CSA Environmental Monitoring Report H2 2023

Name of Mine:	CSA
Leaseholder:	Metals Acquisition Limited
Environment Protection License:	EPL1864
Mining Lease:	Consolidated Mining Lease 5 (CML5)

Document Approval

Originator:	Jasmine Palmer (Environment Grad)
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Contents

Introduction

Cobar Management Pty Ltd (CMPL) operates the CSA mine, which is located 11km north of Cobar, New South Wales. CMPL, a wholly owned subsidiary of Metals Acquisition Limited (MAC), retains ownership of CSA, which operates as an underground copper mine, hoisting up to 1 million tonnes of copper ore and producing more than 146,000 tonnes of copper concentrate per annum.

Ore is processed on site by grinding and flotation. Once processed, the concentrate slurry is thickened, filtered, dried and stockpiled. Concentrate is then transported by rail to Port Waratah in Newcastle, for storage and export by ocean freight. Tailings are stored in the South Tailing Storage Facility on site, and waste rock is stockpiled for future closure requirements.

Scope

This report will provide a summary and brief analysis of the ongoing environmental monitoring for CSA from July to December of 2023. This includes air quality, water (including surface water, potable water, groundwater quality, and groundwater levels), and soil analyses. Any potential breaches will be investigated against the relevant guidelines.

Monitoring of emissions and general airborne pollutant data that is not particulate matter is conducted in accordance with the National Pollutant Inventory (NPI) and National Greenhouse Gas Inventory Reporting (NGER) and is not covered in this report.

Regulatory context

CSA operates within the licensing conditions of the DA set in 1995, as well as the EPL1864. In addition to these, CSA is legally obligated to ensure that operations do not occur in exceedance of set limits within the relevant legislation, this being Protection of the Environment Operations Act (POEO act), the Mining Act 1992, and various other pieces of specific legislation and guidelines, including Australian National Committee on Large Dams (ANCOLD) and the Environment Protection Authority guidelines. A full list of relevant legislation can be found in **Table 10**, Appendix A. CSA provides this monitoring data on the MAC website for public viewing, as of the requirements in the NSW EPA guidelines.

Environmental monitoring and reporting also occurs in accordance with the requirements of the CSA Environmental Management Strategy (EMS), as well as applicable regulations including ISO14001. CSA Mine must report on environmental performance on a yearly basis through the Environmental Protection Authority Annual Return and the Resource Regulator Annual Return. The EPA Annual Return pertains to pollution and monitoring, whereas the Resource Regulator reporting pertains to land rehabilitation.

Note: *Although EPL1864 does not require any specific monitoring and thus doesn't require and monitoring reports to be made publicly available, CSA are operating beyond best practice, and therefore undertakes monitoring and publicly reports on environmental data that is relevant to site operations*.

Weather conditions

Cobar is a highly arid region, experiencing weather extremes of dry weather in addition to high levels of heat and wind. Climatic data for Cobar are collected at a Bureau of Meteorology (BoM) weather station (MO 48027) located adjacent to Louth Road, south of the mine. Rainfall and temperature records have been recorded from May 1962, and evaporation from November 1967 to 2016.

Climatic data for the Cobar region from the Bureau of Meteorology can be seen in Figures 1 through 4, below. This data stands to provide background for monitoring schedules utilised at CSA, in addition to an explanation of possible adverse monitoring results which may occur.

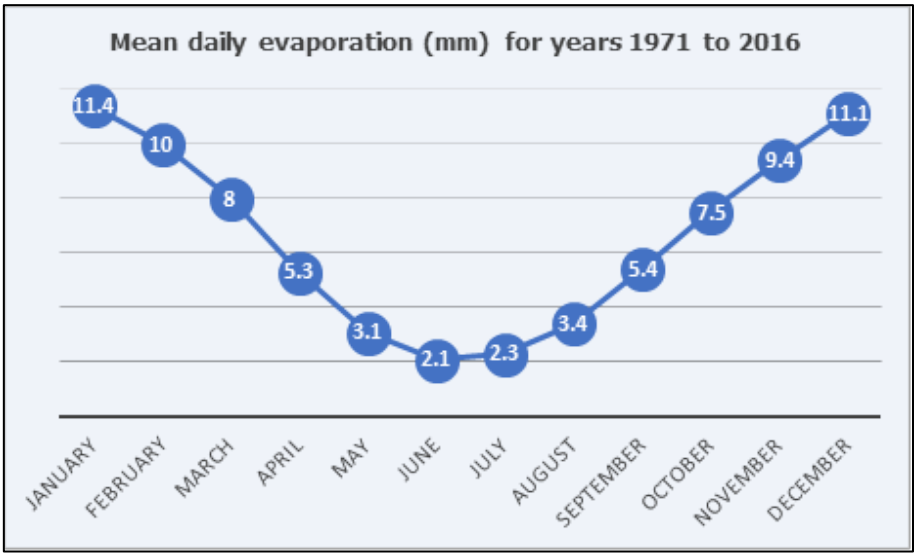

Figure 1 Mean daily evaporation for Cobar, years 1971-2016 (BoM, 2023)

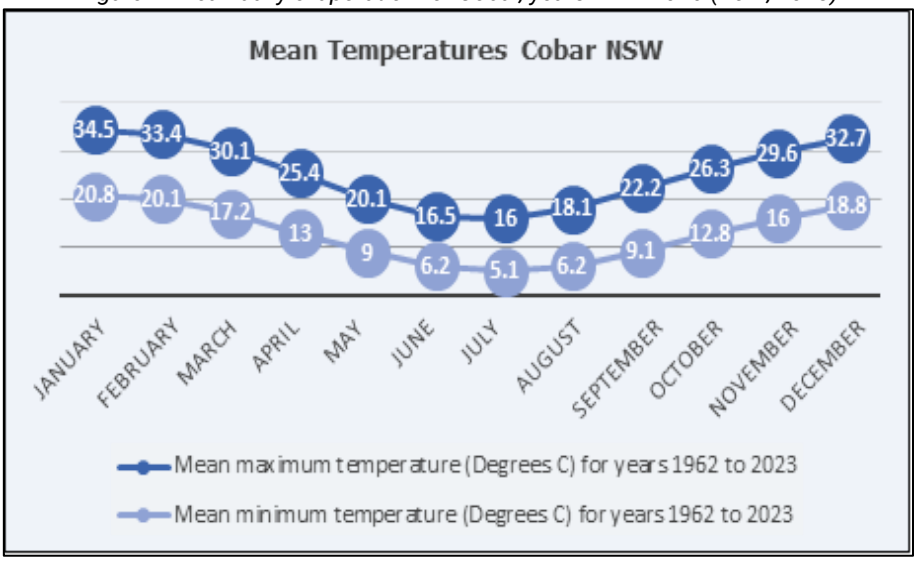

Figure 2 Mean max and min temperatures for Cobar, years 1962-2023 (Bom,2023)

