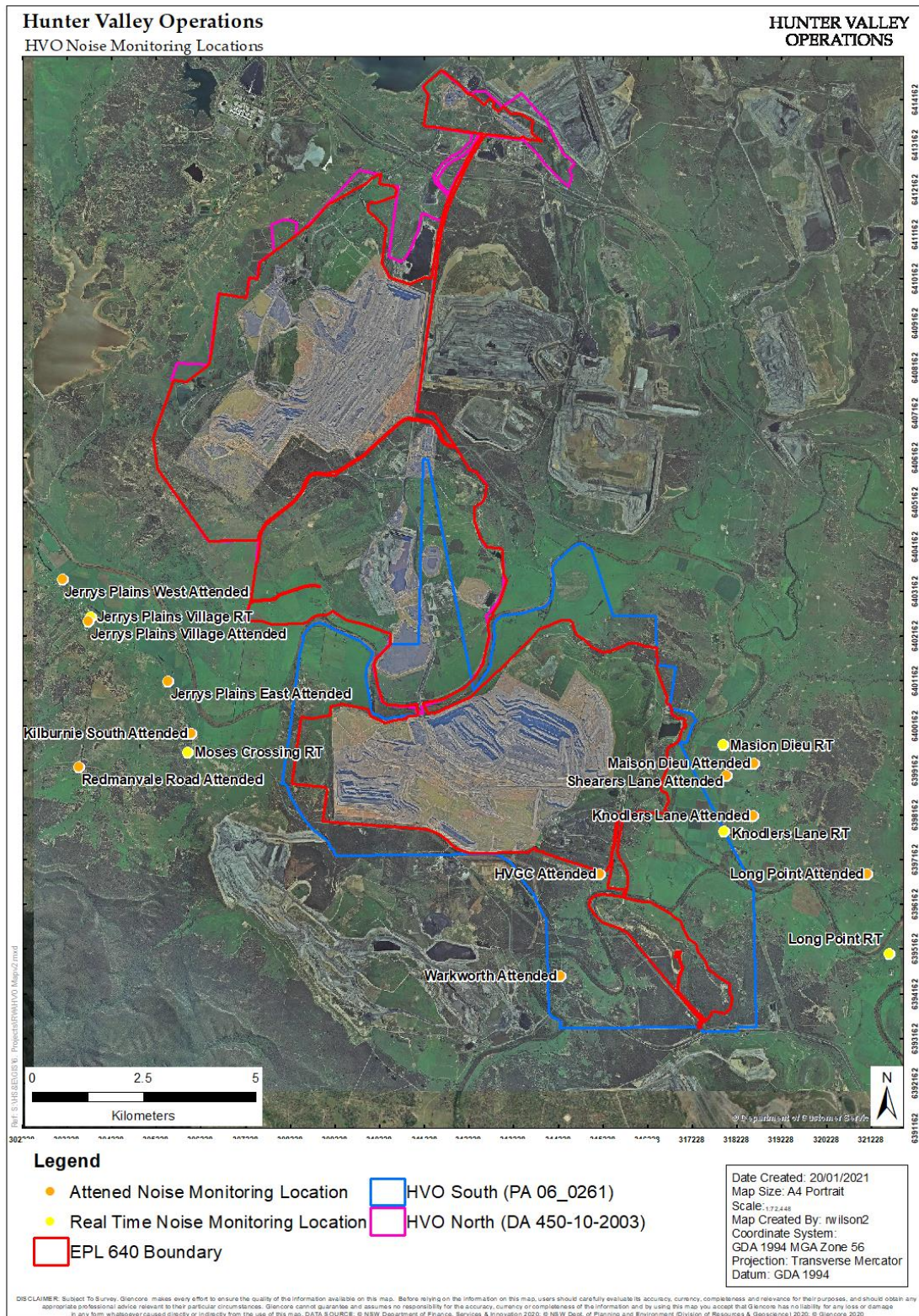


Figure 16 - Noise Monitoring Location Plan

6 Operational Downtime

A total of 132.4 hours of equipment downtime were logged in response to real time monitoring and inspections for environmental factors such as noise and dust during the reporting period. Operational downtime by equipment type is show in **Figure 17**.

