



1 October to 31 December 2023 Northparkes Operations

Environmental Monitoring Results Summary

Name of Mine	Northparkes Mine
Name of Leaseholder and Mine Operator	Evolution Mining (Northparkes) Pty Limited
Mining Leases	ML1247, ML1367, ML1641 AND ML1743
Environment Protection Licence	EPL 4784
Development Consent	DC11_0060 (as modified)

Reviewed by	Chris Higgins
Title	Superintendent – Environment & Farms
Date	
Signature	
Approved by	Stacey Kelly
Title	Manager – People, Safety & Environment
Date	
Signature	

1. SCOPE OF REPORT

This report provides a summary of monitoring results for the period from 1 October to 31 December 2023. This monitoring is undertaken in accordance with the Environmental Monitoring Program (available at www.northparkes.com.au). Details of air quality, noise, water and vibration monitoring locations are available in the Environmental Monitoring Program. Refer to appendix A for all monitoring location maps.

2. AIR QUALITY

During the quarter, the air quality monitoring program utilised PM₁₀ (beta attenuated monitors). Monitoring locations are strategically positioned around the mine lease and neighbouring properties. PM₁₀ monitoring is undertaken at three nearby farm residences Hubberstone, Milpose and Hillview. A summary of the monitoring results are provided below.

2.1 PM10

PM₁₀ monitoring results for the Hubberstone, Milpose and Hillview monitoring locations, for the reporting period, are displayed in Figure 1, Figure 2 and Figure 3 respectively. The criteria for exceedances (as nominated in the Development Consent DC11_0060, known as the Consent), are >25 µg/m³ for the annual average and >50 µg/m³ for a 24-hour monitoring period.

24 hour average:

During the reporting period Milpose recorded three days of elevated results, related to agricultural activities occurring within close proximity to the monitoring location. Missing data is the result of several instrumentation issues which have since been rectified.

Annual Averages:

Annual averages, recorded year to date, at all monitoring locations are below the Consent criteria of 25 µg/m³:

- 10.9 µg/m³ at Hubberstone
- 11.5 µg/m³ at Milpose, and
- 10.5 µg/m³ at Hillview.