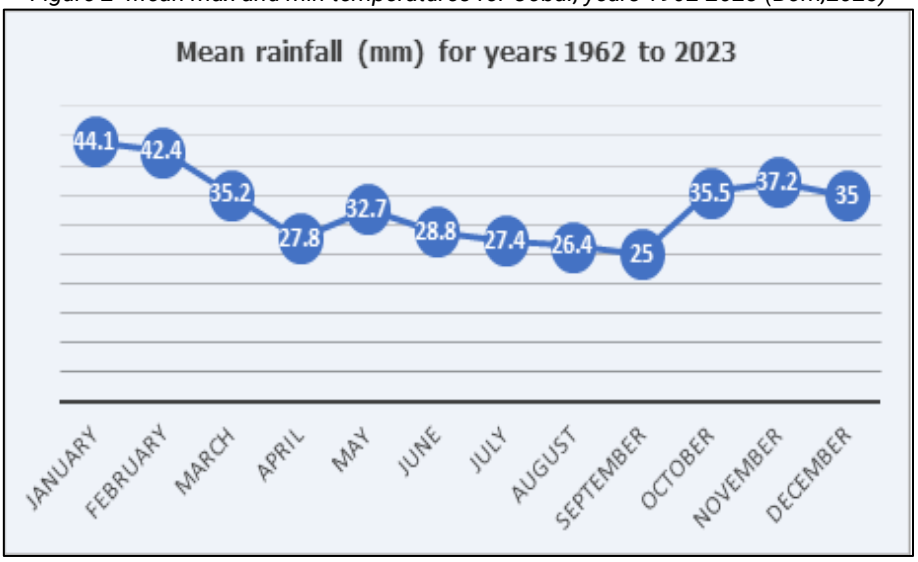

Figure 3 Mean rainfall for Cobar, years 1962-2023 (BoM, 2023)

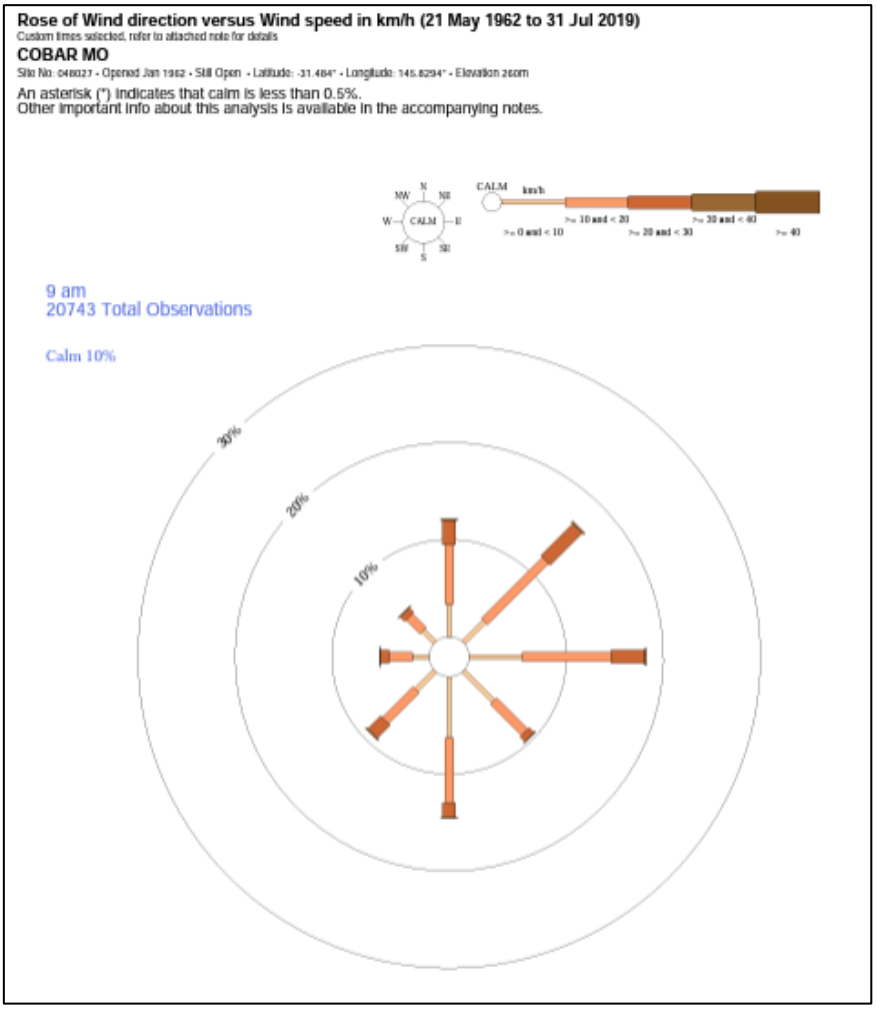

Figure 4 Cobar wind rose (BoM, 2019)

Air Quality

Dust

CSA Mine operations have the potential to contribute to air pollution through the presence of airborne dust. Several aspects of surface operations have the potential to create dust, including the usage of equipment, in addition to secondary pollution created through emissions from vehicles, plant and equipment (the latter of which will not be assessed in this report).

The main dust generating activities which may occur at CSA include: the operations of machinery on unsealed surface roads, topsoil stripping, wind impacts on exposed stockpiles of concentrate, movement of waste rock or other materials, surface exploration drilling, and ventilation exhaust from underground mining activities.

Stationary depositional dust gauges (DDG) are in place at CSA, strategically located to ensure a thorough coverage across all areas of operations. This includes at the corners of the lease/fence area, and in areas of high traffic and operations, i.e. haul roads. See **Figure 7** which shows the DDG locations as well as highlights the sites with exceedances. The DDG's on the site perimeter (D13, D14, D15 and D16) are to ensure compliance with no dust leaving the premise whilst the DDG's in closer proximity to the mine operations are for internal use, to monitor and manage site works and to address or change site work practices as required.

Metrics of dust measurement include depositional dust, measured is in *ash content per square metre per month* ($g/m^2/m$).Data for depositional dust for July to December 2023 can be seen in **Table 1** and **Figure 6** and **Figure 7**.

The lease perimeter dust gauges are all within the NSW EPA guideline limit of $4g/m^2$/month, which shows that the few high dust readings that have been recorded onsite are not impacting or migrating offsite. There were two deposition dust gauge sites that have recorded annual average dust deposition readings above the EPA guideline standard of 4 $g/m^2/m$ being D1 and D5, which are highlighted red in **Table 1**, with readings of 4.7 and 4.5 respectively. These readings which are slightly above the guideline of 4 $g/m^2/m$ where due to excess dust occurrence in high haul road traffic areas during the hot dry month of December. This also coincided with a breakdown of the surface water truck, and the contractor's truck onsite had to manage two operational areas as well as maintain the right moisture content in the Stage 9 STSF buttress construction work.

Figure 5 shows the correlation of rainfall and a summary of all gauges combined per month. This shows that months which had higher rainfall such as July and November show a corresponding reduction in the dust monitoring results.

These exceedances along with the isolated high monthly exceedances have been investigated internally and processes put in place to limit their re-occurrence.