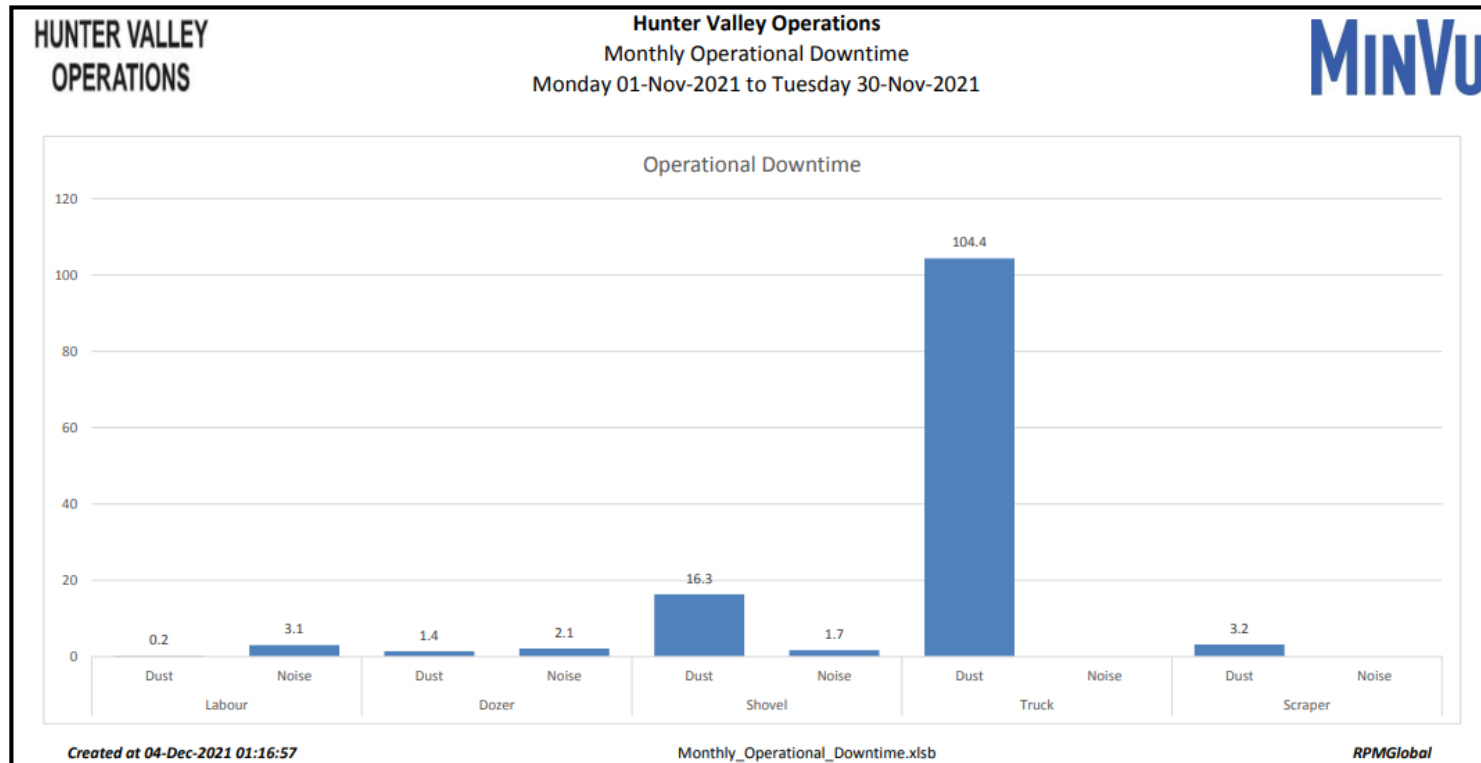


Figure 17

Note that these delays are instances where operations were completely stopped and does not include occasions where operations were changed/modified but not stopped (e.g. changed from exposed dump to in-pit dump).