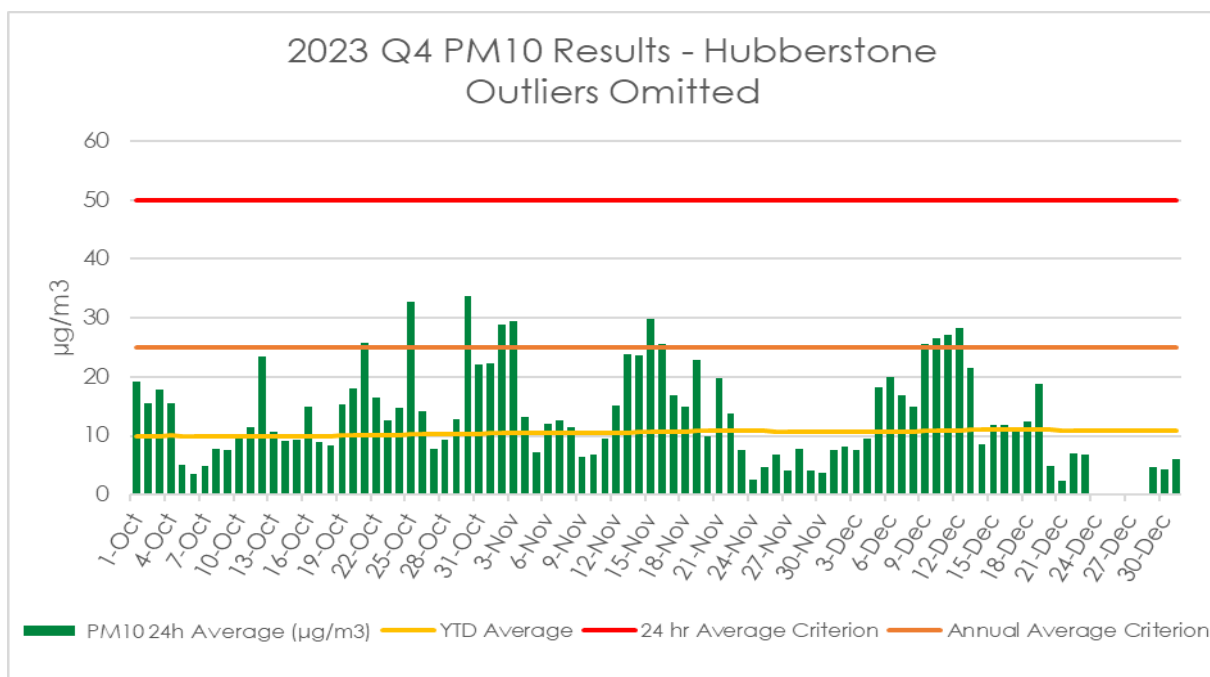


Figure 1: Hubberstone

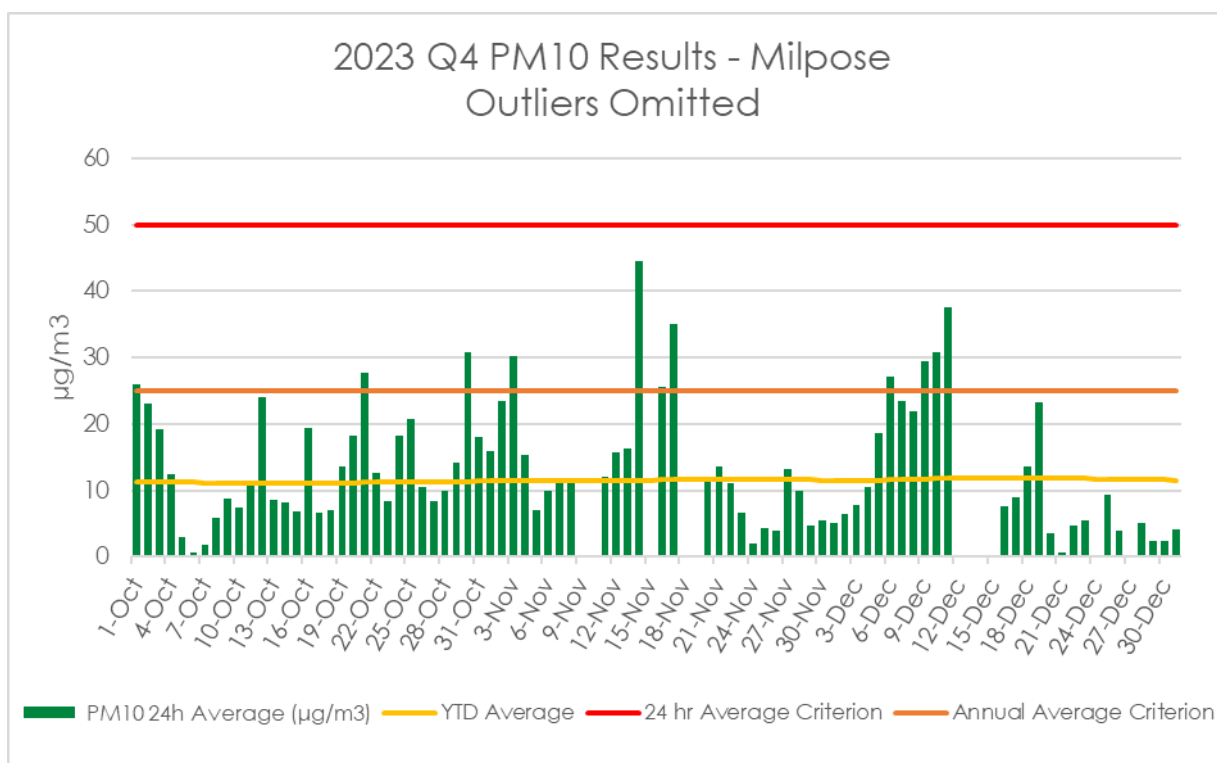


Figure 2: Milpose

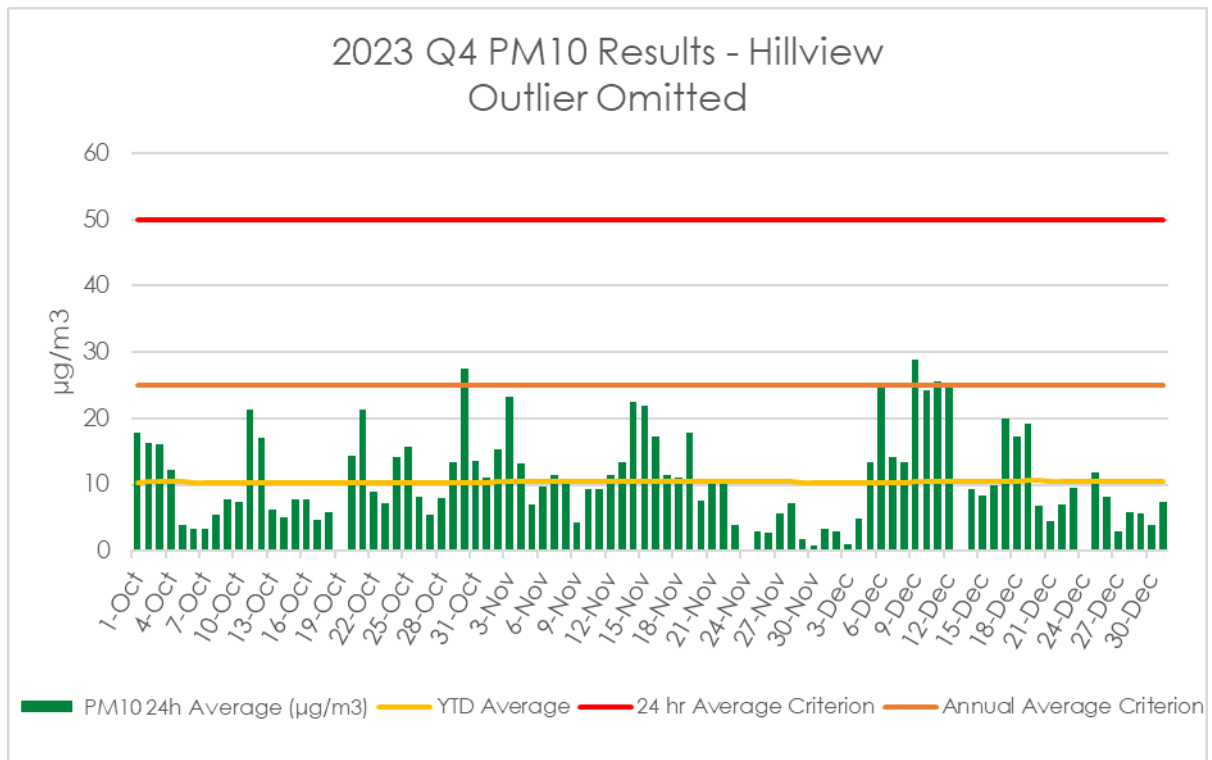


Figure 3: Hillview

2.2 PM_{2.5}

PM_{2.5} monitoring results for the same three properties are displayed in Figures 4, 5 and 6 respectively. The development consent states that compliance with the assessment criteria for PM_{2.5} may be calculated as a ratio of PM₁₀. This ratio is calculated as 0.35.

The criteria for exceedances are >8 µg/m³ for the annual average and >25 µg/m³ for a 24-hour monitoring period.

24 hour average:

During the reporting period two elevated results were recorded at Milpose related to agricultural activities. Missing data is the result of several instrumentation issues which have since been rectified.

Annual Averages:

Annual averages recorded at all monitoring locations are below the Consent criteria of 8 µg/m³:

- 3.8 µg/m³ at Hubberstone
- 4.0 µg/m³ at Milpose, and
- 3.7 µg/m³ at Hillview.