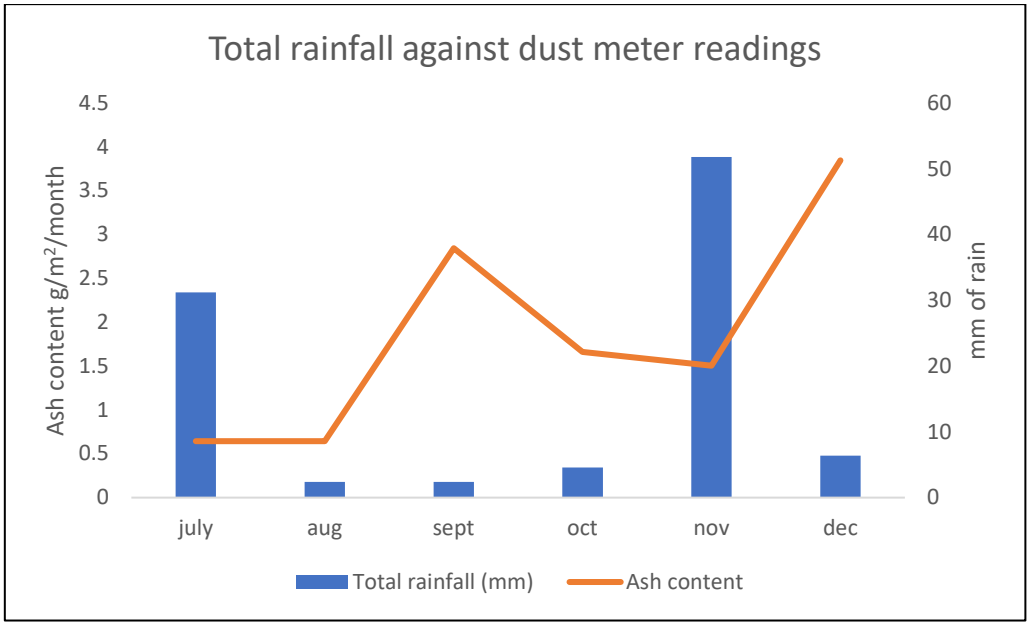

Figure 5 Dust results in relation to total rainfall

Table 1 Depositional Dust results

Dust Gauges	Ash content g/m²/month						
	July	Aug	Sep	Oct	Nov	Dec	12 mth Rolling average
Compliance DDG's							
D13	0.05	0.05	0.6	0.5	0.2	0.8	**0.4**
D14	0.05	0.05	0.4	1	0.8	1.3	**0.6**
D15	0.05	0.05	1.8	0.5	0.4	1.2	**0.7**
D16	0.05	0.05	1.6	0.5	0.3	1.2	**0.6**
Site Management DDG's							
D1	0.35	0.35	10.1	3	2.9	11.4	**4.7**
D2	0.05	0.05	1.3	0.7	0.2	1	**0.6**
D3	0.45	0.45	2.5	0.8	0.6	2.3	**1.2**
D4	0.1	0.1	1.5	0.7	0.5	2.2	**0.9**
D5	4.4	4.4	4.8	4.4	3.9	5.3	**4.5**
D6	0.15	0.15	1.6	1.3	1	2.5	**1.1**
D7	0.65	0.65	2.5	2.1	1.3	3.1	**1.7**
D8	0.05	0.05	1.4		0.2	1	**0.5**
D9	1.2	1.2	3.7	1.7	1.1		**1.8**
D10	1.35	1.35	4.9	4.4	6.1	4	**3.7**
D11	0.6	0.6	3.2	0.7	2.7	9.5	**2.9**
D12	0.75	0.75	3.6	2.6	1.9	10.9	**3.4**

It is noted that the 4 g/m²/month recommended limit is an annualised averaged result and thus short-term spikes are not necessarily a non-compliance with the regulations, nonetheless they are triggers for internal process reviews and remediation processes. It is also noted that depositional dust once it is above the 4 g/m²/month is then termed nuisance dust.

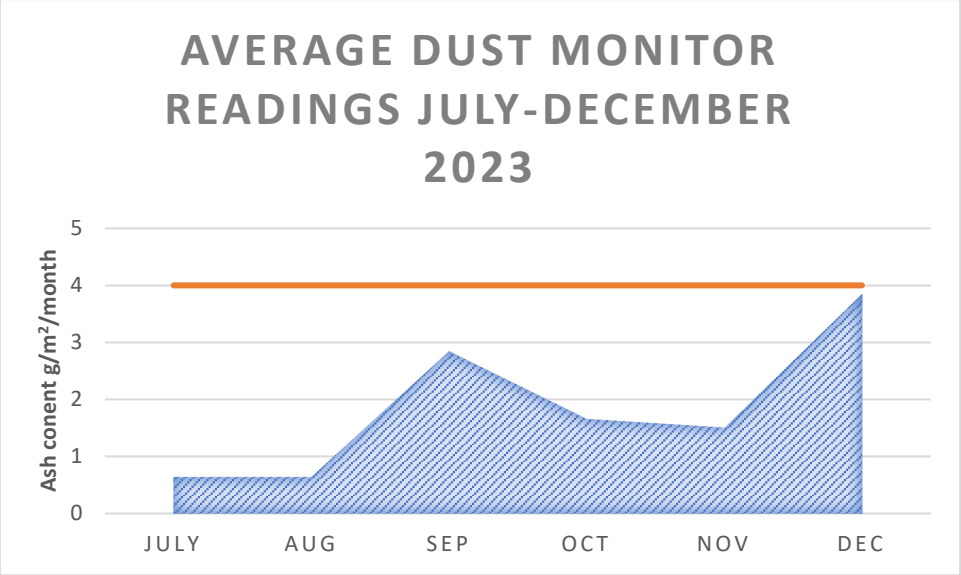

Figure 6 CSA dust monitor averages (average of 14 monitors for 6 months period) Jul to Dec 2023

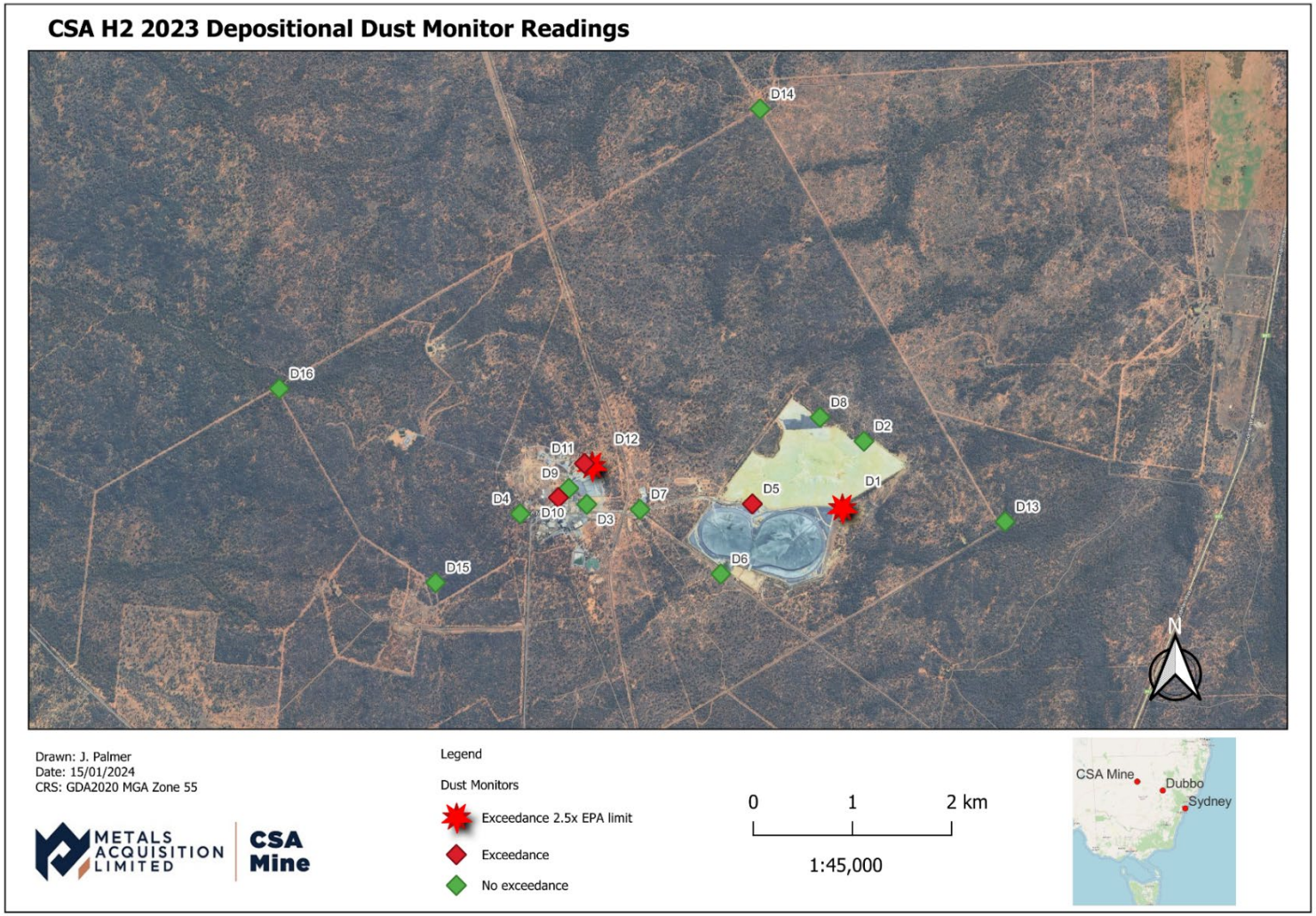

Figure 7 CSA Dust Monitor Locations

Stationary Air Quality Monitoring

The stationary air quality monitoring station at CSA was under maintenance in H2 of 2023. Alternate solutions are being investigated for future monitoring periods.