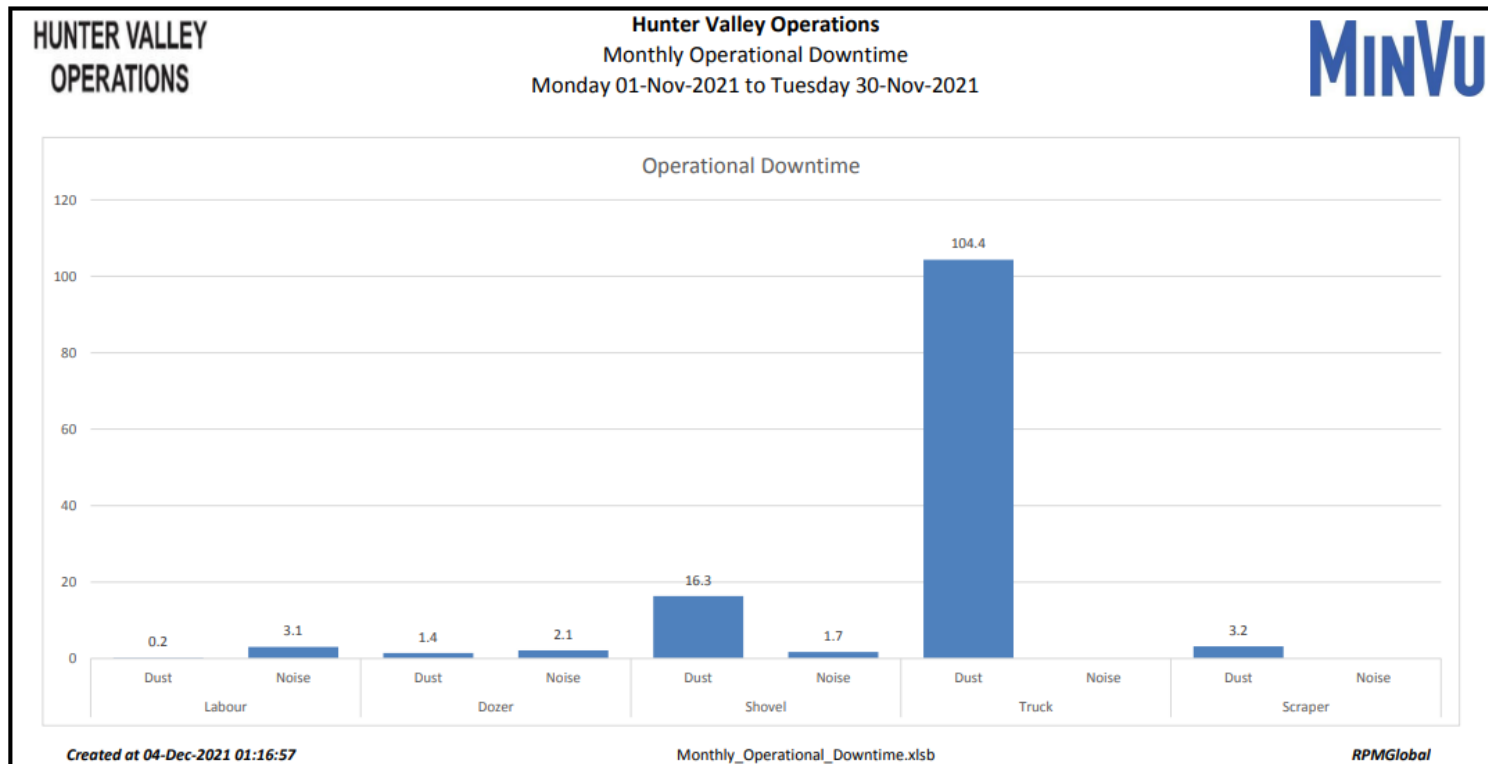


Figure 17 - Operational Downtime by Equipment Type for the reporting period

7 Rehabilitation

The following activities related to rehabilitation were completed during the reporting period:

- 14.9 Ha of land was reshaped
- 14.9 Ha of land was released (became available for the application of topsoil)
- 9.24 Ha of land was topsoiled
- 7.83 Ha of land was rehabilitated

Year to date progress is shown in **Figure 18**.