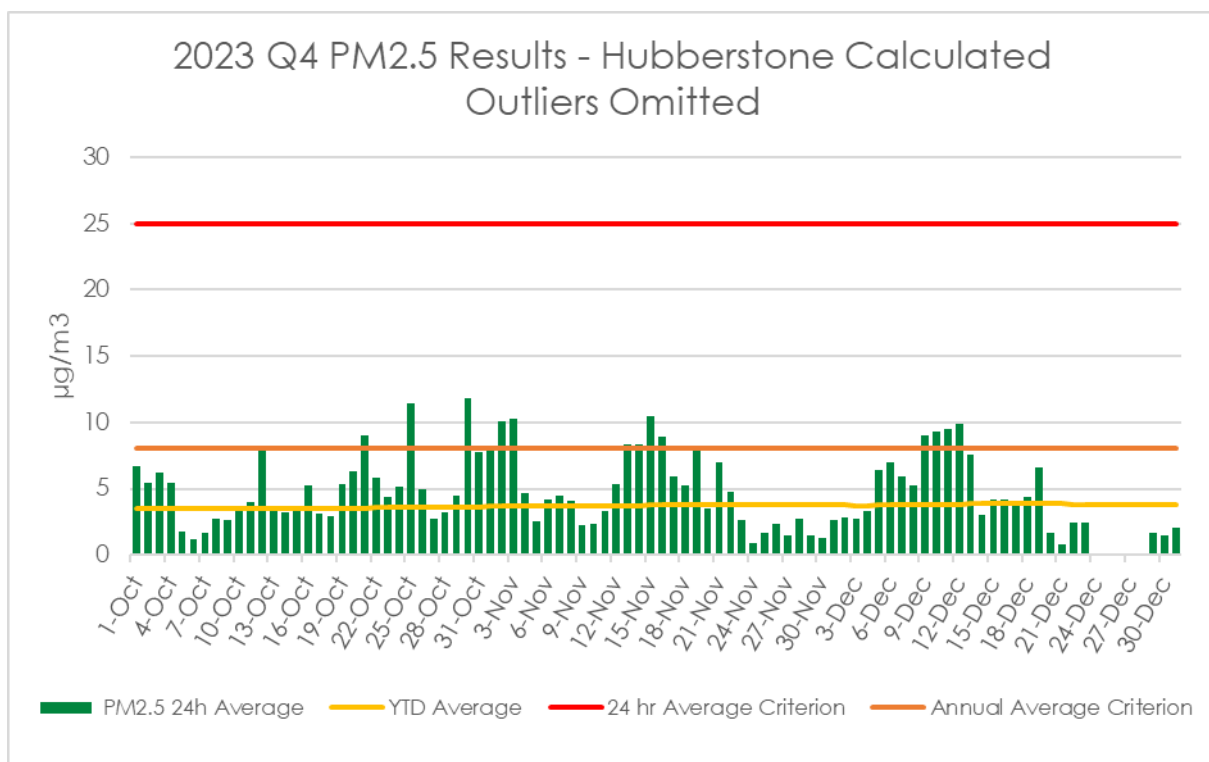


Figure 4: Hubberstone (Calculated)

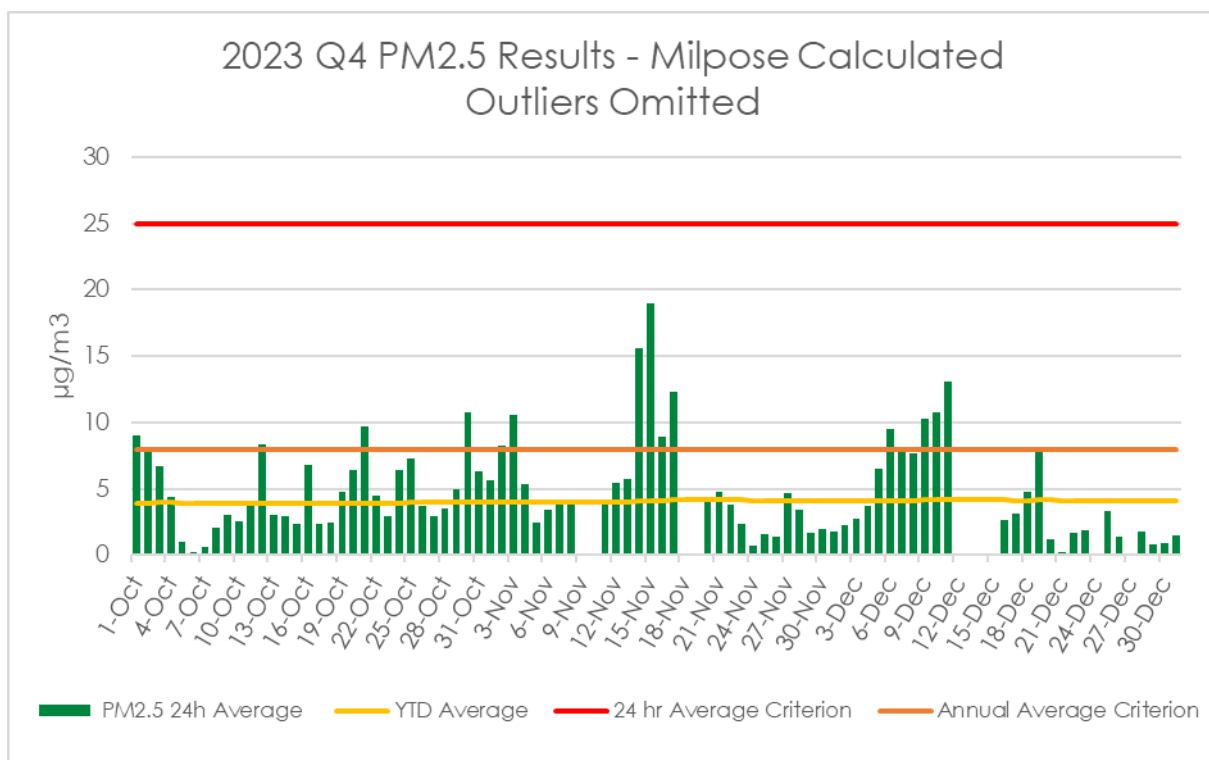


Figure 5: Milpose (Calculated)

