HUNTER VALLEY OPERATIONS

Monthly Environmental Monitoring Report July 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 31st July 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 2021 and 2020 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	106.4	157
March	178	335
April	12.8	347.8
May	28.2	376
June	60.2	436.2
July	22.8	459.0

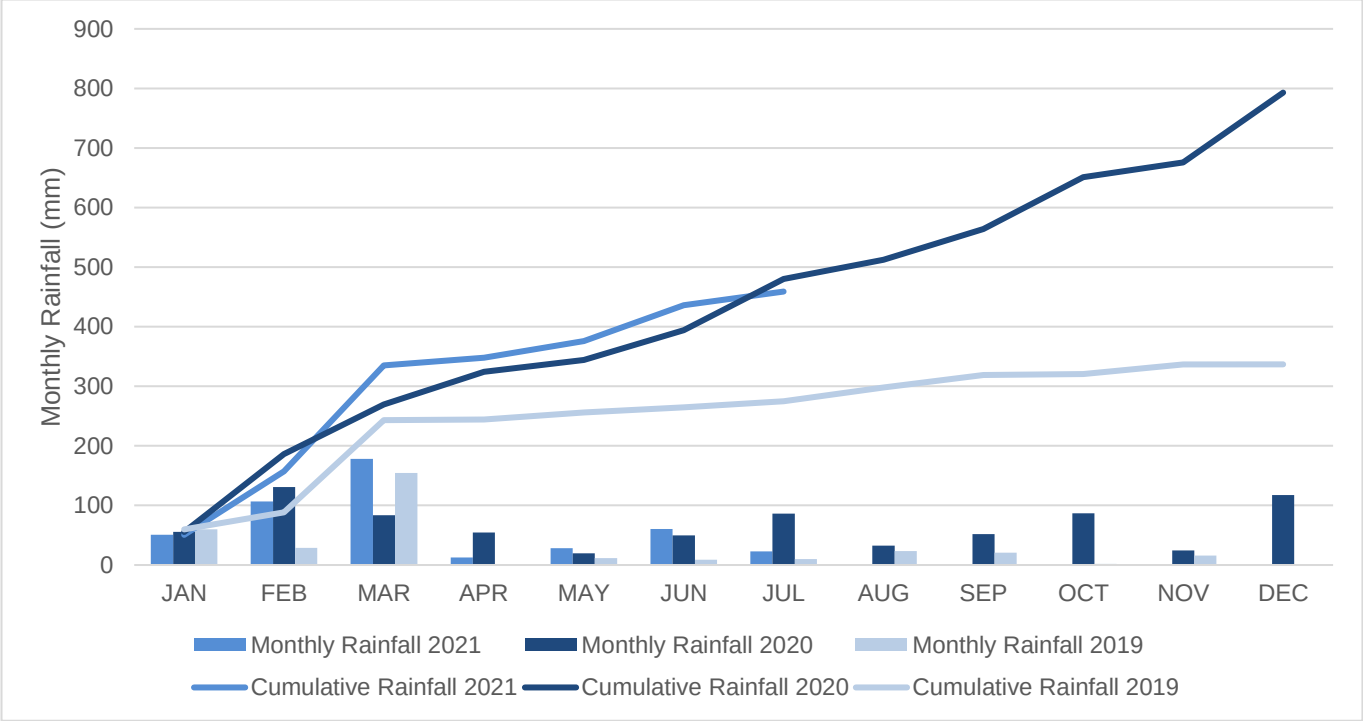

Figure 1 - Rainfall Summary 2021

2.1.2 Wind Speed and Direction

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

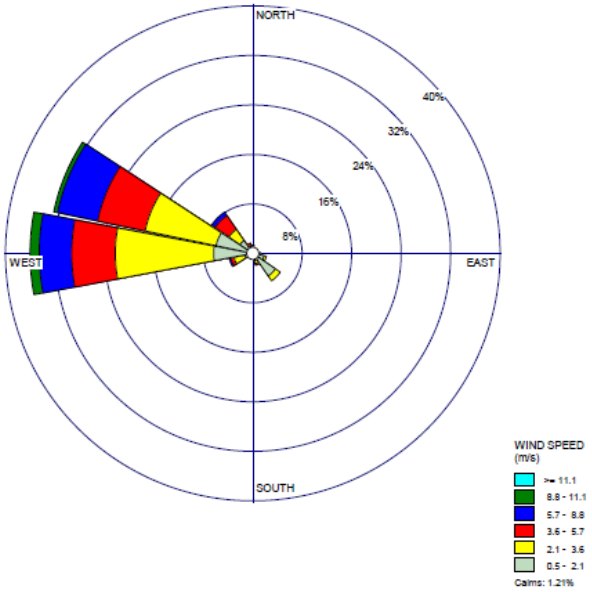

Figure 2 - HVO Corporate Wind Rose for the reporting period

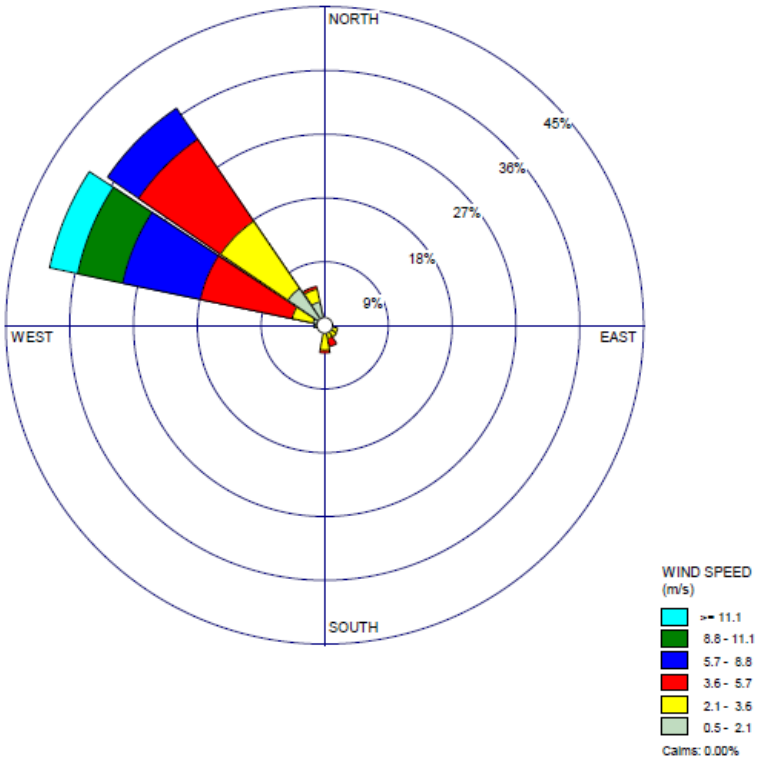

Figure 3 - HVO Cheshunt Wind Rose for the reporting period

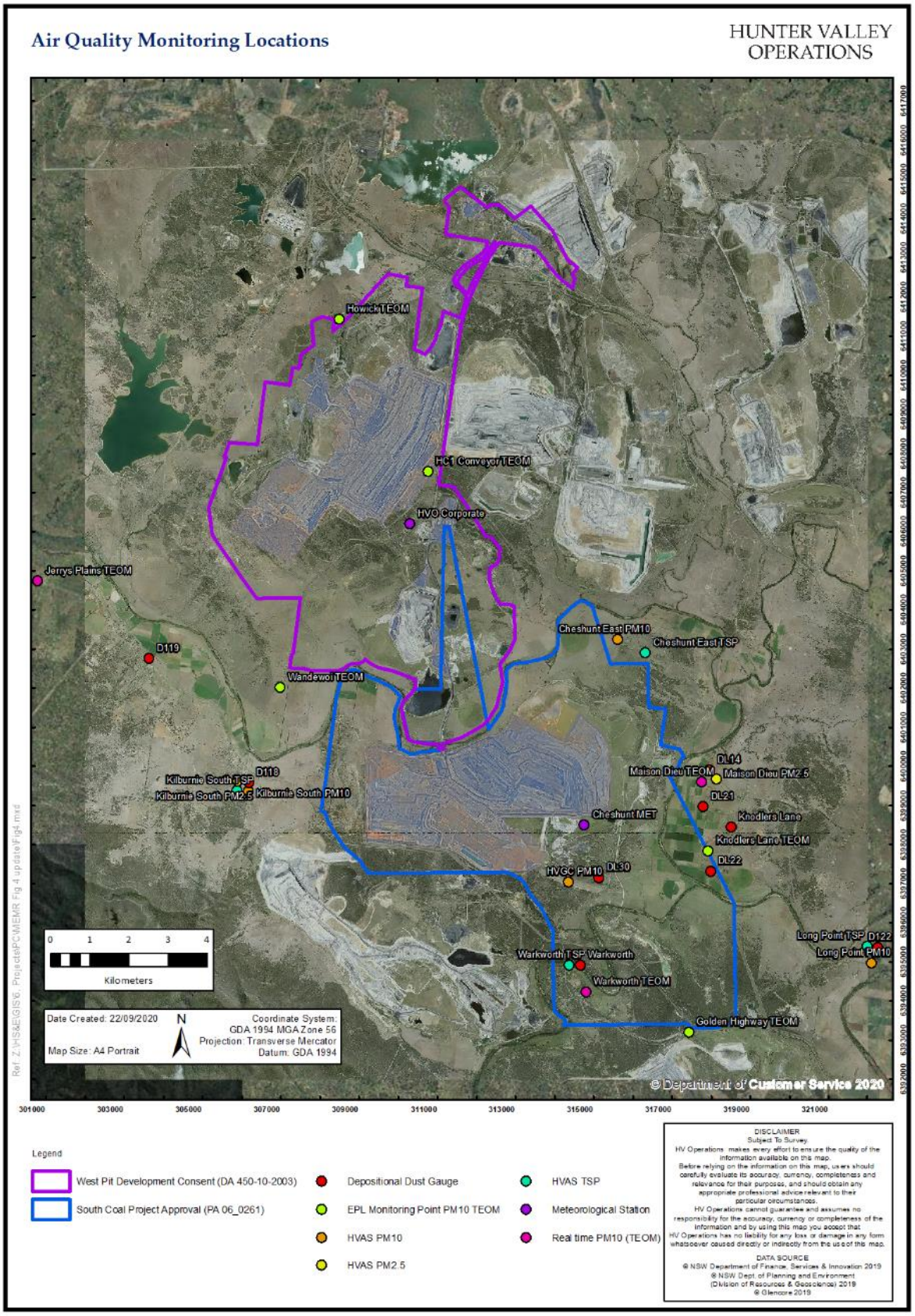

Figure 4 - Air Quality Monitoring Location Plan

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.