Water Quality

Surface Water

CSA retains several surface water dams and catchments, including naturally formed dams, in addition to manmade water storage structures. Water storages are tested for quality to assess for any potential environmental contamination which may occur through operations. The main metric which is assessed in testing is copper contamination. This is to ensure that environmental impacts are not spreading outside mining lease boundary. Copper and Zinc levels are assessed against the Australian and New Zealand Environment and Conservation Council (ANZECC) Guidelines for Irrigation and General Use. These stipulate an upper limit of 5mg/L of copper and zinc contamination in water.

Testing in the latter half of 2023 was increased from the previous H1 period, however many of the dams remain empty and therefore unable to be sampled. Surface water monitoring locations can be seen in **Figure 8** below.

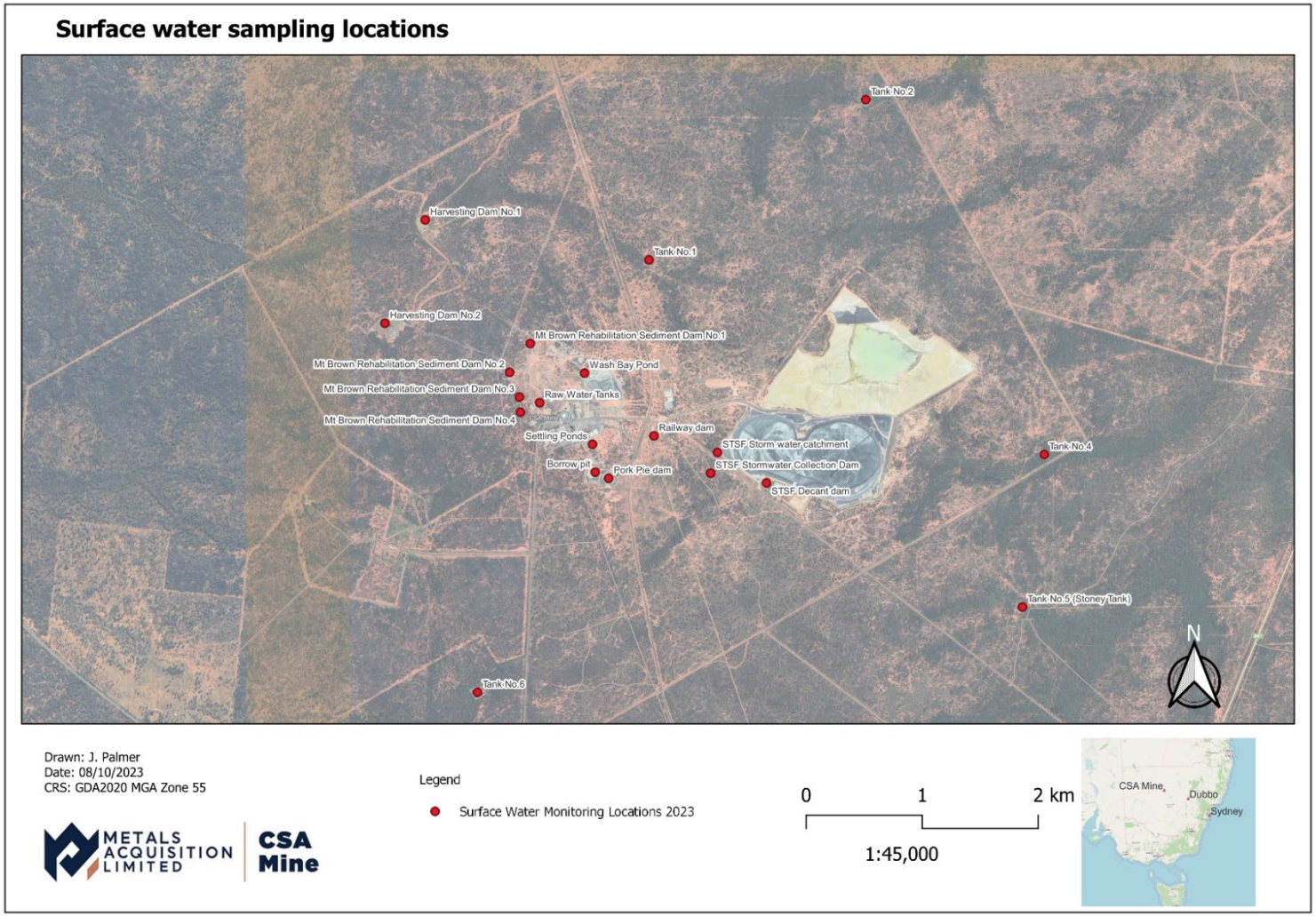

Figure 8 CSA surface water sampling sites

Table 2 Copper levels in surface water in mg/L

DESCRIPTION	Jul	Aug	Sep	Oct	Nov	Dec
Mt Brown Rehabilitation Sediment Dam No.1	14.3					14.1
Raw Water Tanks				0.004	0.012	0.004
STSF Stormwater Collection Dam	0.266		0.205			
Borrow pit	0.392			0.128	0.138	
STSF Decant dam	0.014			0.045		0.032
Wash Bay Pond	0.246		0.243			0.42
Tank No.1						
Railway dam						
Mt Brown Rehabilitation Sediment Dam No.4						
Mt Brown Rehabilitation Sediment Dam No.2						
STSF Storm water catchment						0.264
Mt Brown Rehabilitation Sediment Dam No.3						
Pork Pie dam	0.17		0.248	0.137		0.243
Harvesting Dam No.1			0.016	0.006		0.008
Harvesting Dam No.2		0.0002	0.073	0.011		0.038
Tank No.6						
Settling Ponds	0.146		0.554		0.123	
Tank No.5 (Stoney Tank)		0.036				
Tank No.4		0.008			0.015	0.024
Tank No.2		0.004				0.011

Table 3 Zinc levels in surface water in mg/L

DESCRIPTION	Jul	Aug	Sep	Oct	Nov	Dec
Mt Brown Rehabilitation Sediment Dam No.1	54.1					47.6
Raw Water Tanks				0.014	0.034	0.01
STSF Stormwater Collection Dam	0.157		0.051			
Borrow pit	2.95			0.064	0.912	
STSF Decant dam	0.017			0.046		0.019
Wash Bay Pond	0.149		0.101			0.326
Tank No.1						
Railway dam						
Mt Brown Rehabilitation Sediment Dam No.4						
Mt Brown Rehabilitation Sediment Dam No.2						
STSF Storm water catchment						0.035
Mt Brown Rehabilitation Sediment Dam No.3						
Pork Pie dam	2.62		15.2	0.07		0.282
Harvesting Dam No.1			0.082	0.028		0.07
Harvesting Dam No.2		0.015	0.016	0.105		0.032
Tank No.6						
Settling Ponds	0.33	0.015			0.039	
Tank No.5 (Stoney Tank)		0.014				
Tank No.4		0.015			0.029	0.069
Tank No.2		0.023				0.021

Results of sampling did show some slight exceedances from the ANZECC Guidelines, highlighted in red in Tables 2 and 3. These exceedances in Mt Brown Dam 1 are expected, as this is run off from the excised area which is a known area of contamination from historic mining operations. The Pork Pie September Zinc level can be seen to be an anomaly with an unknown cause.