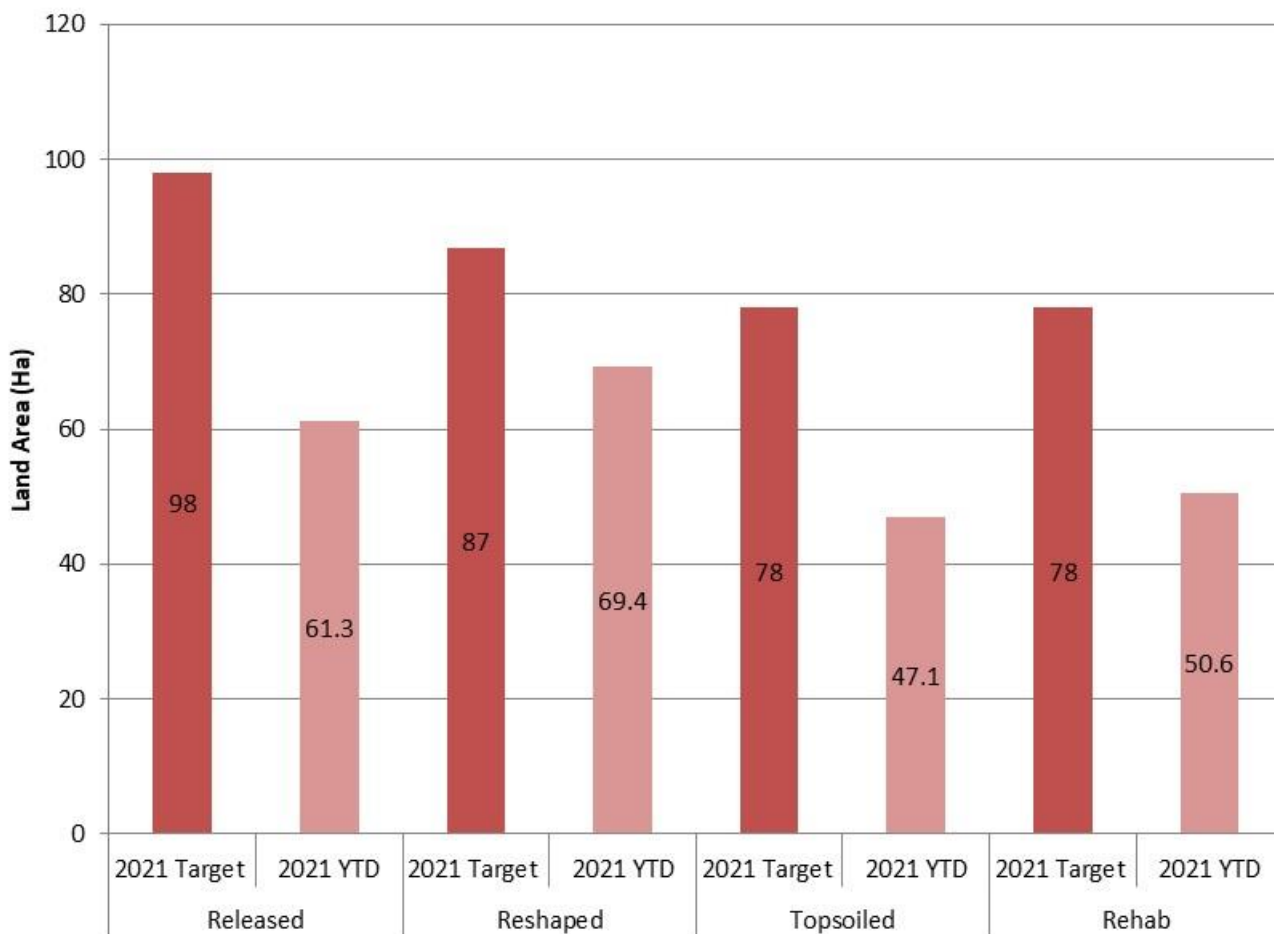


Figure 18 - Rehabilitation YTD November 2021

8 Complaints

No complaints were received during the reporting period. Details of complaints received are shown in **Table 12**.

Table 12 - Complaints Summary 2021

Month	Noise	Dust	Blast	Lighting	Other	Total
January	1	-	-	1	-	2
February	-	-	-	-	-	-
March	-	-	-	-	-	-
April	-	-	3	1	-	4
May	2	-	2	1	-	5
June	1	-	3	-	-	4
July	-	1	-	-	-	1
August	-	2	-	-	1	3
September	1	-	2	-	-	3
October	-	-	2	-	-	2
November	-	-	-	-	-	-
December						
Total	5	3	12	3	1	24

9 Environmental Incidents

There were three reportable environmental incidents during the reporting period:

- **24/11/2021 – Run Failure – Maison Dieu PM2.5 HVAS and Kilburnie South PM10 HVAS**

On 24 November, HVO was notified that both the Maison Dieu PM2.5 High Volume Air Sampler (HVAS) and Kilburnie South PM10 HVAS did not run on 23 November. Upon inspection a crack was found in the plug casing at the Maison Dieu PM2.5 monitor and is thought to have allowed water ingress. The socket was replaced on 26 November. An issue with the plug on the power lead is thought to be the cause of the trip at the Kilburnie South PM10 HVAS with the lead replaced on 24 November. Electrical testing and tagging was last undertaken in October 2021. The incident was notified to the DPIE.