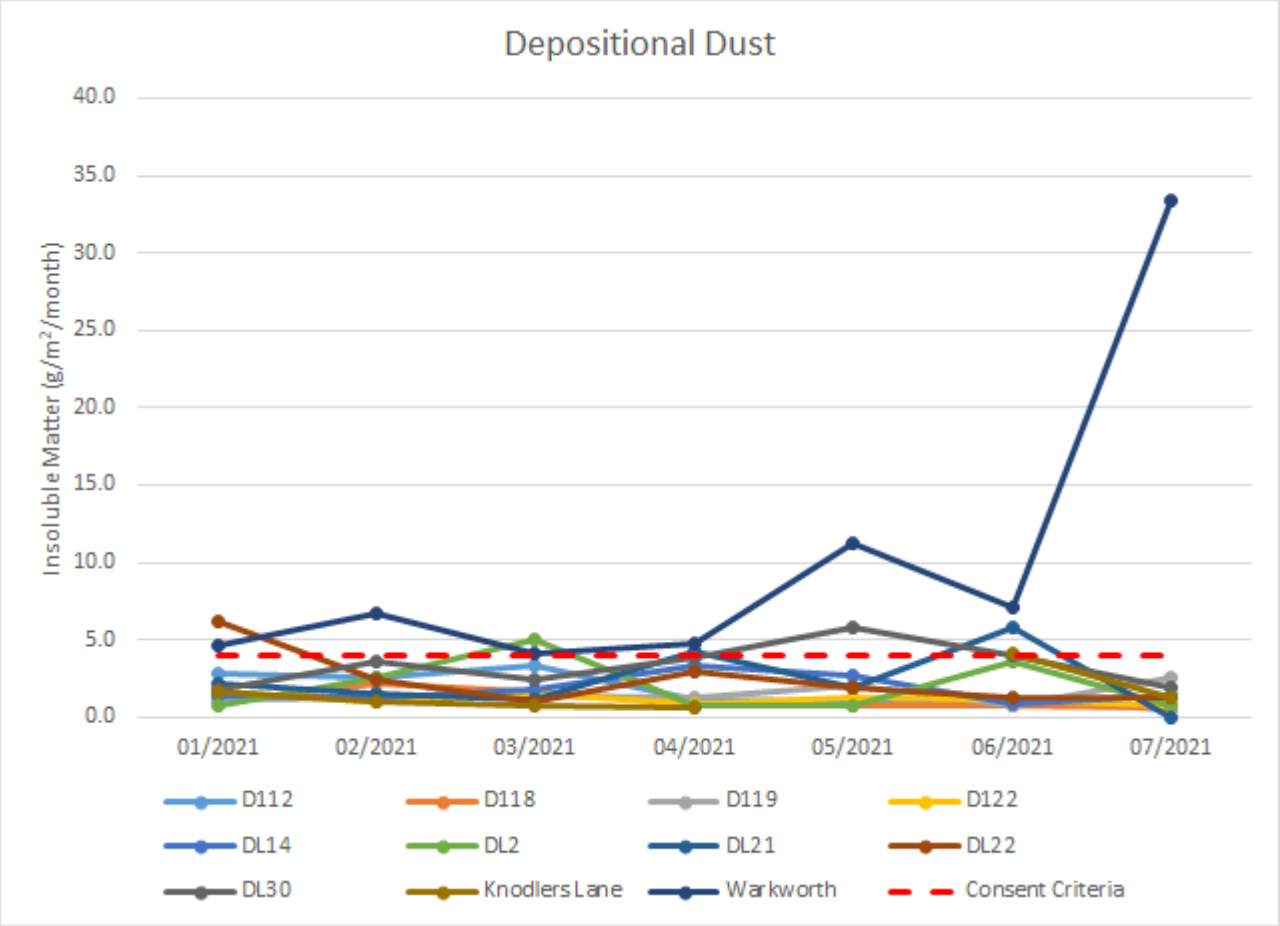

Figure* 5 - *Depositional Dust Results for the reporting period

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 (PM_{10}). 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 PM_{10} Results

2.3.1.1 Performance against short term impact assessment criteria

Figure 6 shows individual PM_{10} results at each monitoring station against the short-term impact assessment criteria of 50µg/m^3. All monitors were below the relevant short-term impact assessment criteria during the reporting period.

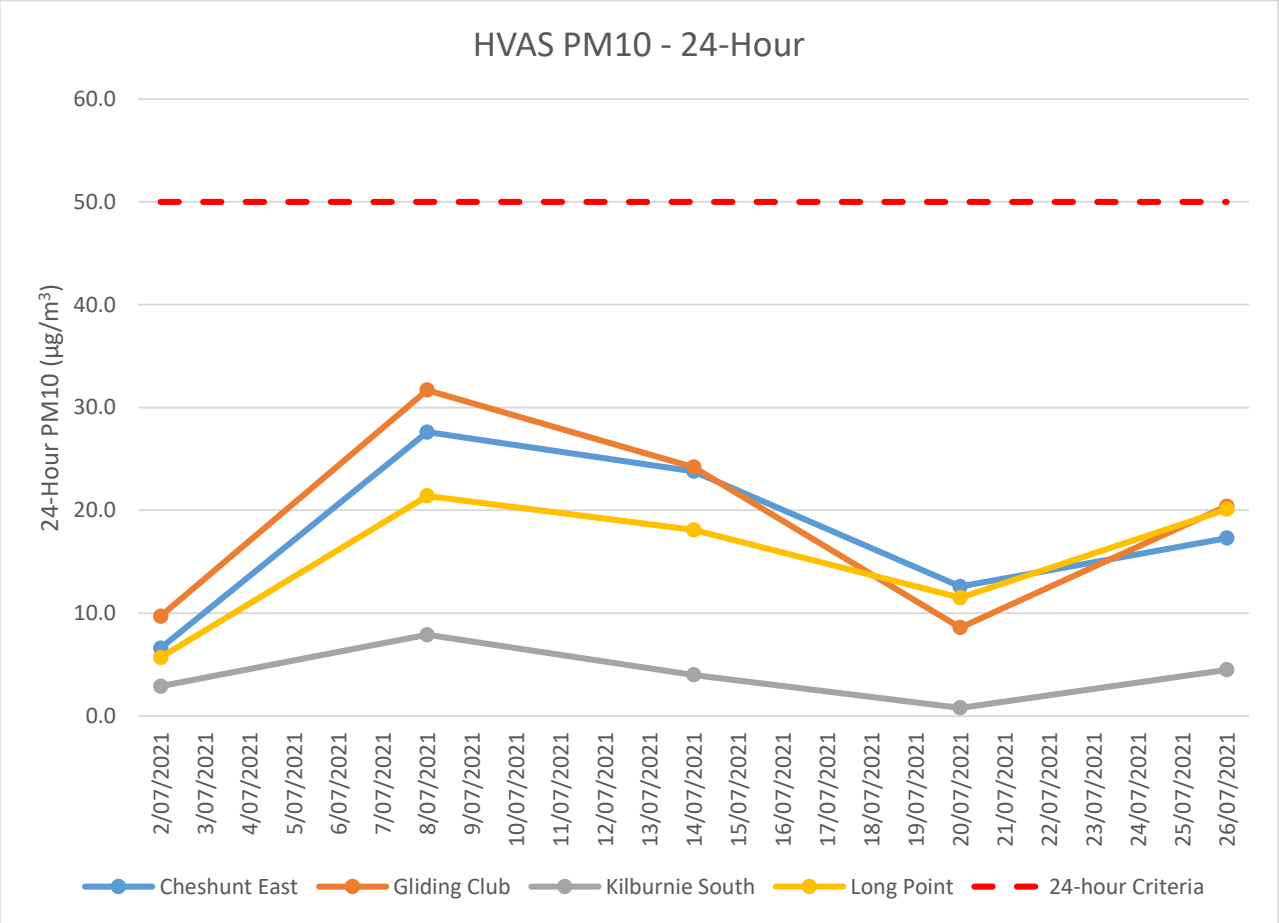

Figure 6 - Individual PM_{10} Results for the reporting period

2.3.1.2 Performance against long term impact assessment criteria

Figure 7 shows the year to date annual average PM_{10} 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.

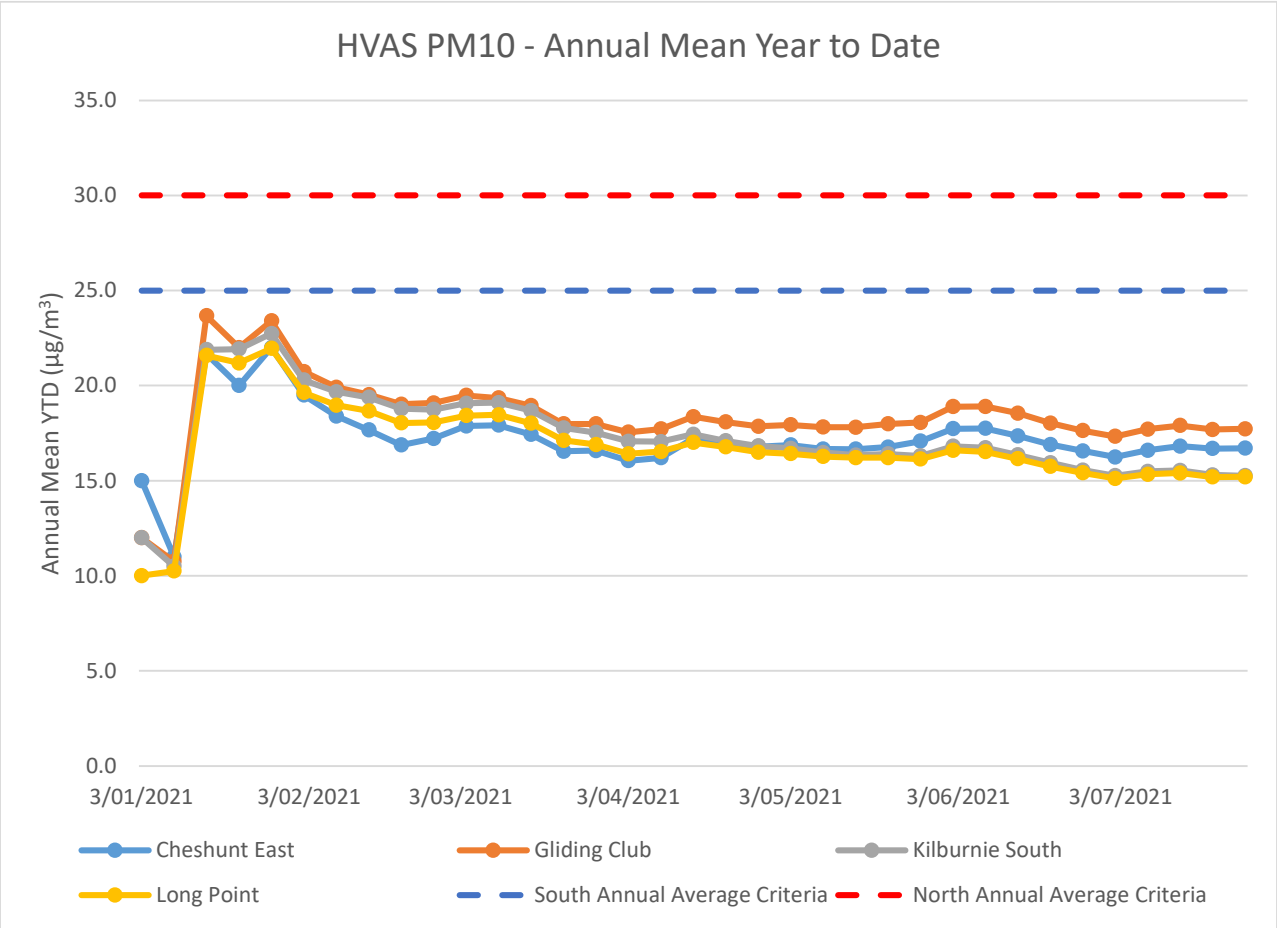

Figure 7 - Year to Date Average PM_{10} as at end of July 2021

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.