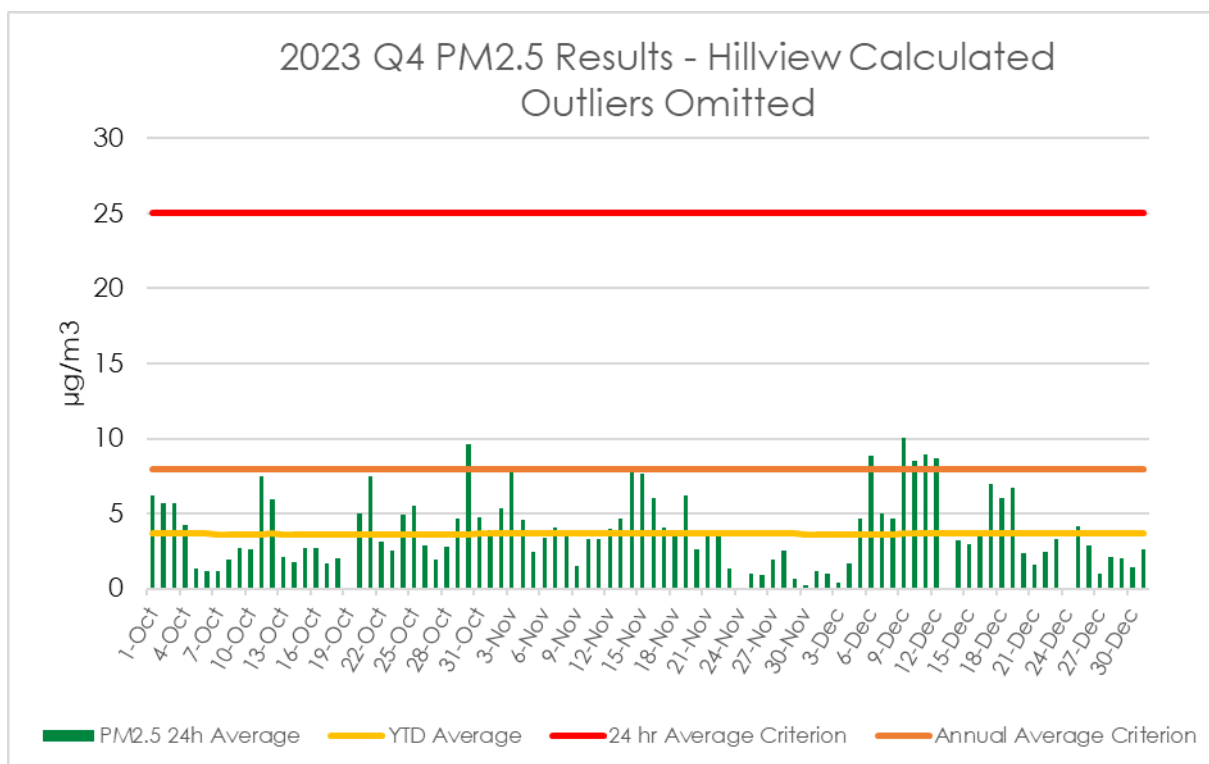


Figure 6: Hillview (Calculated)

3. WATER

3.1 Overview

Water management at Northparkes is undertaken in accordance with approved management plans, prepared in accordance with the Consent. All water samples are analysed at an independent National Association of Testing Authorities (NATA) accredited laboratory.

Surface water quality monitoring is undertaken at Northparkes specifically within the three defined water management systems of;

- Clean water management system, which includes farm dams and watercourses;
- Dirty water management system, which includes settlement ponds; and
- Contaminated water management system, which includes all aspects of ore processing, and retention ponds.

The groundwater monitoring program at Northparkes aims to identify any changes to the natural groundwater system as a result of mining operations and ensure compliance with the Consent. It focuses on potential impacts to environmental assets and groundwater users in the area surrounding Northparkes.

Monitoring results are assessed and interpreted utilising historical trend analysis and internal water quality criteria and trigger levels to identify potential changes.

3.2 Quarterly Monitoring Analysis

Water quality monitoring was carried out generally in accordance with the Consent, with no significant changes to the pH or EC for all locations. Copper concentrations increased at several locations, although results are still consistent with long term data. These locations will be closely monitored during the future reporting periods. A summary of the monitoring results at each location sampled are presented in Tables 1-7 below.

* Sample not received at laboratory

Table 1: Process Water System

Location	RP01	RP02	RP03	RP04	RP05	RP06	RP07	RP08	RP09	RP12	RP13	RP15	RP16	RP19	RP20	RP21
EC (uS/cm)	567	653	4,453	2,453	519	3,460	Dry	2,053	6,621	351	782	No sample	8,464	3,543	8,536	2,601
Cu (mg/L)	0.073	0.02	0.034	0.368	0.013	0.008	Dry	0.013	0.018	0.014	0.02	No sample	0.007	0.005	0.035	0.014
pH	7.85	8.87	7.53	7.4	9.3	8.12	Dry	8.24	8.97	9.31	7.78	No sample	8.15	8.41	8.14	7.63

Table 1 continued: Process Water System

Location	RP22	RP23	RP24	RP25	RP26	RP27	RP28	RP32	PWD	Caloola North	Caloola South	GT02	SD1	SD2
EC (uS/cm)	No sample	Dry	Dry	409	487	4,577	6,503	874	4,393	2,192	3,057	1,630	No sample	Dry
Cu (mg/L)	No sample	Dry	Dry	0.022	0.016	0.024	0.011	0.018	0.026	0.005	0.004	0.087	No sample	Dry
pH	No sample	Dry	Dry	8.19	8.5	7.38	8.4	8.83	7.4	8.27	8.07	8.59	No sample	Dry

Table 2: Sediment Ponds

Location	SP03	SP10	SP15	SP33
EC (uS/cm)	4,180	339	Dry	235
Cu (mg/L)	0.002	0.003	Dry	0.004
pH	8.16	7.48	Dry	8.66