Low water levels can be seen to skew results at or below the 25% level. Due to the semi-arid climate of Cobar, this is a common occurrence and thus dams will be sampled regardless, but with increased concentration taken into account when assessing results.

Surface water levels of dissolved metals, in addition to pH and other factors, vary greatly seasonally due to levels of precipitation impacting the concentration gradient. Due to this, quarterly testing of sites is planned, which will then be compared to previous seasons and not between seasons within the same year. Longer term cycles of climate and weather such as drought periods have a significant impact on surface water volumes and should be considered when analysing and comparing data.

Potable Water

CSA's Potable water is tested fortnightly with a microbiological analysis, and bi-annually with a full chemical analysis. Microbiological analysis mainly focusses on coliforms, ensuring no faecal coliforms are present, and monitoring baseline levels of other coliforms.

Sampling is conducted on 12 potable water taps across site, which are seen to be representative locations as seen in **Figure 9**. Coliform measurement is by membrane filtration (MF). Testing of the potable water treatment plant occurs daily including chlorine levels, and the occurrence of this is checked by the mine environmental team through an online form. Any exceedances that occur are immediately reported to the surface maintenance team, and if necessary, external contractors are engaged to assess any issues occurring with the on-site treatment plant.

Figure 9 CSA Potable water testing locations

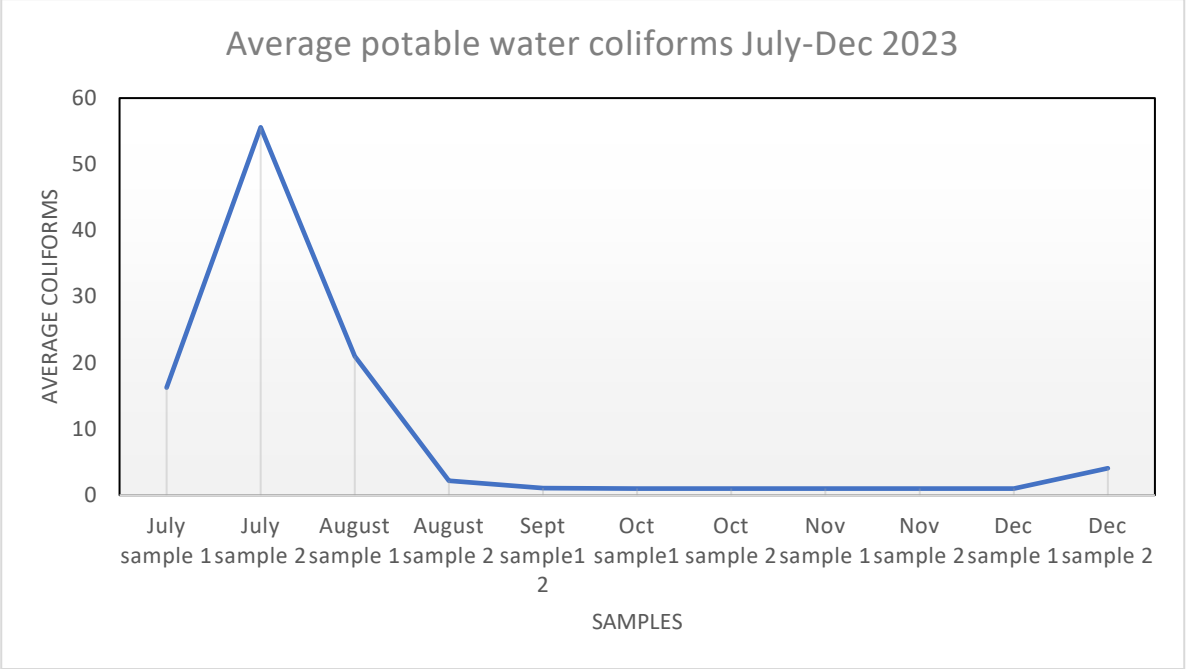

Figure 10 *CSA Potable water testing results for coliforms Jan-June 2023*

Coliforms peaked in the second lot of testing for July (**Figure 10**) and were quickly brought under control and back down to safe numbers by site maintenance teams, in collaboration with external maintenance teams. It is of note that 'Neverfail' water dispensers are always available across site and in underground crib rooms for drinking purposes in addition to tap water from the site potable water treatment plant.

In the full chemical analysis of potable water, conducted on surface and underground, it was found that there were no results of concern when measured against the Australian Drinking Water Guidelines. Key measures from this testing can be seen for surface and underground respectively, in **Table 4**.

Table 4 Surface and Underground Potable Water Analysis

Sample Site	pH	EC (µS/cm)	Suspended Solids (mg/L)	Turbidity (NTU)	Sulfate (mg/L)	Copper (mg/L)	Zinc (mg/L)
womens toilet	8.27	686	<5	0.2	25	0.2	0.006
admin crib	8.3	672	<5	0.2	25	0.022	0.024
workshop crib	8.34	683	<5	0.2	25	0.004	0.018
development crib	8.25	667	<5	0.2	24	0.034	0.052
mill hand basin	8.34	667	<5	0.2	24	0.079	0.018
minign crib	8.32	678	<5	1.8	25	0.011	0.314
common crib	8.36	682	<5	0.2	25	0.123	0.006
mill crib	8.36	677	<5	0.5	24	0.01	0.019
PITRAM crib	8.29	675	<5	0.2	24	0.267	0.019
training crib	7.94	699	<5	<0.1	24	0.013	0.028
hset crib	8.21	654	<5	0.1	26	0.138	0.013
core yard	8.22	659	<5	<0.1	26	0.024	0.005
8980	8.11	649	<5	0.3	28	0.049	0.031
11L	8.18	672	<5	0.2	28	0.015	1.85
9080	8.28	652	<5	0.6	28	0.007	0.032
9L	8.28	655	<5	0.3	28	0.007	0.346

Groundwater quality

All available groundwater bores were tested in H2 2023. The results of this testing may be seen in **Table 5** below. Bore WB7 was not tested due to maintenance issues.

Table 5 CSA Groundwater Monitoring H2 2023

Analyte	WB1	WB2	WB3	WB4	WB5	WB8	WB9	WBAL3	WBAL2	WBAL4	WBAL1
Copper (mg/L)	0.004	0.104	0.004	0.019	0.02	0.004	0.572	0.062	0.012	0.242	0.062
Lead (mg/L)	0.001	0.004	0.001	0.002	0.002	0.001	0.076	0.007	0.003	0.025	0.004
Zinc (mg/L)	0.015	0.324	0.046	0.064	0.073	0.013	1.37	0.617	0.3	3.31	0.332
Mercury (mg/L)	0.0002	0.0003	0.0003	0.0001	0.0002	0.0002	0.0002	0.0001	0.0001	0.001	0.0001
pH	7.79	7.31	7.83	7.74	7.86	7.85	7.79	7.97	7.5	7.56	7.9
Sulfate (mg/L)	5810	5430	754	3290	3440	500	4670	84	390	372	268
EC (µS/cm)	11000	10900	7390	11400	13600	6330	13600	963	3850	3730	2290
Total dissolved solids (mg/L)	10700	10700	5010	9480	10800	4420	11300	519	2490	2430	1420

It should be noted that the bores that were utilised for this monitoring are not designed for monitoring purposes, rather as production bores, and therefore are not located such as to be representative of the aquifer as a whole and its quality. Approval of construction of bores for the purpose of groundwater monitoring was approved in November 2023, and installation of these will begin in 2024.