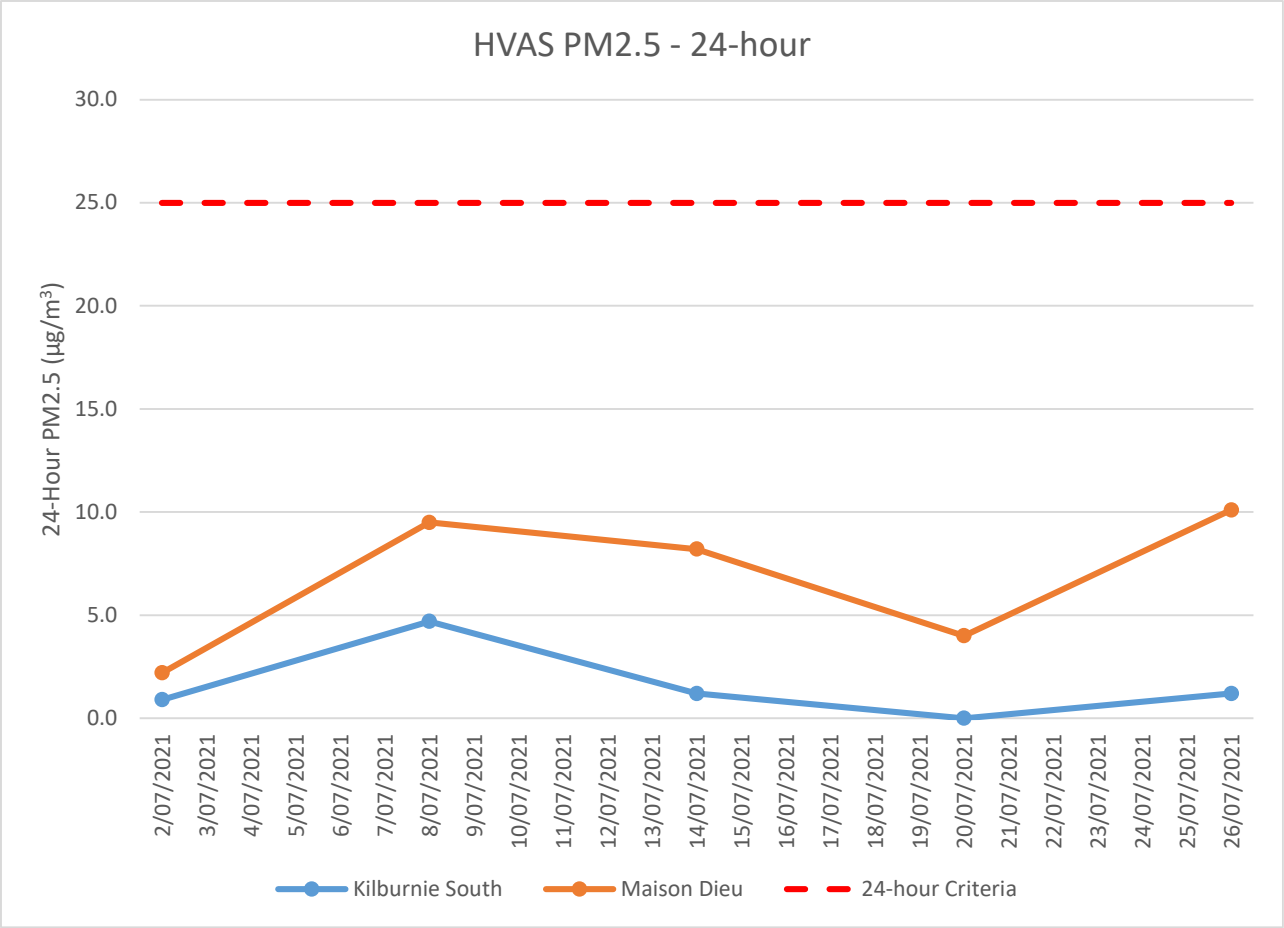

Figure 8 - Individual $PM_{2.5}$ Results for the reporting period

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 recorded an annual average 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.

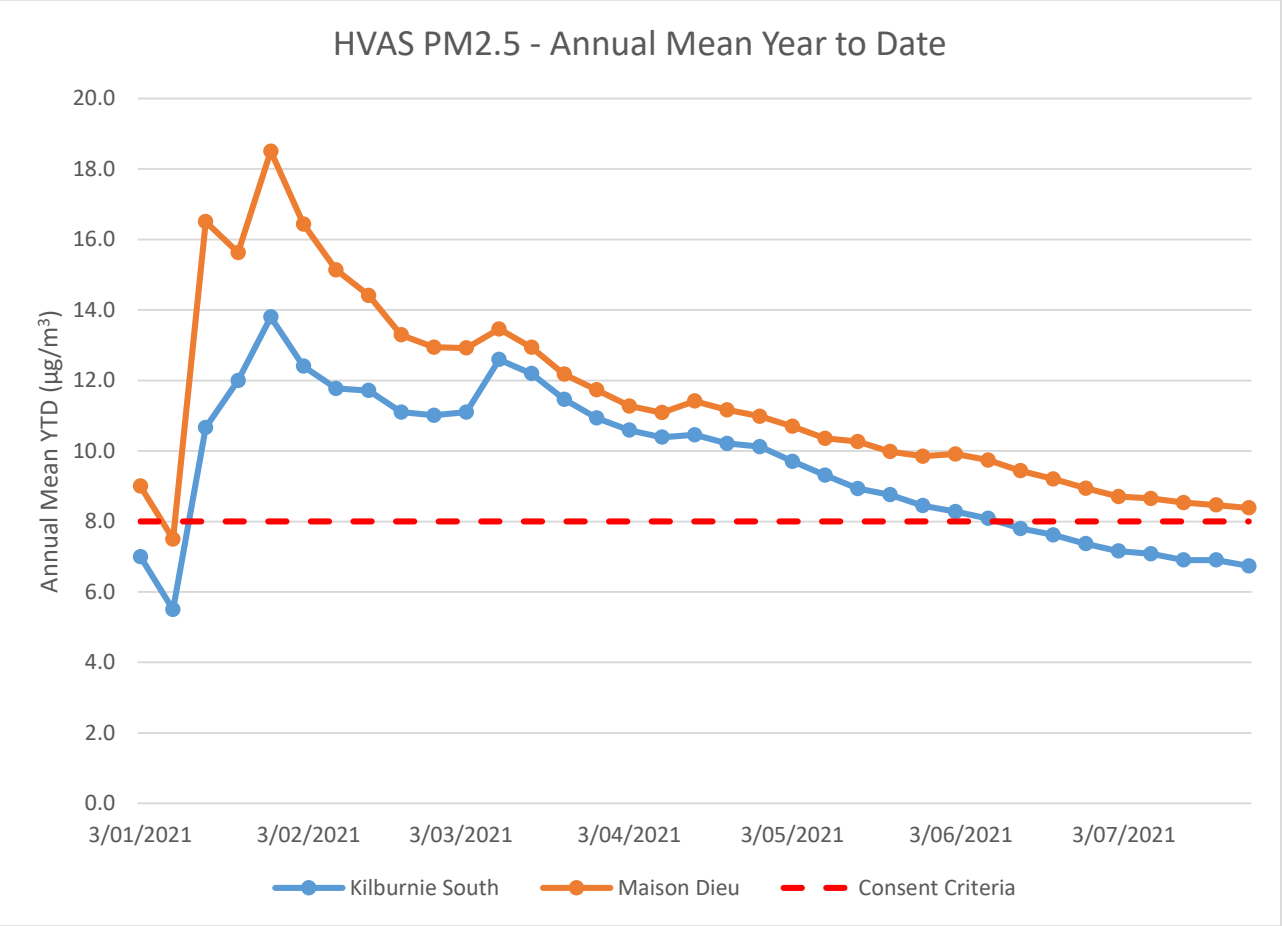

Figure 9 - Year to Date Average $PM_{2.5}$ as at end of July 2021

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/m^3.

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.