Table 3: Farm Dams

Location	FD04	FD05	FD06	FD07	FD11	FD12	FD16	FD18	FD25	FD26	FD27
EC (uS/cm)	1,460	108	134	181	408	Dry	380	2,636	282	646	260
Cu (mg/L)	0.007	0.016	0.013	0.012	0.016	Dry	0.04	0.008	0.008	0.008	0.01
pH	7.95	8.81	9.01	8.49	8.52	Dry	8.79	8.35	7.55	8.41	8.65

*No sample – insufficient water to collect sample or no access

Table 4: Water Courses

Location	WC01	WC02	WC03	WC04	WC05	WC06	WC07	WC11	WC12	WC13	WC14	WC15	WC16
EC (uS/cm)	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	132	Dry	Dry	Dry	Dry
Cu (mg/L)	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	0.020	Dry	Dry	Dry	Dry
pH	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	8.7	Dry	Dry	Dry	Dry

Table 5: TSF Bores

Location	MB01	MB02	MB03	MB05	MB06B	W26	W27	W28	W29	W30	W31	W32	W33	W34
EC (uS/cm)	5,503	9,166	22,847	21,694	16,108	10,645	No sample	12,911	17,552	2,095	643	2,923	7,461	11,832
Cu (mg/L)	0.004	0.006	0.027	0.01	0.005	0.012	No sample	0.007	0.04	0.004	0.011	0.008	0.004	0.018
pH	7.23	7.08	5.27	6.54	6.97	7.13	No sample	9.58	12.35	7.27	8.06	11.63	10.11	7.41
SWL							No sample							

Table 6: Opencut Bores

Location	MB10	MB11 (dry)	MB12	MB13	MB14	W14	W19	W20	W21	W22	W23	W24	W25
EC (uS/cm)	11,383	dry	no sample	20,908	3,140	3,708	10,335	10,396	22,937	10,479	12,178	2,050	2,035
Cu (mg/L)	0.005	dry	no sample	0.01	0.009	0.012	0.007	0.026	0.01	0.01	0.005	0.004	0.026
pH	6.79	dry	no sample	6.63	6.96	7.92	7.29	7.31	7.65	7.37	7.06	7.66	7.65
SWL		dry	no sample										

Table 7: Underground Bores

Location	MB17	MB18	MB19	MB20	P101	P102	P103	P104	P139	P145	P149
EC (uS/cm)	698	15,262	13,471	10,673	no sample	no sample	no sample	no sample	25,122	191	23,941
Cu (mg/L)	0.004	0.008	0.003	0.034	no sample	no sample	no sample	no sample	0.01	0.004	0.01
pH	7.61	8.04	7.3	7.42	no sample	no sample	no sample	no sample	6.56	7.18	6.21
SWL	240.4	248.5	239.4	245.3					252.3	225.5	235.6

Table 8: Regional Bores

Location	Far Hilliers	Long Paddock	Moss #1	South Hilliers	Wright
EC (uS/cm)	655	986	1913	No sample	769
Cu (mg/L)	0.005	0.008	0.005	No sample	0.004
pH	7.1	7.7	7.7	No sample	8.8
SWL	264.3		246.6	253.1	

4. VIBRATION

4.1 Overview

The assessment criteria for blast impacts at Northparkes are based on the ANZECC Guideline, aimed to minimise annoyance to human comfort levels.

The blast monitoring program uses blast units which measure ground vibration and air overpressure at the residences of the four closest privately owned properties, Adavale, Hillview, Hubberstone and Milpose. The program is designed to measure the effectiveness of control measures and ensure compliance with consent and licence conditions, relevant standards and corporate requirements. A summary of the monitoring results are provided below.

4.2 Quarterly Monitoring Analysis

During the reporting period, 12 surface blasts were undertaken. Highlighted cells are those where an exceedance was identified.

Table 9: Overpressure results at monitoring locations.

Monitor Location	Overpressure (dB) – 115 (dB)											
	12 Oct 23 E31N	19-Oct-23 E31N	26-Oct-23 E31N	3-Nov-23 E31N	9-Nov-23 E31S	10-Nov-23 E31N	17-Nov-23 E31S	24-Nov-23 E31N	30-Nov-23 E31S	7-Dec-23 E31N	14-Dec-23 E31S	22-Dec-23 E31N
Adavale	101.5	89.2	97.9	92.2	92.2	89.2	92.3	91.4	101.3	104.9	102	93.7
Hillview	102.6	104	88.1	98	98	99.1	99.6	99.3	103.4	106.5	100.7	90.5
Hubberstone	102.8	94.8	102.8	94.4	94.4	102.2	98.6	87.6	100.7	106.6	98.6	89.1
Milpose	106.8	99.3	98.2	90.4	90.4	96.5	93.6	94.7	92.4	95.2	88.7	94.5

Table 10: Vibration results at monitoring locations

Monitor Location	Vibration (mm/s) – 5 mm/s											
	12 Oct 23 E31N	19-Oct-23 E31N	26-Oct-23 E31N	3-Nov-23 E31N	9-Nov-23 E31S	10-Nov-23 E31N	17-Nov-23 E31S	24-Nov-23 E31N	30-Nov-23 E31S	7-Dec-23 E31N	14-Dec-23 E31S	22-Dec-23 E31N
Adavale	0.02	0.03	0.02	0.02	0.05	0.06	0.07	0.05	0.07	0.03	0.14	0.09
Hillview	0.02	0.02	0.02	0.03	0.07	0.08	0.12	0.06	0.13	0.04	0.16	0.04
Hubberstone	0.03	0.03	0.03	0.02	0.06	0.08	0.09	0.05	0.05	0.04	0.11	0.05
Milpose	0.03	0.02	0.03	0.06	0.04	0.04	0.05	0.03	0.05	0.04	0.06	0.03

4.3 Exceedance

On Thursday 30 November, the E31S blast was recorded as being fired at 5.01.19 pm – 1 minute and 19 seconds outside of the permitted period defined in the Consent (DC 11_0060) (Schedule 3 Condition 7). Northparkes self-reported to the Department of Planning.