Groundwater levels

CSA currently has 63 Vibrating Wire Piezometers (VWPs) in place on and adjacent to the South TSF. These are monitored on an ongoing basis by the tailings management team and external consultants, largely to assess for lateral or vertical leaching of tailings water into soil and groundwater. These are not ideally located to assess for groundwater levels or overarching groundwater monitoring, as the aquifer is non-homogenous, highly fractured, and has a fault running through it. In addition, VWPs were not installed for the express purpose of groundwater level monitoring.

Automated groundwater monitoring bores are planned for construction in order to provide more accurate and useful environmental data regarding groundwater uptake and recharge times, however there is currently no baseline data as to the original groundwater levels and quality due to a lack of data in construction records regarding historic infrastructure.

Groundwater levels for the 64 VWPs CSA operates on site can be seen below in Figure 11, with the locations of each VWP in relation to the STSF plotted in Figure 12. VWPs were intermittently disconnected and re-connected during the period of time this report covers due to buttressing earthworks. In this process, VWP 35 was accidentally damaged, which can be seen in Figure 16 as a large 'drop' in water level. This does not represent an actual drop in water level.

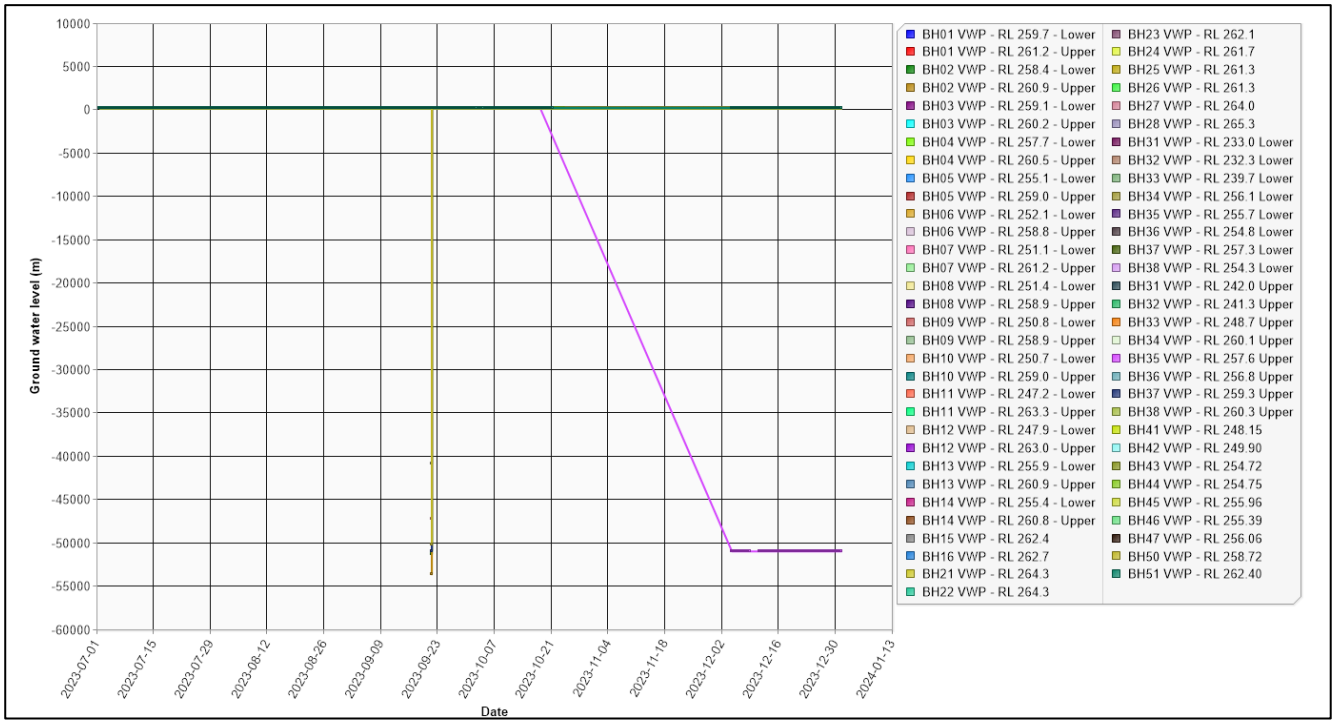

Figure 11 CSA VWP constant groundwater level data H1 2023

Figure 12 South TSF and CSA VWP locations

Soil

Soil testing is conducted at several locations across CSA in order to ensure soil contamination is not occurring as a result of ongoing operations, through spills, dust settling, leaching, and other adverse events which may occur. Regular testing locations are shown in **Figure 13**.

When an environmental incident is known to have occurred, extra testing is conducted with a baseline site also tested for comparison. Soil samples are generally conducted at the same sites as stationary dust monitor stations, in order to ensure a comprehensive coverage of all corners of site and monitor for cumulative effects of dust and other features of ongoing operations. The major analytes assessed within this sampling are copper, zinc, and lead.