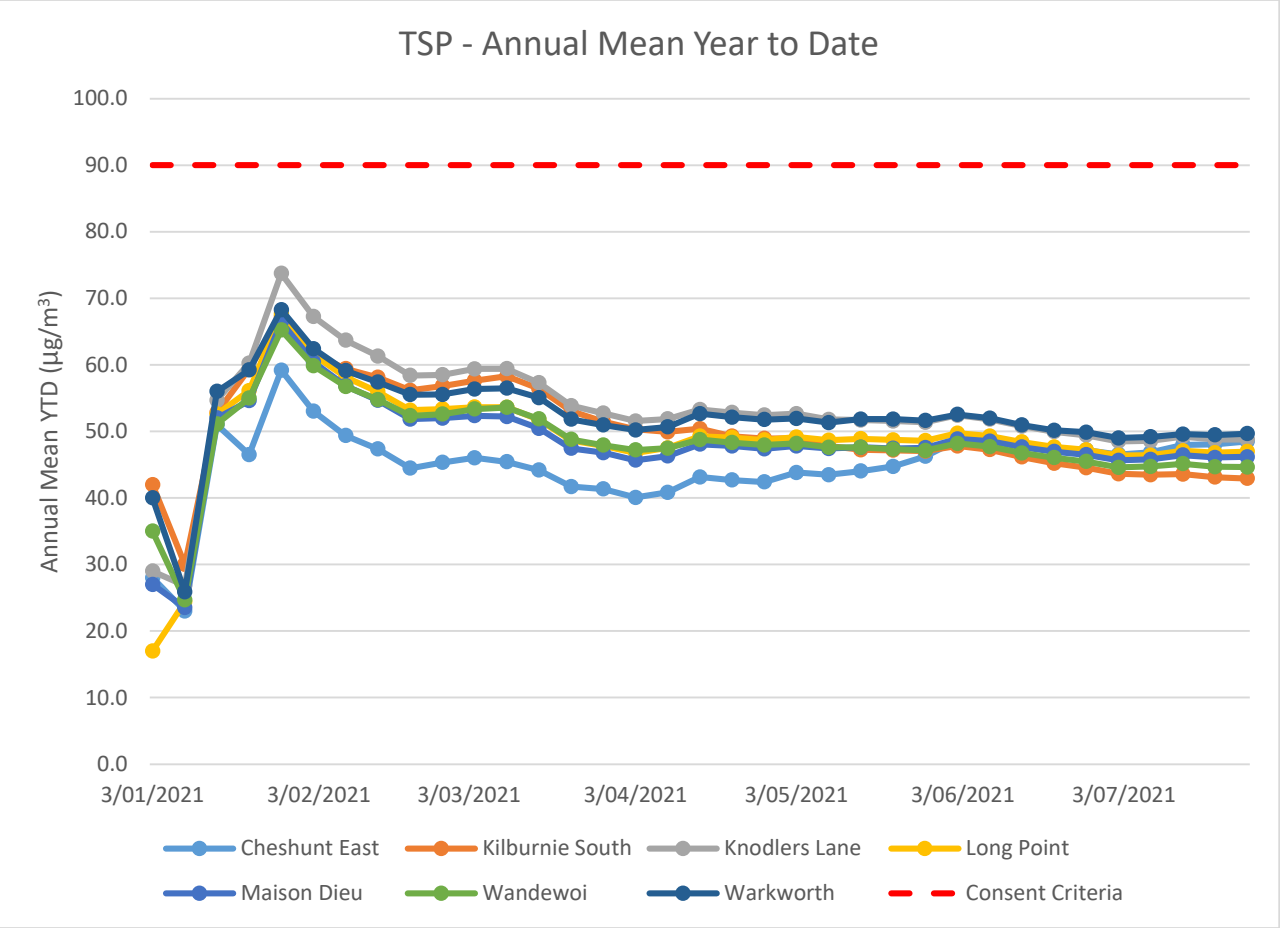

Figure 10 - Year to Date Average Total Suspended Particulates as at end of July 2021

2.3.4 Real Time PM_{10} Results

HVO maintains a network of real time PM_{10} 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 PM_{10} 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 PM_{10} result from the real time monitoring sites. The year to date annual averages for each monitoring site are shown in **Figure 12**.

Knodlers Lane (28 July) was the only monitor to exceed the 24 hour average during the reporting period. An external investigation found that the maximum estimated HVO south contribution was 55.8mg/m3. This estimate conservatively assumes no other dust is contributed between the mine and the monitor. HVO followed its approved Air Quality Management Plan on the day in response to high winds. The exceedance was reported to the Department.

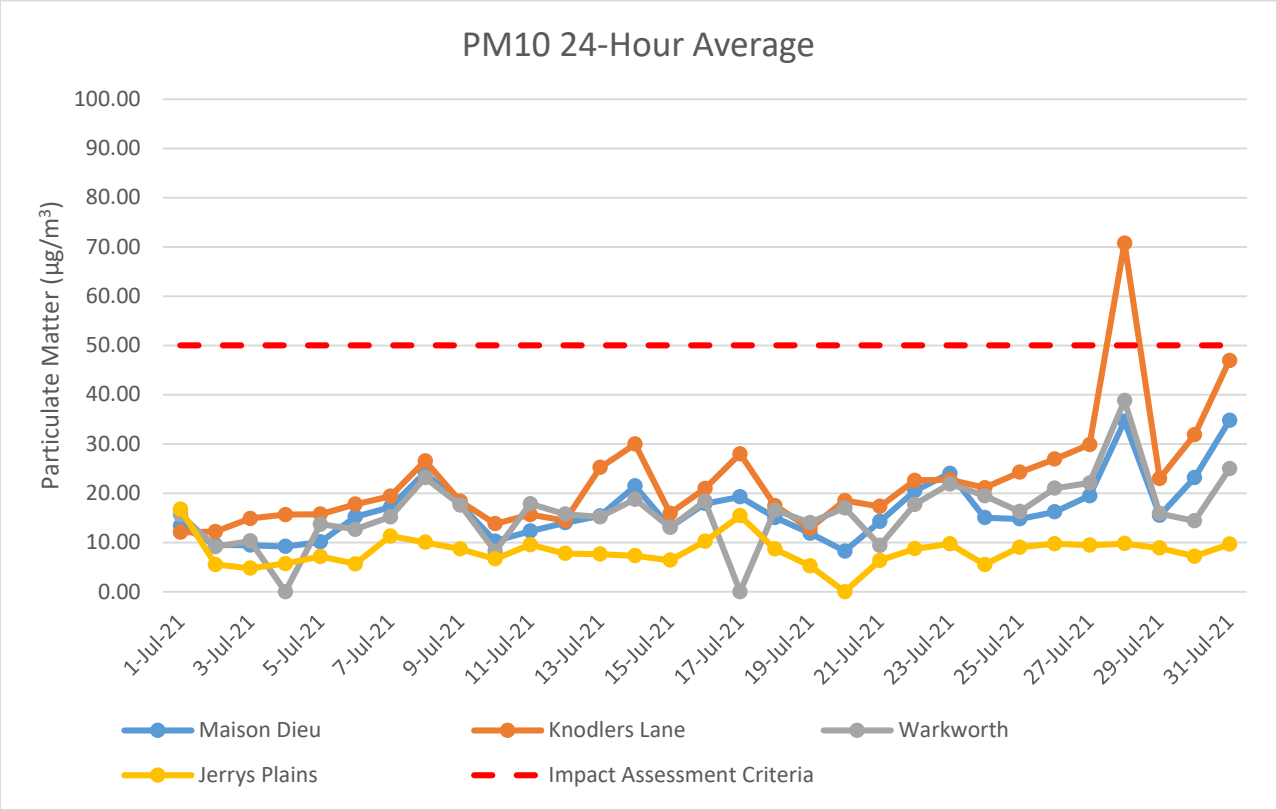

Figure 11 - Real Time PM_{10} 24hr for the reporting 2021

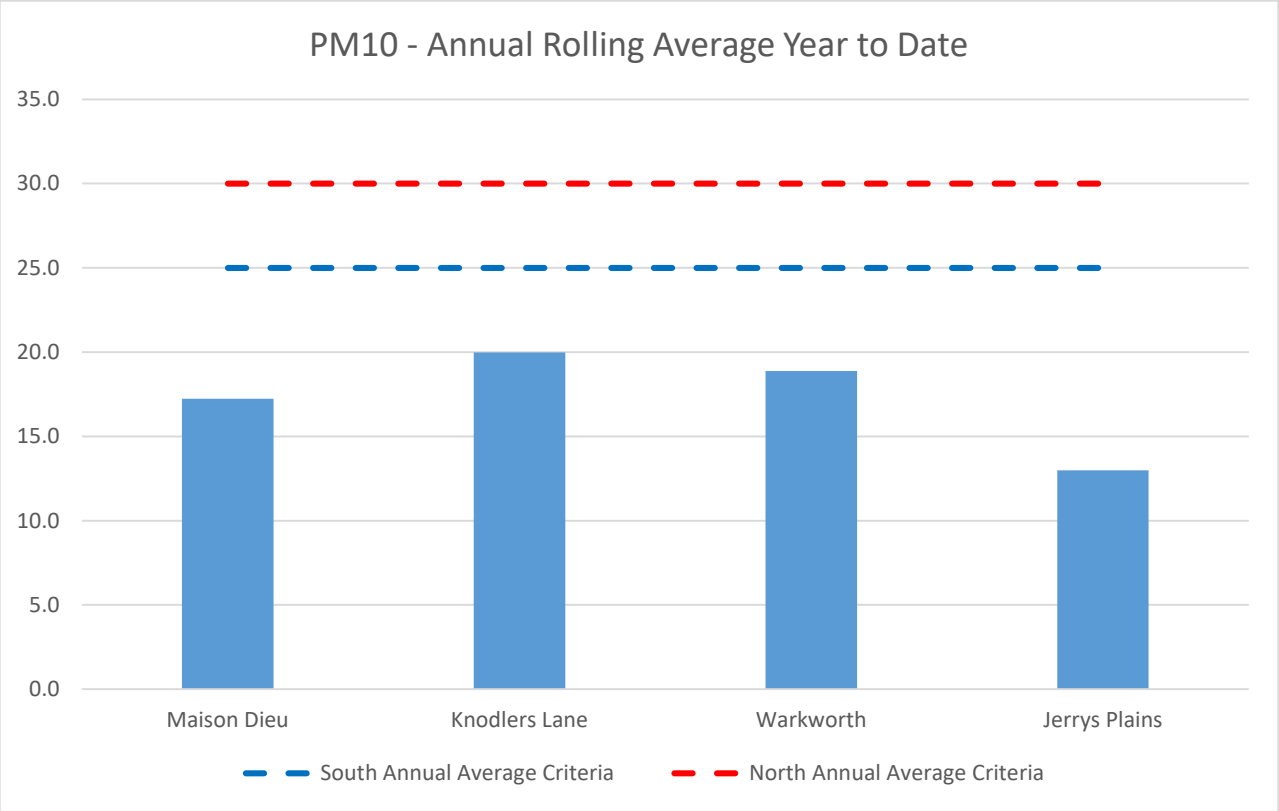

Figure 12 - Real Time PM_{10} Annual Average July 2021

2.3.5 Real Time Alarms for Air Quality

The real time monitoring system generated 72 automated air quality related alarms during the reporting period. 67 alarms related to adverse weather conditions and 5 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 September 2021 Monthly Environmental Monitoring Report.