- **26/11/2021 – Wandewoi TEOM Data Miscapture**

The TEOM stopped recording data from approximately 9:40pm on 26 November and resumed at approximately 1:20pm on 29 November. On inspection the cause was identified as a faulty relay in the thermal protection circuit. The miscapture will be reported in the Annual Return.

- **29/11/2021 – Run Failure – Kilburnie South PM10 HVAS**

On 30 November, HVO was notified that the Kilburnie South PM10 HVAS did not run on 29 November due to a motor drive or filter blockage error. The monitor has been removed for further investigation and a temporary unit organised whilst the existing unit is repaired.

Appendix A - Meteorological Data

Date	Air Temp Max (°C)	Air Temp Min (°C)	Relative Humidity (Max %)	Relative Humidity (Min %)	Solar Radiation Maximum (W/Sq. M)	Average Wind Direction (°)	Average Wind Speed (m/sec)	Rainfall (mm)
1/11/2021	23.21	2.862	98.5	32.17	1330	159	1.638	0
2/11/2021	26.7	6.55	97	29.94	1289	118.9	3.224	0
3/11/2021	27.12	5.108	100	28.77	1098	131.5	2.34	0
4/11/2021	21.36	8.77	100	62.12	646	108.2	1.705	0.4
5/11/2021	18.88	8.3	109.6	81.4	374.9	137.3	1.789	5.4
6/11/2021	27.92	5.547	110.8	38.72	1550	164.5	1.366	0.2
7/11/2021	25.15	9.44	110.3	60.54	1212	176.3	1.437	2.8
8/11/2021	27.5	8.97	111.4	48.68	1459	148.8	1.953	13
9/11/2021	29.06	8.63	100	30.87	1305	146	1.924	0
11/11/2021	24.03	8.77	111.7	67.2	909	129	1.791	26.2
11/11/2021	22.9	8.48	111.5	82.6	456.8	187.7	3.031	21
12/11/2021	26.95	5.784	111.5	38.36	1527	238.5	5.108	41.6
13/11/2021	17.94	5.731	82.4	38.24	1720	280.6	8.72	0
14/11/2021	21.12	3.14	82.1	23.84	1616	280.5	5.352	0.4
15/11/2021	21.55	4.085	81.2	25.86	1256	280.2	6.521	0.2
16/11/2021	23.65	1.557	78.37	26.19	1728	236.8	3.353	0
17/11/2021	23.92	3.323	93.9	37.94	1493	113.5	2.916	0
18/11/2021	27.69	4.704	100	28.12	1232	212.6	1.729	0
19/11/2021	26.73	10.84	88	48.23	686	278.4	3.127	0.2
20/11/2021	29.91	9.41	100	45.7	1406	214.9	2.28	0.8
21/11/2021	16.7	7.571	111.1	97	235.5	125.5	3.151	31.4
22/11/2021	20.22	6.031	110.4	61.15	1466	120.4	4.399	5
23/11/2021	24.22	7.166	110	62.58	1543	121.8	3.696	0.2
24/11/2021	28.35	10.08	110.6	47.9	1667	119.7	1.874	5.6
25/11/2021	26	11.21	111.5	70.56	1557	145.5	1.236	14.6

Date	Air Temp Max (°C)	Air Temp Min (°C)	Relative Humidity (Max %)	Relative Humidity (Min %)	Solar Radiation Maximum (W/Sq. M)	Average Wind Direction (°)	Average Wind Speed (m/sec)	Rainfall (mm)
26/11/2021	20.54	8.5	111.7	84.3	950	152	2.686	48
27/11/2021	16.61	6.323	100	82.1	427.1	124.2	3.728	1.6
28/11/2021	18.87	6.222	98.9	66.26	1655	122	3.284	0
29/11/2021	20.69	6.154	100	65.29	1487	124.7	2.112	0.6
30/11/2021	19.68	8.9	111.4	87.4	401.6	121.9	1.625	9.4