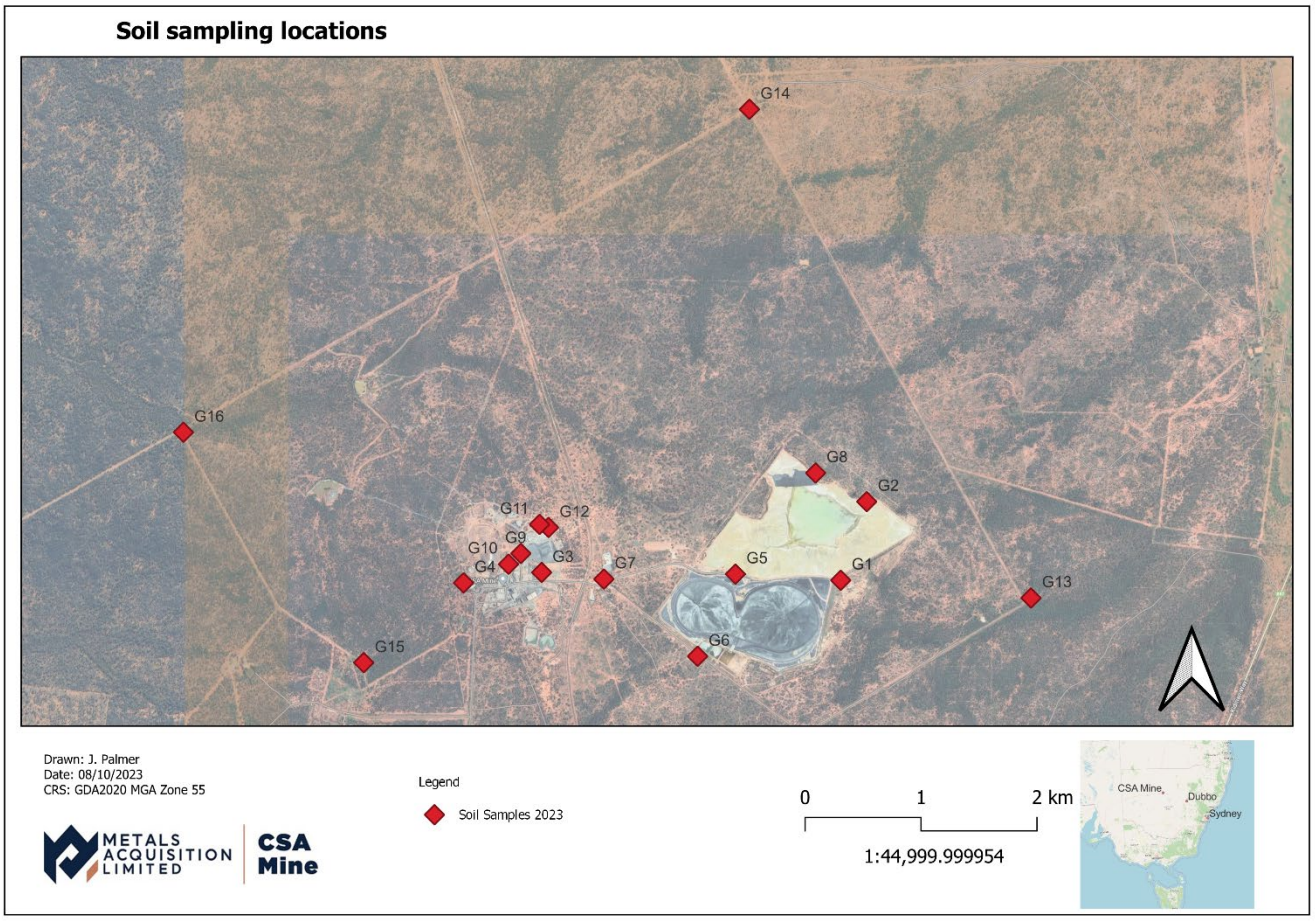

Figure 13 CSA soil sampling locations

Testing was only undertaken in the months of July, August, October and November. The results are displayed in Table 7 through to Table 9. Copper, Lead and Zinc concentrations are seen to be indicators of possible contamination and thus are the metrics used to assess soil samples. **Table 6** shows the HIL (health investigation levels) as identified in Schedule B Appendix A1 of the National Environment Protection (Assessment of Site Contamination) Measure.

The yearly average across all sites was approx. 780mg/kg for copper, 144mg/kg for zinc, and 244 mg/kg for lead. These levels are well below the HIL figures for the three metals as outlined in **Table 6**. G5, G3, G9 and G10 are all in central areas of site and adjacent to haul roads, and G7 is located on top of an old tailings stockpile, which has led to elevated results as anticipated. G4 resides within close proximity to natural outcrops of lead rock and other deposits, which appear on the surface and do not represent contamination from mining activities.

The copper, lead and zinc soil samples were all below the HIL-D for commercial areas at all sites. All sites were below the HIL-A for residential areas based on the yearly averaged figures.

Table 6 HIL- health investigation levels

Element	HIL scenario	HIL (mg/kg)
Copper	Commercial HIL D	250,000
	Residential HIL A	7000
Lead	Commercial HIL D	1,500
	Residential HIL A	300
Zinc	Commercial HIL D	400,000
	Residential HIL A	8000

Table 7 Lead in CSA soil samples mg/kg

Sample site	Jul	Aug	Oct	Nov
G16		16		
G15		68		
G4	321			
G14		14		
G13		11	16	
G6/DECANT	17		18	
G3	60		381	
G12	206		155	
G11	160			
G9	318		317	
G10	700			104
G8		16		14
G2		51		45
G1		65		66
G7		1440		592
G5		121		211

Table 8 Copper in CSA soil samples in mg/kg

Sample site	Jul	Aug	Oct	Nov
G16		20		
G15		71		
G4	386			
G14		23		
G13		19	28	
G6/DECANT	63		41	
G3	552		1580	
G12	591		262	
G11	486			
G9	360		549	
G10	3000			904
G8		96		30
G2		370		300
G1		124		518
G7		423		386
G5		1080		1030

Table 9 Zinc in CSA soil samples in mg/kg

Sample site	Jul	Aug	Oct	Nov
G16		30		
G15		90		
G4	207			
G14		26		
G13		28	32	
G6/DECANT	36		30	
G3	68		182	
G12	112		258	
G11	217			
G9	268		317	
G10	548			338
G8		49		25
G2		103		68
G1		145		163
G7		159		136
G5		173		253

Waste rock sampling

CSA samples waste rock stockpiles at least once per annum, in order to assess for the possibility of acid-mine drainage occurring. Rock is assessed as either potentially acid-forming (PAF) or non-acid forming (NAF). The following tests are conducted in order to make this assessment accurately:

- Water leachable metals
- Water leachable mercury
- pH 1:5
- Conductivity
- Net Acid Generation
- Acid Neutralising capacity
- pH
- acidity trail
- sulfur trail
- calcium values (%)
- magnesium values (%)
- excess acid-neutralising capacity
- acid base accounting
- actual acidity
- potential acidity

Waste rock sampling was conducted in September of 2023 across stockpiles located on the North Tailings Storage Facility (NTSF). A map of where samples were taken from can be seen in **Figure 16**. Ten samples were taken, and one was found to be PAF, three were on the cusp of being PAF but are still considered to be NAF, and the remaining 6 were NAF- see **Figure 14** below. These were assessed utilising the net acid producing potential (NAPP)/NAG (net acid generation) pH plot shown in **Figure 15**. This fits within the expectations and knowledge that CSA maintains in relation to its waste rock stores, in that approximately 30% is PAF. These will encompass a larger range of samples, in addition to a larger breadth of area sampled.