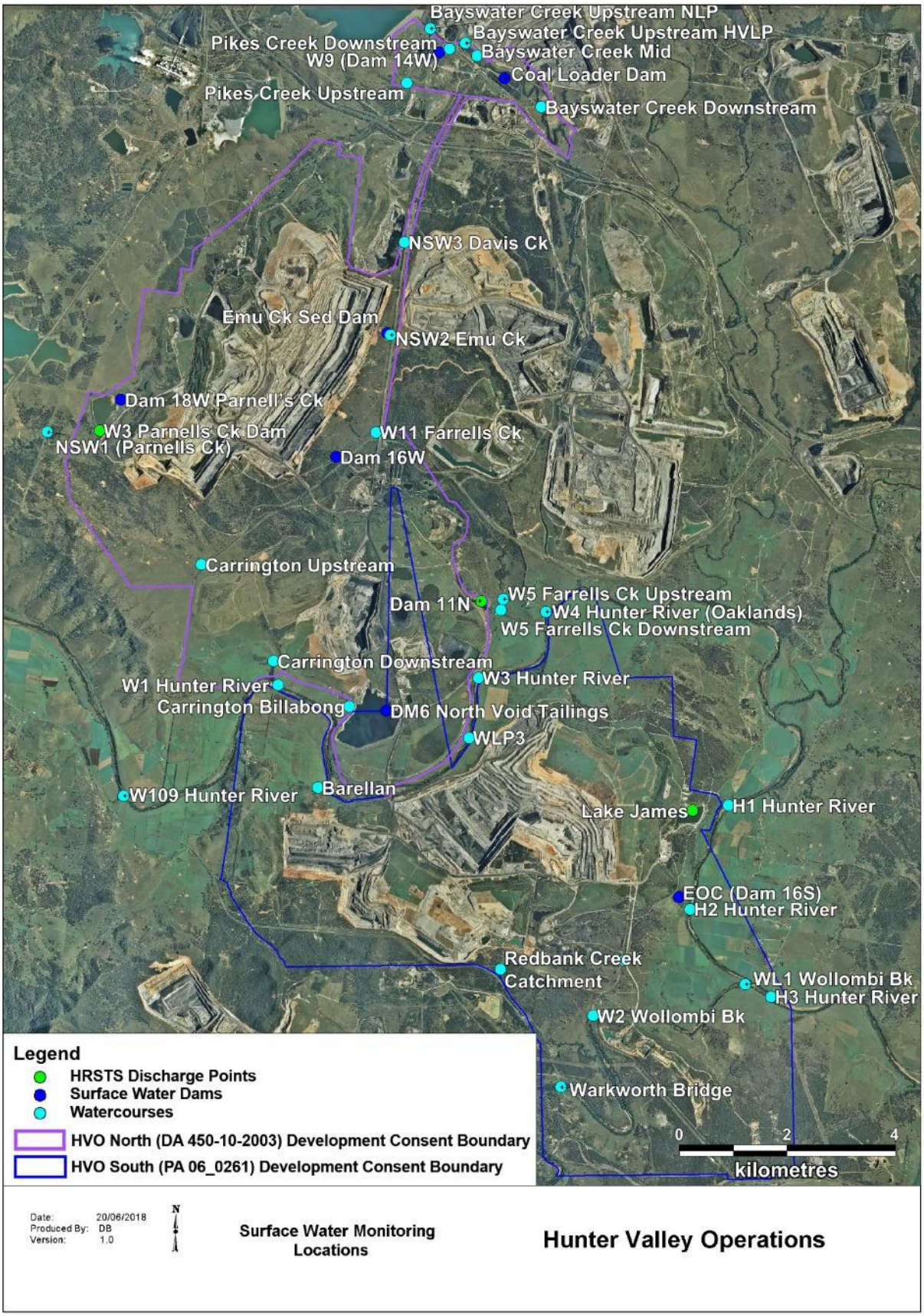

Figure 13 - HVO Surface Water Monitoring Locations

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 September 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.

During the reporting period, HVO extracted 0 ML of water from the Hunter River.

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.

During the reporting period, HVO discharged 0 ML of water under the HRSTS.

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 September 2021 Monthly Environmental Monitoring Report.

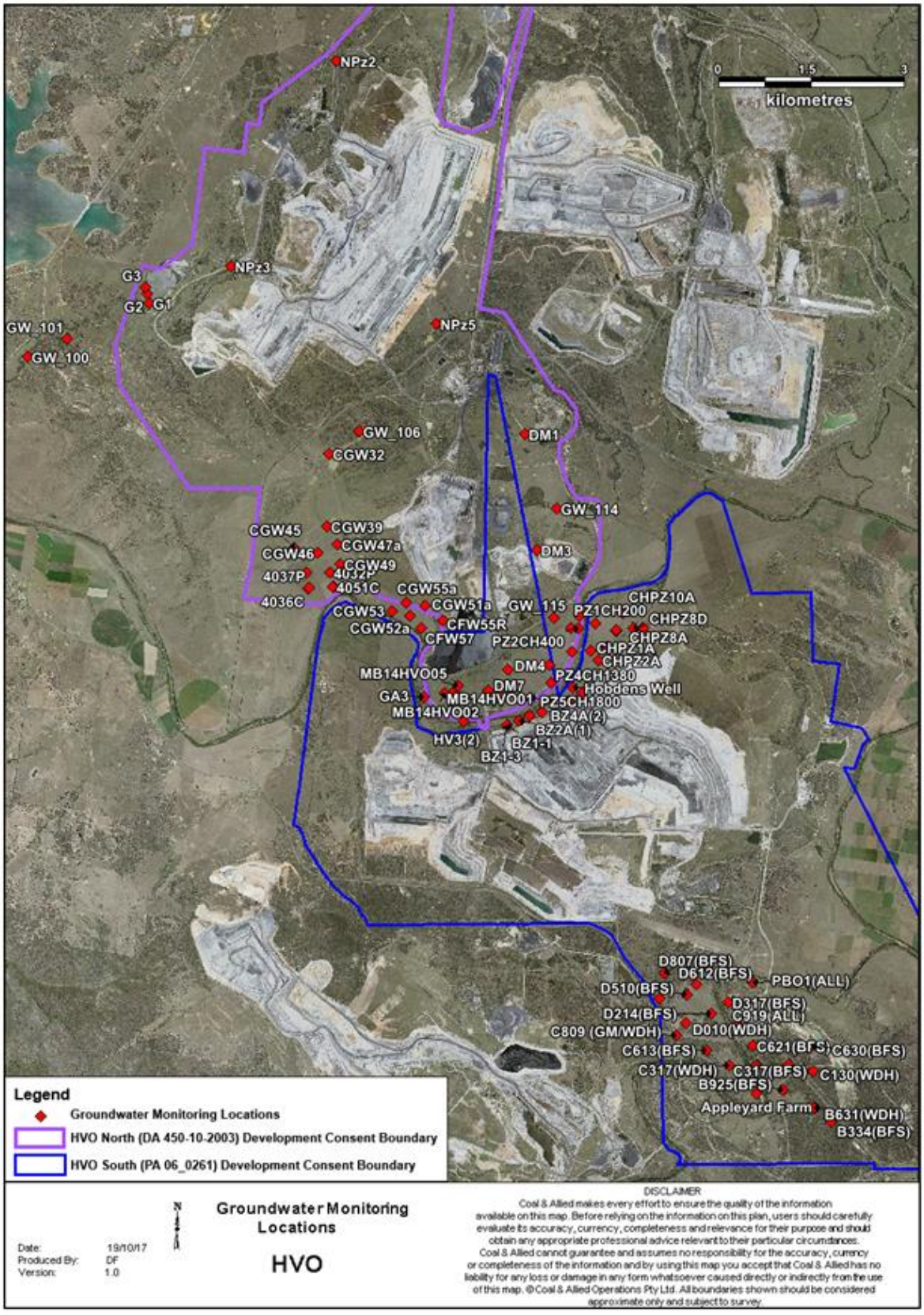

Figure 14 Groundwater monitoring Locations at HVO

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 September 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 (dB(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 and record no exceedances against the blasting criteria of 120 dB for overpressure and 10mm/s for ground vibration.

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)
1/07/2021 13:15	94.88	96.07	103.16	103.09	111.01
3/07/2021 15:03	86.32	83.86	92.34	97.02	94.36
5/07/2021 13:45	88.63	88.77	96.93	93.73	100
5/07/2021 13:46	89.11	95.53	93.07	92.45	101.29
6/07/2021 13:05	93.79	95.16	97.43	101.64	99.13
10/07/2021 14:00	101.1	93.36	104.47	95.43	109
12/07/2021 13:21	80.32	80.07	89.16	91.78	97.64
12/07/2021 13:23	94.02	92.17	100.69	107.68	102.22
13/07/2021 13:15	97.83	96.57	93.13	93.84	98.41
15/07/2021 16:45	80.13	89.16	105.41	106.47	97.31
15/07/2021 16:46	89.31	91.8	105.41	106.47	109.88
21/07/2021 13:08	106.63	98.55	95.68	97.98	107.82
21/07/2021 13:10	95.76	95.39	98.51	95.98	107.22
21/07/2021 13:11	98.51	87.29	103.19	105.11	103.82
22/07/2021 13:11	93.35	93.2	105.33	106.06	104.74
23/07/2021 16:03	95.29	91.5	97.37	89.7	100.8
27/07/2021 12:17	89.96	87.95	94.04	98.24	98.86
27/07/2021 15:25	84.47	84.83	92.91	93.39	99.31
29/07/2021 13:52	96.47	86.41	99.59	92.11	97.91
30/07/2021 14:29	92.38	88.11	95.39	95.11	92.69
31/07/2021 13:14	97	100.07	100.65	103.22	104.12
31/07/2021 13:14	89.16	109.87	98.06	96.42	100.12

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)
1/07/2021 13:15	0.22	0.19	0.19	0.25	0.1
3/07/2021 15:03	0.17	0.07	0.15	0.43	0.18
5/07/2021 13:45	0.12	0.05	0.14	0.7	0.13
5/07/2021 13:46	0.1	0.05	0.06	0.22	0.1
6/07/2021 13:05	0.13	0.06	0.09	0.91	0.18
10/07/2021 14:00	0.23	0.1	0.44	1.06	0.43
12/07/2021 13:21	0.11	0.04	0.11	0.81	0.12
12/07/2021 13:23	0.18	0.08	0.33	0.66	0.34
13/07/2021 13:15	0.23	0.23	0.16	0.82	0.16
15/07/2021 16:45	0.14	0.05	0.08	0.47	0.09
15/07/2021 16:46	0.14	0.05	0.08	0.47	0.09
21/07/2021 13:08	0.11	0.04	0.13	0.23	0.14
21/07/2021 13:10	0.13	0.05	0.2	0.37	0.2
21/07/2021 13:11	0.23	0.1	0.21	1.25	0.17
22/07/2021 13:11	0.12	0.05	0.14	0.57	0.18
23/07/2021 16:03	0.16	0.12	0.1	0.2	0.1
27/07/2021 12:17	0.1	0.04	0.04	0.36	0.08
27/07/2021 15:25	0.1	0.05	0.1	0.25	0.13
29/07/2021 13:52	0.35	0.29	0.12	0.55	0.09
30/07/2021 14:29	0.12	0.05	0.04	0.13	0.09
31/07/2021 13:14	0.13	0.06	0.32	0.67	0.27
31/07/2021 13:14	0.16	0.1	0.32	0.67	0.27