5. NOISE

Operational noise is managed in accordance with the approved Noise Management Plan (NMP). The NMP covers all operational activities with the potential to generate noise at Northparkes. It details specific noise management and mitigation measures, outlines monitoring and reporting requirements and provides clear definitions of the roles and responsibilities for noise management.

5.1 Overview

Northparkes undertakes a noise monitoring program that consists of both operator-attended and unattended surveys. This program includes four real time monitors at the nearest occupied residences of Hubberstone, Milpose, Hillview and Adavale. Lone Pine is included in the attended monitoring program along with the four listed previously.

Operator-attended noise measurements and recordings are undertaken outside the mining leases in order to quantify the intrusive noise emissions from construction and of general mine activity as well as the overall level of ambient noise. This noise monitoring was undertaken by an independent and suitably qualified noise professional.

5.2 Quarterly Monitoring Analysis

Attended noise monitoring was undertaken between Wednesday 6 December to Thursday 7 December 2023.

The assessment was completed to quantify site noise emissions against relevant noise criteria pertaining to Northparkes operations in accordance with Conditions 1 to 5 of Schedule 3 of the NSW Development Consent Conditions (DC11_110060), Northparkes Noise Management Plan (NMP, 2019) and Traffic Management Plan (TMP, 2019).

Road noise monitoring identified that vehicle movements associated with shift change generated levels below the relevant road noise criteria specified in the TMP and NMP.

Attended monitoring has identified that operational emissions generated by Northparkes comply with relevant noise criteria at all monitoring locations for all assessment periods. Furthermore, project related noise emissions are generally barely audible at monitoring locations. Extraneous non-mining sources such as traffic, insects, wind in trees, birds, aircraft, residential and agricultural noise were audible during the monitoring period. A summary of the monitoring results at each monitoring location are presented in Tables 11-16 below.

Table 11: Attended noise monitoring results for Hubberstone

Table 3 Operator-Attended Noise Survey Results – Location NM1, Hubberstone						
Time(hrs)/Date	Noise Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA	
Duration 15min	L _A max	L _A eq	L _A 90			
Day						
17:03 07/12/2023	69	50	42	WD: SW WS: 2.5m/s Stab Class: D	Wind 36-65 Birds 35 -69	
17:18 07/12/2023	73	49	42		Traffic 35-53	
17:33 07/12/2023	71	48	41		MAC Operator 71-73 NPM Inaudible	
Site L _A eq(15min) Contribution					<35	
Evening						
20:06 06/12/2023	57	39	34	WD: SE WS: 1.0m/s Stab Class: E	Birds 30-57 Insects 31-44	
20:21 06/12/2023	53	38	35		Traffic 30-48	
20:36 06/12/2023	55	39	35		Dogs Barking 30-38 NPM Inaudible	
Site L _A eq(15min) Contribution					<35	
Night						
00:58 07/12/2023	59	41	35	WD: SE WS: 0.1m/s Stab Class: D	Traffic 30-59 Insects 32-45	
01:13 07/12/2023	44	37	34		NPM – Processing Hum 25-30 (barely to just audible throughout)	
01:28 07/12/2023	43	37	34			
Site L _A eq(15min) Contribution					<35	
Site L _A 1(1min) Contribution					<45	
Note: NPM denotes Northparkes Mines.						
Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.						

Table 12: Attended noise monitoring results for Lone Pine

Table 4 Operator-Attended Noise Survey Results – Location NM2, Lone Pine					
Time(hrs)/Date	Noise Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
Duration 15min	L _A max	L _A eq	L _A 90		
Day					
16:05 07/12/2023	66	49	44	WD: S WS: 2.5m/s Stab Class: D	Wind 40-66
16:20 07/12/2023	62	49	45		Birds 35-66
16:35 07/12/2023	66	51	48		Traffic 35-55
					Residential Noise 40-59
					NPM Inaudible
Site L _A eq(15min) Contribution					<35
Evening					
21:06 06/12/2023	58	51	42	WD: SE WS: 0.5m/s Stab Class: E	Insects 35-58
21:21 06/12/2023	48	43	41		Aircraft <35-45
21:36 06/12/2023	47	41	39		Agricultural Noise <35-41
					NPM Inaudible
Site L _A eq(15min) Contribution					<35
Night					
22:00 06/12/2023	54	42	40	WD: SE WS: 0.5m/s Stab Class: F	Insects 37-54
22:15 06/12/2023	45	42	40		Aircraft 35-54
22:30 06/12/2023	46	41	39		Agricultural Noise <35-40
					NPM Inaudible
Site L _A eq(15min) Contribution					<35
Site L _A 1(1min) Contribution					<45
Note: NPM denotes Northparkes Mines.					
Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.					

Table 13: Attended noise monitoring results for Milpose

Table 5 Operator-Attended Noise Survey Results – Location NM3, Milpose					
Time(hrs)/Date	Noise Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
Duration 15min	L _A max	L _A eq	L _A 90		
Day					
14:13 07/12/2023	61	41	33	WD: S WS: 2.0m/s Stab Class: D	Wind 29-62 Birds 25-53 Aircraft 30-44 MAC Operator 72 NPM Inaudible
14:28 07/12/2023	72	46	34		
14:43 07/12/2023	62	44	38		
Site L _A eq(15min) Contribution			<35		
Evening					
21:27 07/12/2023	53	43	37	WD: S WS: 1.0m/s Stab Class: E	Insects 35-54 Wind 30-46 Birds 35-45 NPM Inaudible
21:42 07/12/2023	49	41	38		
21:57 07/12/2023	54	45	39		
Site L _A eq(15min) Contribution			<35		
Night					
23:53 06/12/2023	50	44	41	WD: SE WS: 0.1m/s Stab Class: E	Insects 37-50 Traffic 35-43 NPM – Exhaust Fan/Hum <30 (barely audible throughout)
00:08 07/12/2023	47	42	40		
00:23 07/12/2023	50	43	40		
Site L _A eq(15min) Contribution			<35		
Site L _A 1(1min) Contribution			<45		

Note: NPM denotes Northparkes Mines.