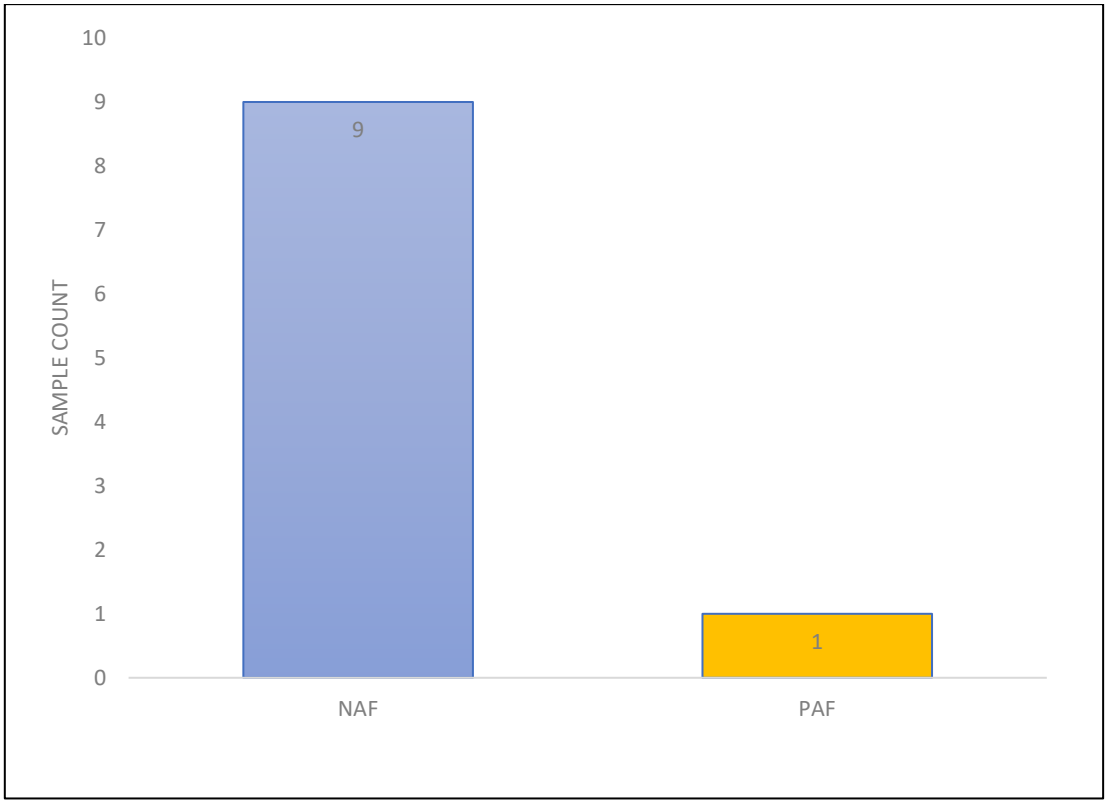

Figure 14 *Waste rock PAF/NAF results*

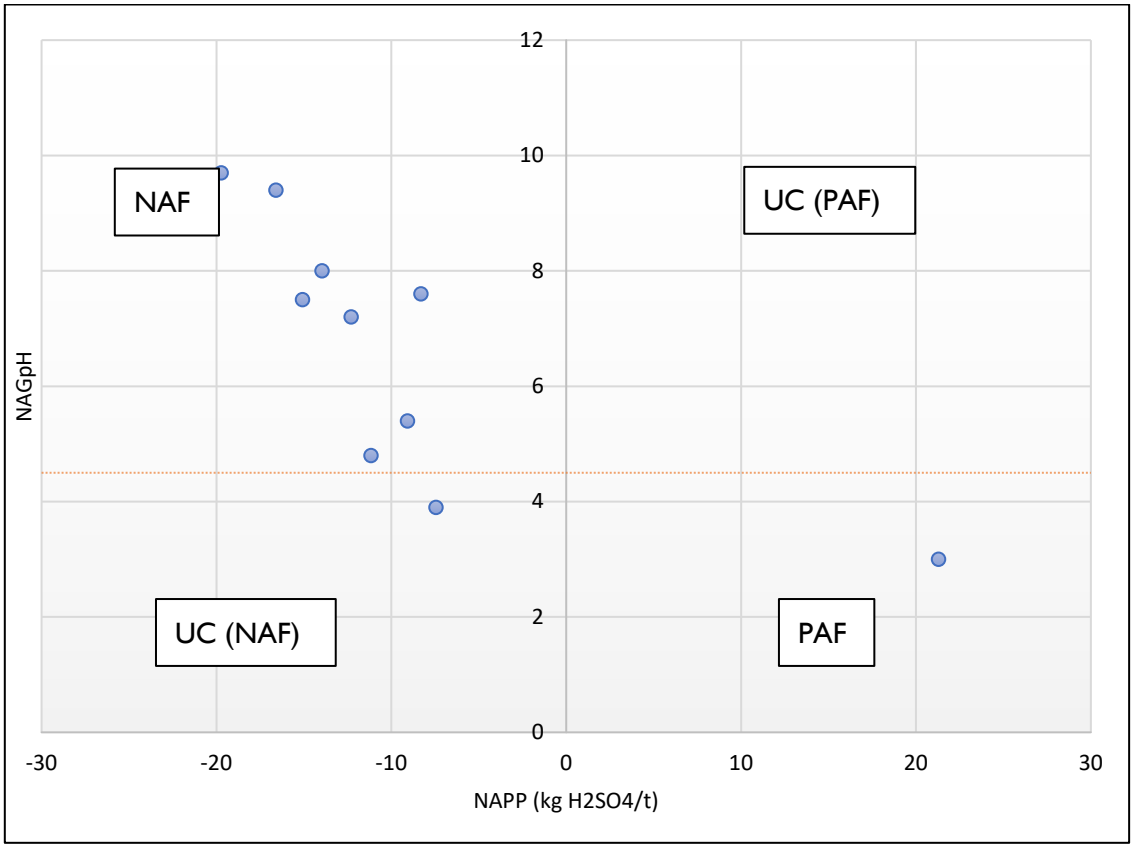

Figure 15 *Waste rock NAPP/NAGpH plot*

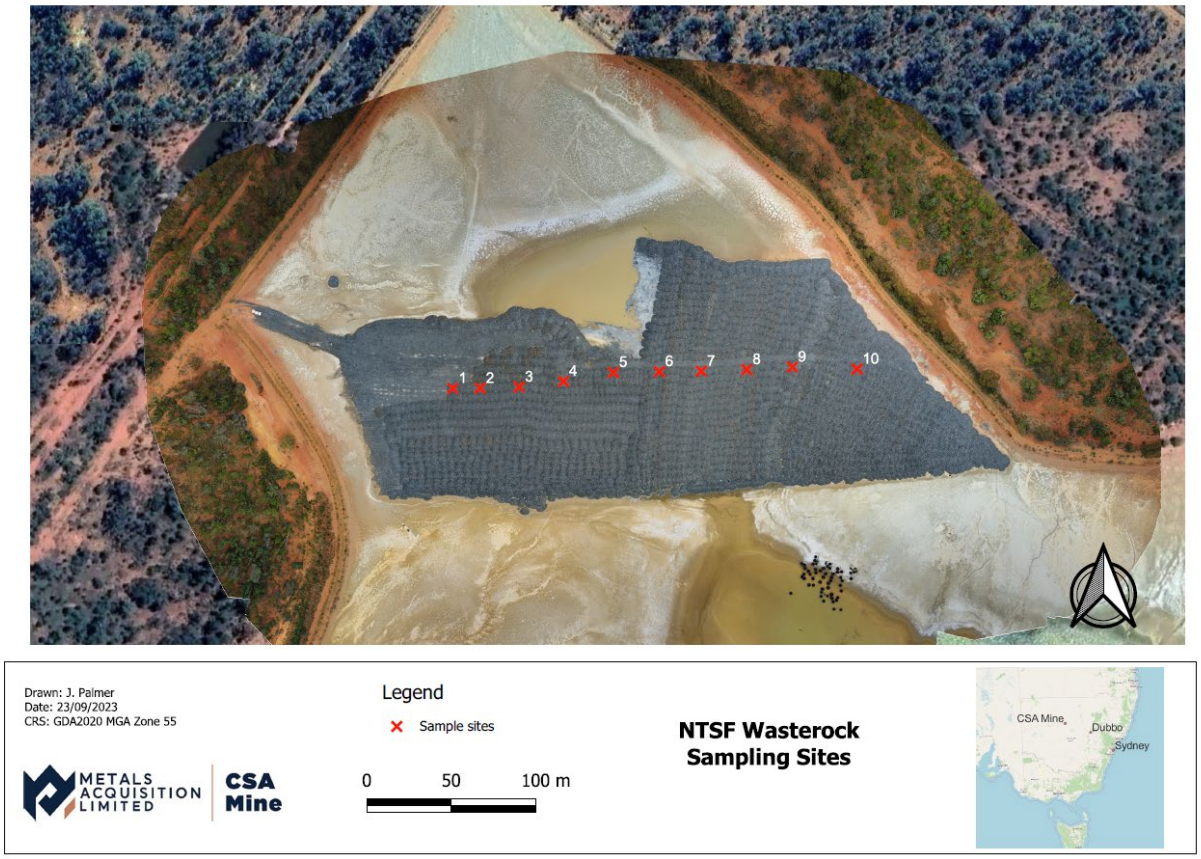

Figure 16 *Waste rock sample locations*

Conclusions

There were no exceedances of environmental concern from July through to December of 2023. Any data which presented as elevated above the norm for CSA were investigated, and origins of said exceedances found to be easily explained. Follow-up assessments were carried out where necessary.

Appendix A

Table 10 Legislation

Legislation	Associated regulation (if any)
Protection of the Environment Operations Act 1997	Protection of the Environment Operations (Clean Air) Regulation 2022 Protection of the Environment Operations (General) Regulation 2009 Protection of the Environment Operations (Waste) Regulation 2014
Contaminated Land Management Act 1997	Contaminated Land Management Regulation 2022
Environment Protection and Biodiversity Conservation Act 1999	
Environmentally Hazardous Chemicals Act 1985	Environmentally Hazardous Chemicals Regulation 2017
Mining Act 1992	Mining Regulation 2016
Pesticides Act 1999	Pesticides Regulation 2017
Contaminated Land Management Act 1997	Contaminated Land Management Regulation 2022