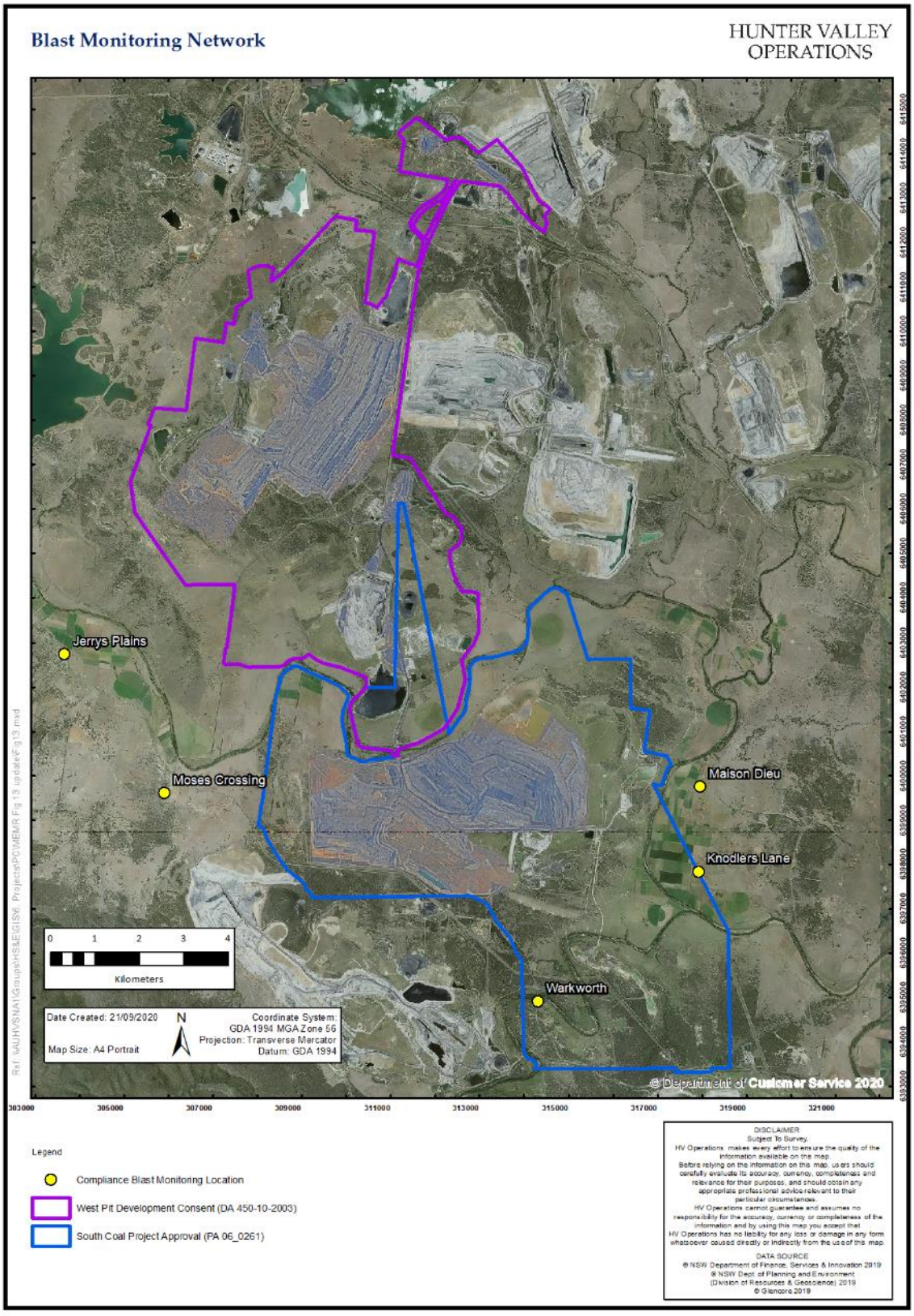

Figure 15 - Blast Monitoring Location Plan

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 on the nights of 22 and 29 July 2021. Impact noise from a dragline at the Jerrys Plains East location was audible, generating a site-only LA1,1min noise level of 55 dB against a criteria of 45 dB. Follow up monitoring was below criteria with five additional 1 minute measurements taken on the night and additional measurement taken the following week. Follow-up monitoring indicates noise was not sustained. EPA and DPIE were notified of the exceedance and report provided.

Monitoring results are detailed in **Table 7 to Table 11.**

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 dB(A)	Criterion Applies[2]	HVO North L_{Aeq} dB[3,4,5,6,]	Exceedance[4,5]
Shearers Lane	*22/07/2021 21:08*	0.9	E	35	Yes	IA	Nil
Knodlers Lane	*22/07/2021 22:24*	0.4	F	35	Yes	IA	Nil
Maison Dieu	*22/07/2021 21:49*	0.4	F	35	Yes	IA	Nil
Long Point (Dights Crossing)	*22/07/2021 23:30*	0.6	D	35	Yes	IA	Nil
Kilburnie South	*22/07/2021 23:43*	0.2	D	39	Yes	IA	Nil
Jerrys Plains East	*22/07/2021 23:16*	1.1	E	39	Yes	IA	Nil
Jerrys Plains East[6]	*29/07/2021 21:00*	3.9	D	39	No	IA	NA
Jerrys Plains Village	*22/07/2021 21:42*	0.4	F	40	Yes	33	Nil
Jerrys Plains West	*22/07/2021 21:18*	0.9	E	40	Yes	30	Nil
HVGC	*23/07/2021 0:57*	0.4	F	NA	Yes	IA	Nil

1. Atmospheric data is sourced from the HVO Cheshunt (or MTW Charlton Ridge for Long Point) AWS using logged meteorological data;

2. Noise criteria apply for wind speeds up to 3m/s (at a height of 10m), or during stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;

3. Site-only L_{Aeq} 15 minute attributed to HVO South 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;

6. Re-measure.

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 dB(A)	Criterion Applies[2]	HVO North L_{Aeq} dB[3,4,6,]	Exceedance[4,5]
Shearers Lane	*22/07/2021 21:08*	0.9	E	41	Yes	IA	Nil
Knodlers Lane	*22/07/2021 22:24*	0.4	F	41	Yes	IA	Nil
Maison Dieu	*22/07/2021 21:49*	0.4	F	41	Yes	IA	Nil
Long Point (Dights Crossing)	*22/07/2021 23:30*	0.6	D	41	Yes	IA	Nil
Kilburnie South	*22/07/2021 23:43*	0.2	D	41	Yes	IA	Nil
Jerrys Plains East	*22/07/2021 23:16*	1.1	E	41	Yes	IA	Nil
Jerrys Plains East [6]	*29/07/2021 21:00*	3.9	D	41	No	IA	NA
Jerrys Plains Village	*22/07/2021 21:42*	0.4	F	41	Yes	33	Nil
Jerrys Plains West	*22/07/2021 21:18*	0.9	E	41	Yes	30	Nil
HVGC	*23/07/2021 0:57*	0.4	F	NA	Yes	IA	Nil

1. Atmospheric data is sourced from the HVO Cheshunt (or MTW Charlton Ridge for Long Point) AWS using logged meteorological data;

2. Noise criteria apply for wind speeds up to 3m/s (at a height of 10m), or during stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;

3. Site-only L_{Aeq} 15 minute attributed to HVO South 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;

6. Re-measure.

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 dB(A)	Criterion Applies[2]	HVO North L_{Aeq} dB[3,4,6,]	Exceedance[4,5]
Shearers Lane	*22/07/2021 21:08*	0.9	E	46	Yes	IA	Nil
Knodlers Lane	*22/07/2021 22:24*	0.4	F	46	Yes	IA	Nil
Maison Dieu	*22/07/2021 21:49*	0.4	F	46	Yes	IA	Nil
Long Point (Dights Crossing)	*22/07/2021 23:30*	0.6	D	46	Yes	IA	Nil
Kilburnie South	*22/07/2021 23:43*	0.2	D	46	Yes	IA	Nil
Jerrys Plains East	*22/07/2021 23:16*	1.1	E	46	Yes	IA	Nil
Jerrys Plains East[6]	*29/07/2021 21:00*	3.9	D	46	No	IA	NA
Jerrys Plains Village	*22/07/2021 21:42*	0.4	F	46	Yes	36	Nil
Jerrys Plains West	*22/07/2021 21:18*	0.9	E	46	Yes	31	Nil
HVGC	*23/07/2021 0:57*	0.4	F	NA	Yes	NA	Nil

1. Atmospheric data is sourced from the HVO Cheshunt (or MTW Charlton Ridge for Long Point) AWS using logged meteorological data;

2. Noise criteria apply for wind speeds up to 3m/s (at a height of 10m), or during stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;

3. Site-only L_{Aeq} 15 minute attributed to HVO South 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;

6. Re-measure.

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 dB(A)	Criterion Applies[2]	HVO South L_{Aeq} dB[3,4,6,]	Exceedance[4,5]
Shearers Lane	*22/07/2021 21:08*	3	E	41	No	IA	NA
Knodlers Lane	*22/07/2021 22:24*	1.5	F	40	Yes	IA	Nil
Maison Dieu	*22/07/2021 21:49*	2.5	D	39	Yes	IA	Nil
Long Point (Dights Crossing)	*22/07/2021 23:30*	1.5	F	37	Yes	IA	Nil
Kilburnie South	*22/07/2021 23:43*	1.1	D	39	Yes	IA	Nil
Jerrys Plains East	*22/07/2021 23:16*	0.6	F	38	Yes	NM	Nil
Jerrys Plains East[6]	*29/07/2021 21:00*	4.6	E	38	No	IA	NA
Jerrys Plains Village	*22/07/2021 21:42*	2.5	D	35	Yes	IA	Nil
Jerrys Plains West	*22/07/2021 21:18*	3	E	35	No	IA	NA
HVGC	*23/07/2021 0:57*	1.9	D	55	Yes	NM	Nil