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Table 14: Attended noise monitoring results for Hillview

Table 6 Operator-Attended Noise Survey Results – Location NM4, Hillview					
Time(hrs)/Date	Noise Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
Duration 15min	L _A max	L _A eq	L _A 90		
Day					
13:00 07/12/2023	78	51	32	WD: SW WS: 1.5m/s Stab Class: C	Residential Noise 30-78
13:15 07/12/2023	78	57	35		Traffic 30-58
13:30 07/12/2023	56	41	34		Wind 25-51
					Birds 25-40
					Agricultural Noise 25-39
					NPM Inaudible
Site L _A eq(15min) Contribution					<35
Evening					
18:00 07/12/2023	79	53	43	WD: S WS: 2.0m/s Stab Class: D	Residential Noise 35-79
18:15 07/12/2023	68	50	43		Traffic 35-58
18:30 07/12/2023	59	47	42		Wind 39-59
					Aircraft 40-68
					NPM Inaudible
Site L _A eq(15min) Contribution					<35
Night					
01:53 07/12/2023	41	28	26	WD: SE WS: 0.1m/s Stab Class: F	Traffic 30-62
02:08 07/12/2023	62	43	27		Insects 24-36
02:23 07/12/2023	46	28	26		Birds 20-30
					Dogs Barking 20-32
					NPM Inaudible
Site L _A eq(15min) Contribution					<35
Site L _A 1(1min) Contribution					<45
Note: NPM denotes Northparkes Mines.					
Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.					

Table 15: Attended noise monitoring results for Adavale

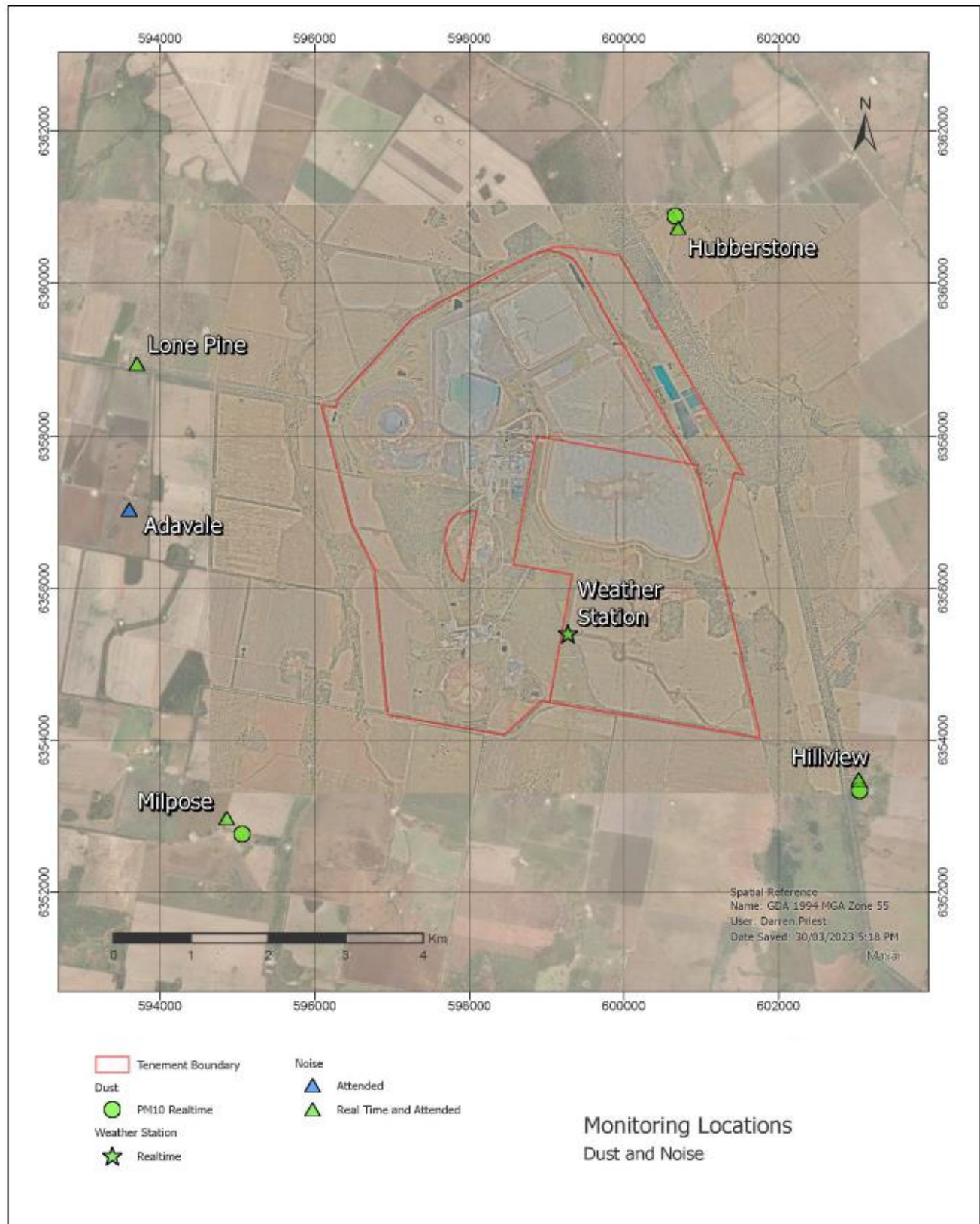
Table 7 Operator-Attended Noise Survey Results – Location NM5, Adavale					
Time(hrs)/Date	Noise Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
Duration 15min	L _A max	L _A eq	L _A 90		
Day					
15:10 07/12/2023	60	54	51	WD: SE WS: 3.0m/s Stab Class: E	Residential Noise 45-64 Wind 43-60 Birds 40-62 Insects 40-53 NPM Inaudible
15:25 07/12/2023	62	54	49		
15:40 07/12/2023	64	54	43		
Site L _A eq(15min) Contribution			<35		
Evening					
19:16 07/12/2023	64	43	38	WD: SE WS: 1.5m/s Stab Class: D	Wind 25-60 Insects 25-56 MAC Operator 64 NPM Inaudible
19:31 07/12/2023	57	36	32		
19:46 07/12/2023	64	38	32		
Site L _A eq(15min) Contribution			<35		
Night					
22:55 06/12/2023	43	38	35	WD: SE WS: 0.1m/s Stab Class: D	Insects 34-44 Birds 30-35 Aircraft 30-35 Agricultural Noise 52-55 NPM – Exhaust Fan <30 (barely to just audible throughout)
23:10 06/12/2023	52	37	35		
23:25 06/12/2023	55	38	36		
Site L _A eq(15min) Contribution			<35		
Site L _A 1(1min) Contribution			<45		
Note: NPM denotes Northparkes Mines.					
Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods					