1. Atmospheric data is sourced from the HVO Cheshunt (or MTW Charlton Ridge for Long Point) AWS using logged meteorological data;

2. Noise criteria apply for wind speeds up to 3m/s (at a height of 10m), or during stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;

3. Site-only L_{Aeq} 15 minute attributed to HVO South 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;

6. Re-measure.

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 dB(A)	Criterion Applies[2]	HVO South L_{Aeq} dB[3,4,6,7]	Exceedance[4,5]
Shearers Lane	*22/07/2021 21:08*	3	E	45	No	IA	NA
Knodlers Lane	*22/07/2021 22:24*	1.5	F	45	Yes	IA	Nil
Maison Dieu	*22/07/2021 21:49*	2.5	D	45	Yes	IA	Nil
Long Point (Dights Crossing)	*22/07/2021 23:30*	1.5	F	45	Yes	IA	Nil
Kilburnie South	*22/07/2021 23:43*	1.1	D	45	Yes	IA	Nil
Jerrys Plains East	*22/07/2021 23:16*	0.6	F	45	Yes	55	10
Jerrys Plains East[6]	*29/07/2021 21:00*	4.6	E	45	No	IA	NA
Jerrys Plains Village	*22/07/2021 21:42*	2.5	D	45	Yes	IA	Nil
Jerrys Plains West	*22/07/2021 21:18*	3	E	45	No	IA	NA
HVGC	*23/07/2021 0:57*	1.9	D	NA	Yes	NM	Nil

1. Atmospheric data is sourced from the HVO Cheshunt (or MTW Charlton Ridge for Long Point) AWS using logged meteorological data;

2. Noise criteria apply for wind speeds up to 3m/s (at a height of 10m), or during stability class G conditions. Criterion may or may not apply due to rounding of meteorological data values;

3. Site-only L_{Aeq} 15 minute attributed to HVO South 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;

6. Re-measure.

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}dB	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 dB[2]
Shearers Lane	*22/07/2021 21:08*	IA	Yes	No	No	NA	No	NA	Nil
Knodlers Lane	*22/07/2021 22:24*	IA	Yes	No	No	NA	No	NA	Nil
Maison Dieu	*22/07/2021 21:49*	IA	Yes	No	No	NA	No	NA	Nil
Long Point (Dights Crossing)	*22/07/2021 23:30*	IA	Yes	No	No	NA	No	NA	Nil
Kilburnie South	*22/07/2021 23:43*	IA	Yes	No	No	NA	No	NA	Nil
Jerrys Plains East	*22/07/2021 23:16*	IA	Yes	No	No	NA	No	NA	Nil
Jerrys Plains East[3]	*29/07/2021 21:00*	IA	No	No	No	NA	No	NA	Nil
Jerrys Plains Village	*22/07/2021 21:42*	33	Yes	No	No	NA	No	NA	Nil
Jerrys Plains West	*22/07/2021 21:18*	30	Yes	No	No	NA	No	NA	Nil
HVGC	*23/07/2021 0:57*	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; and

3. Remeasure

.

Table 11 - Modifying Factor Assessment HVO South for the reporting period

Location	Date and Time	Measured HVO South L_{Aeq}dB	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 dB[2]
Shearers Lane	*22/07/2021 21:08*	IA	No	No	No	NA	No	NA	Nil
Knodlers Lane	*22/07/2021 22:24*	IA	Yes	No	No	NA	No	NA	Nil
Maison Dieu	*22/07/2021 21:49*	IA	Yes	No	No	NA	No	NA	Nil
Long Point (Dights Crossing)	*22/07/2021 23:30*	IA	Yes	No	No	NA	No	NA	Nil
Kilburnie South	*22/07/2021 23:43*	IA	Yes	No	No	NA	No	NA	Nil
Jerrys Plains East	*22/07/2021 23:16*	NM	Yes	No	No	NA	No	NA	Nil
Jerrys Plains East[3]	*29/07/2021 21:00*	IA	No	No	No	NA	No	NA	Nil
Jerrys Plains Village	*22/07/2021 21:42*	IA	Yes	No	No	NA	No	NA	Nil
Jerrys Plains West	*22/07/2021 21:18*	IA	No	No	No	NA	No	NA	Nil
HVGC	*23/07/2021 0:57*	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; and

3. Remeasure

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.

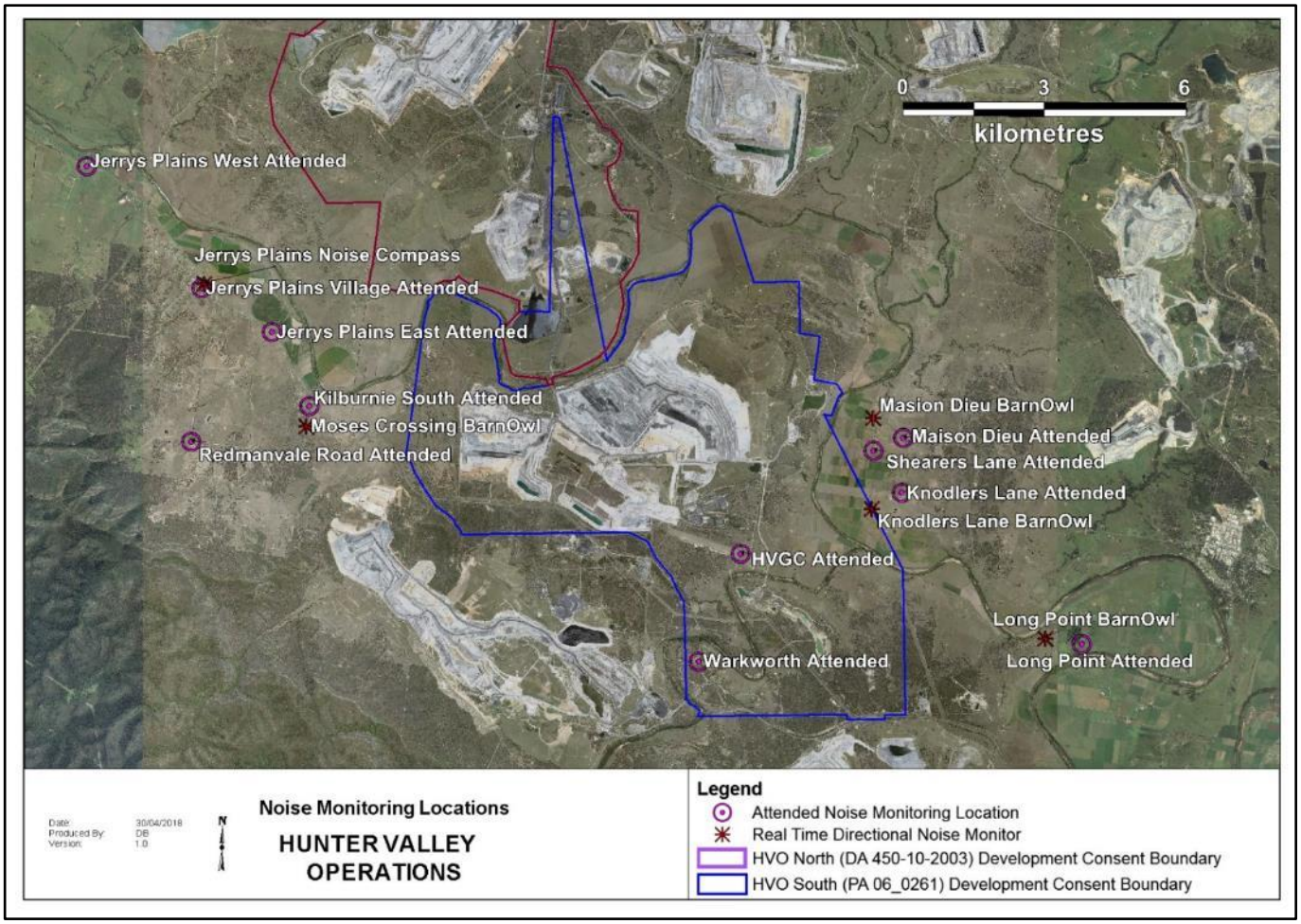

Figure 16 - Noise Monitoring Location Plan

6 Operational Downtime

A total of 16.1 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**. 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).

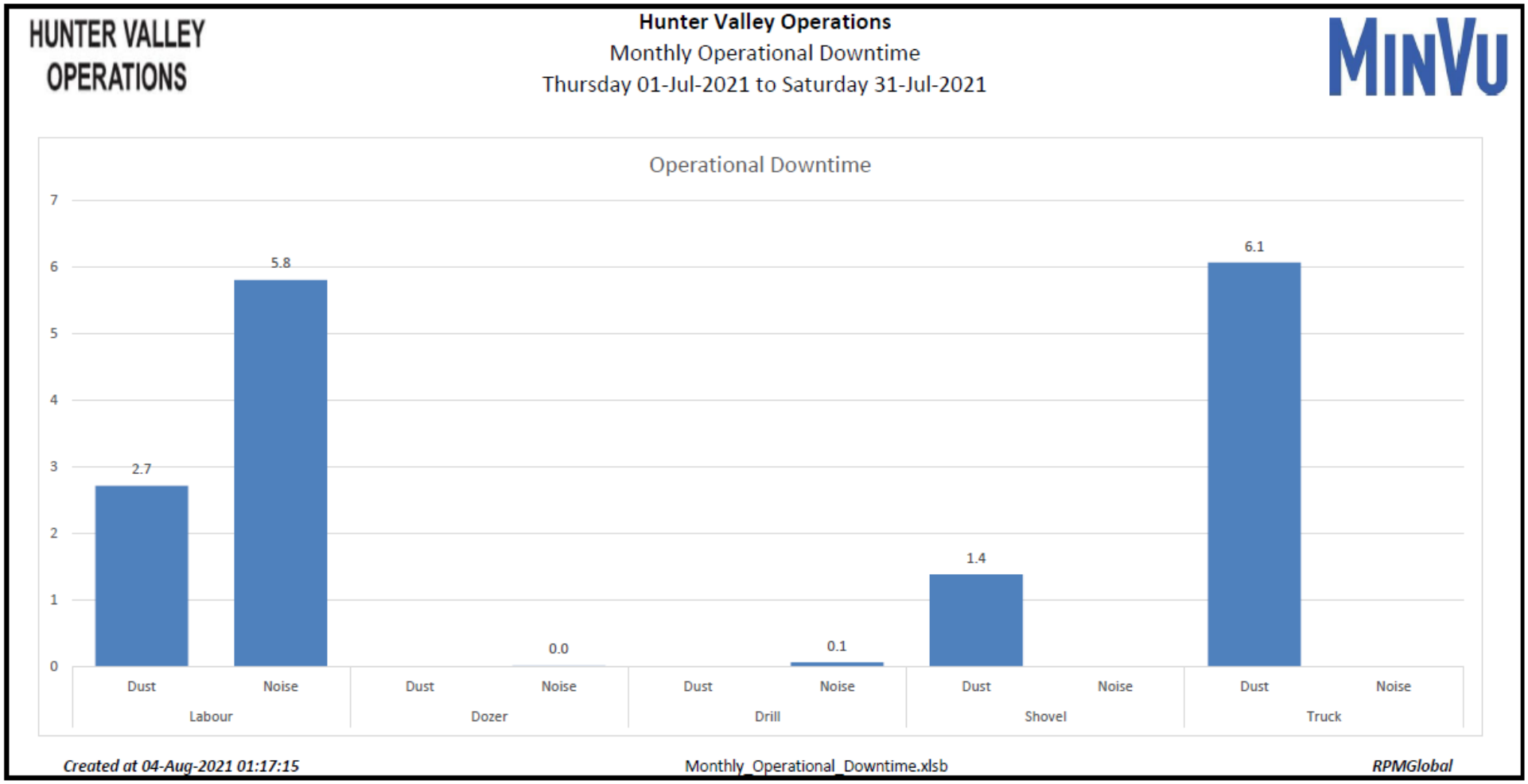

Figure 17 - Operational Downtime by Equipment Type for the reporting period (downtime hours)

7 Rehabilitation

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

- 7.69 Ha of land was reshaped
- 7.69 Ha of land was released (became available for the application of topsoil)
- 0 Ha of land was topsoiled
- 0 Ha of land was rehabilitated

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

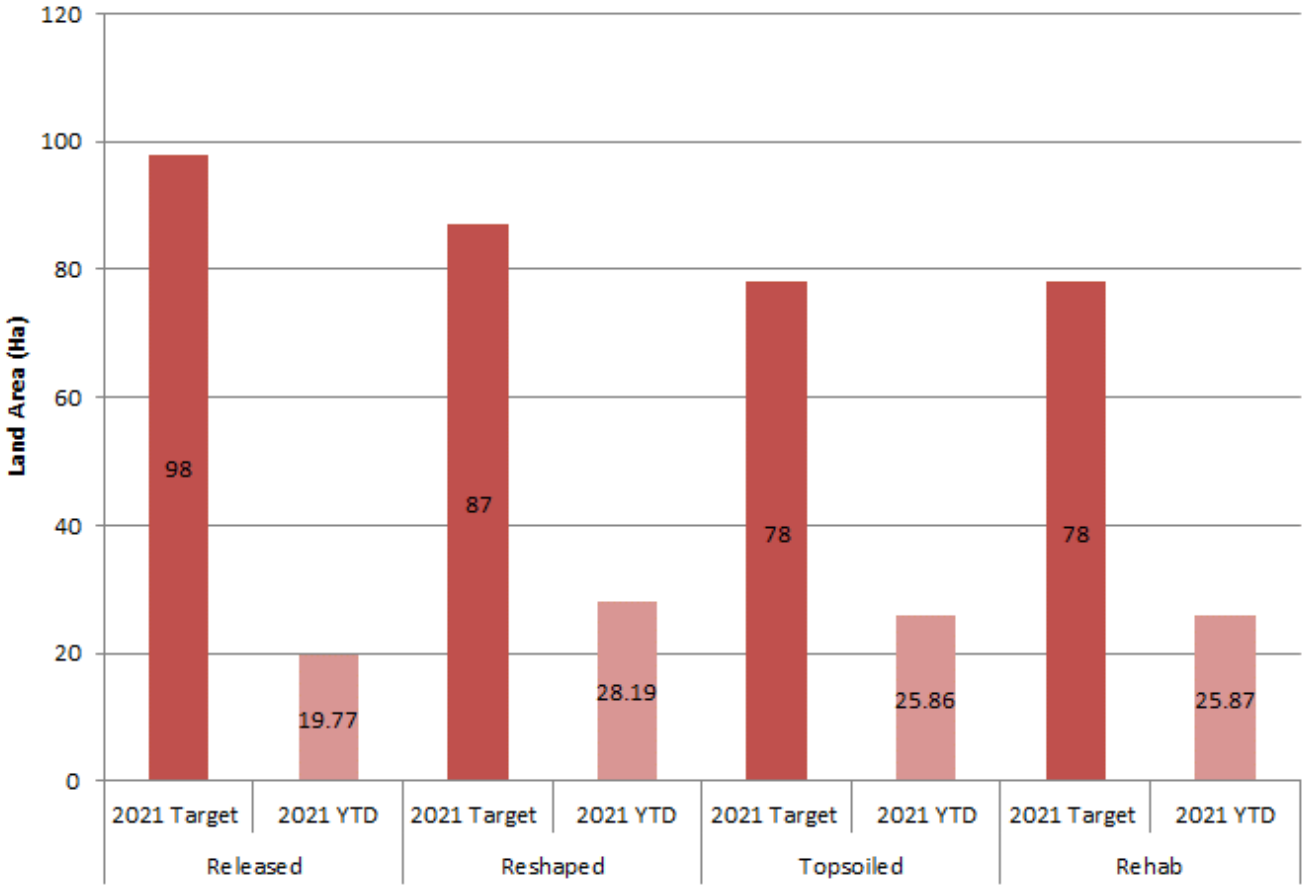

Figure 18 - Rehabilitation YTD July 2021

8 Complaints

One complaint was 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						
September						
October						
November						
December						
Total	**4**	**1**	**8**	**3**	**-**	**16**

9 Environmental Incidents

During July there were four (5) reportable environmental incidents. These will be discussed in the next annual review.

- **05/07/2021 Warkworth TEOM miscapture.**

The Warkworth TEOM was not producing valid data from 04:30 to 15:00 on 04/07/2021, resulting in a data capture of only 54% which is less than the required 75% capture rate. Lockup of the DPIE logger at the TEOM was found to be the cause of the miscapture. The DPIE was contacted for further information and notified of miscapture.

- **17/07/2021 Warkworth TEOM miscapture.**

The Warkworth TEOM was not producing valid data from 07:10 to 16:20 on 17/07/ resulting in a data capture of only 58% which is less than the required 75% capture rate. Lockup of the DPIE logger at the TEOM was found to be the cause of the miscapture. The DPIE was contacted for further information and notified of miscapture.

- **20/07/2021 Jerrys Plains TEOM miscapture.**

The 24-hour data capture at the Jerrys Plains TEOM was 71% on 20 July, below the 75% data capture required. The lockup of the DPIE logger at the TEOM found to be the cause of the miscapture. The DPIE was notified of the incident.

- **22/07/2021 LA1 (1 minute) Noise exceedance – Jerrys Plains East.**

Monthly attended noise monitoring at the Jerrys Plains East monitoring location recorded a LA1(1 min) result of 55dB, above the compliance criteria of 45dB. The acoustic consultant contacted the Senior OCE to explain the monitoring result and that the source of the noise was coming from the dragline bucket in Riverview Pit. The dragline was shut down and progressively restarted while monitoring noise levels. Follow up monitoring was below criteria with five additional 1 minute measurements taken on the night and additional measurement taken the following week. EPA and DPIE were notified of the incident and report provided. Constitutes non-compliance with EPL but not the Development Consent.

- **28/07/2021 Knodlers Lane PM10 Dust exceedance**

Review of monitoring data identified a 24-hour PM10 average of 70.8ug/m3 at the Knodlers Lane TEOM, exceeding the Project Approval criteria of 50ug/m3. Initial investigation found site contribution to be below the Project Approval criteria, however the data was sent to an external consultant for investigation which found contribution from HVO South to be less than or equal to 55.8ug/m3, or 79% of the total level recorded at Knodlers Lane. Following receipt of consultant's report notification was made to the DPIE.

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)
1/07/2021	13.06	3.459	111.8	85.5	184.2	152.2	0.791	5.4
2/07/2021	18.6	2.761	112	60.02	803	253.9	2.337	1.2
3/07/2021	18.29	-1.371	109.7	36.9	565	273.3	2.416	0.2
4/07/2021	14.03	-2.405	100	38.05	558.7	277.5	3.091	0
5/07/2021	14.97	-5	90.9	35.21	549.6	285.5	2.828	0
6/07/2021	13.36	-4.667	99.5	42.9	642.4	267.2	2.154	0
7/07/2021	15.17	-7.663	100	51.41	551.5	189.7	1.299	0
8/07/2021	15.63	-5.614	109.5	46.29	603.2	202.1	1.045	0
9/07/2021	10.06	-1.512	111.6	88.1	162.1	227	1.439	7.8
10/07/2021	15.48	-1.405	98.5	50.03	877	208.7	3.134	0
11/07/2021	16.18	-1.888	100	56.97	740	148.9	1.428	0
12/07/2021	17.47	-4.873	111.4	48.17	578.5	209	0.933	0.2
13/07/2021	17.62	-2.051	100	41.06	654.8	277.3	2.467	0.2
14/07/2021	16.89	0.371	86	49.02	768.4	274.9	2.78	0
15/07/2021	19.41	3.961	100	55.84	864	273.5	3.04	1.6
16/07/2021	16.86	3.24	100	37.4	783.5	281.9	6.309	3
17/07/2021	12.49	-0.407	96.2	44.61	877	278.4	7.722	1.6
18/07/2021	15.72	-0.803	89.5	41.54	708.4	290.4	4.643	0
19/07/2021	12.73	-4.229	96.6	45.71	846	288.6	3.591	0
20/07/2021	13.11	4.572	90.2	46.68	746.6	287.5	5.698	0
21/07/2021	14.77	-5.225	91.9	29.48	606.5	218.3	2.691	0
22/07/2021	16.57	-7.427	91.4	34.08	593.8	237.2	2.001	0
23/07/2021	19.04	-2.485	95.8	40.6	838	263.7	2.988	0.2
24/07/2021	14.79	-0.741	100	46.25	909	284	5.823	0
25/07/2021	12.62	-0.498	93.9	35.51	966	285.5	7.146	0.4

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)
26/05/2021	17.07	-2.418	83.6	43.83	836	288.5	4.971	0
27/07/2021	19.78	-1.209	90	32.91	708.9	278	2.837	0
28/07/2021	22.29	-0.977	92.6	23.53	604.9	278.5	4.777	1
29/07/2021	16.95	-3.166	97.9	23.38	632.1	280	3.554	0
30/07/2021	18.51	-5.85	90.2	23.84	655.4	271.7	2.343	0
31/07/2021	23.59	-1.778	64.15	28.29	889	265.1	2.595	0