Table 16: Attended road noise survey results

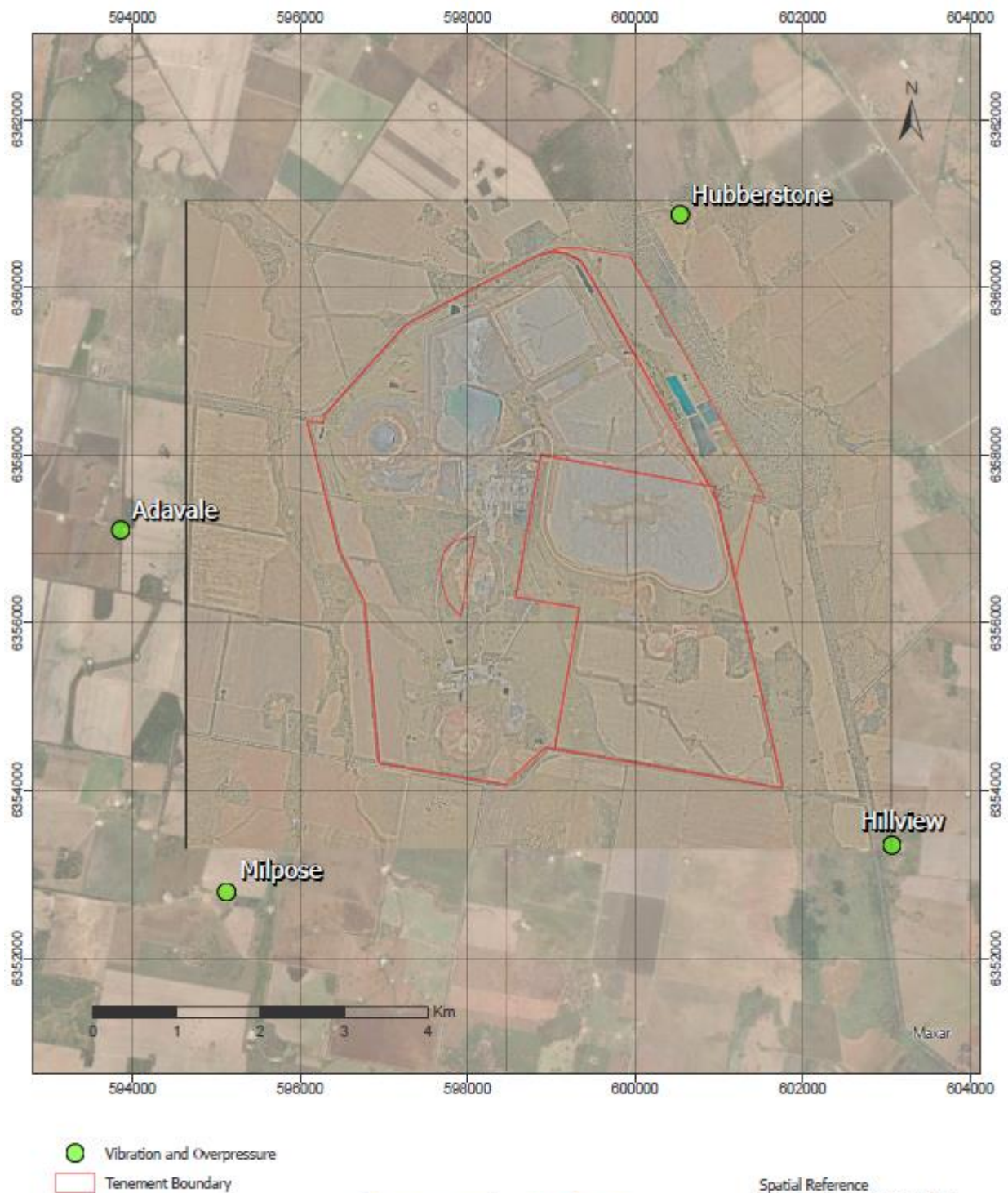
Table 8 Operator-Attended Road Noise Survey Results – Location NM4, Hillview				
Time(hrs)/Date	Measured Noise Level	Meteorology	Criteria	Description and SPL dBA
Duration 1 hour	dB LAeq(1hr)		dB LAeq(1hr)	
13:00 07/12/2023	53	WD: SW WS: 1.5m/s Stab Class: C	55	Residential Noise 30-78
				Traffic 30-58
				Wind 25-51
				Birds 25-40
				Agricultural Noise 25-39
				NPM Concentrate Truck (offsite) 30-56
				(2 Passes)
				(Approx. 18 vehicles Enter/Exit
				NPM Site)
18:00 07/12/2023	49	WD: S WS: 2.0m/s Stab Class: D	55	Residential Noise 35-79
				Traffic 35-58
				Wind 39-59
				Aircraft 40-68
				NPM Concentrate Truck (offsite) 30-55
				(2 Passes)
				(Approx. 68 vehicles Enter/Exit
				NPM Site)
Note: NPM denotes Northparkes Mines.				
Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.				

Appendix 1 - Monitoring Locations

Dust & Noise



Vibration & Overpressure



Vibration and Overpressure
Monitoring Locations - March 2023

Spatial Reference
Name: GDA2020 MGA Zone 55
User: Darren.Priest
Date Saved: 28/03/2023 8:41 AM

Surface water monitoring locations

