



SUNRISE PROJECT

ANNUAL REVIEW 2022



MARCH 2023

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SUNRISE PROJECT

2022 Annual Review

Name of Operation/Mine	<i>Sunrise Project</i>
Name of Operator	<i>Sunrise Energy Metals Limited</i>
Development Consent	<i>DA 374-11-00 (as modified)</i>
Name of Holder of Development Consent	<i>SRL Ops Pty Ltd</i>
Mining Leases	<i>ML1770, ML1769</i>
Name of Holder of Mining Lease	<i>SRL Ops Pty Ltd</i>
Environmental Protection Licence (EPL)	<i>21146</i>
Name of Holder of EPL	<i>SRL Ops Pty Ltd</i>
Water Licences	<i>WALs 32068, 39837, 28681, 42370, 1798, 6679</i>
Name of Holder of Water Licences	<i>SRL Ops Pty Ltd</i>
Mining Operations Plan (MOP) Commencement Date	<i>08 August 2020</i>
MOP Completion Date	<i>02 July 2022</i>
Annual Review Start Date	<i>01 January 2022</i>
Annual Review End Date	<i>31 December 2022</i>
<i>I, Bronwyn Flynn, certify that this audit report is a true and accurate record of the compliance status of the Sunrise Project for the period 01 January 2022 – 31 December 2022 and that I am authorised to make this statement on behalf of Sunrise Energy Metals Limited.</i>	

Name of Authorised Reporting Officer	Bronwyn Flynn
Title of Authorised Reporting Officer	Environment, Approvals & Community Lead
Signature of Authorised Reporting Officer	
Date	31 March 2023

1 STATEMENT OF COMPLIANCE

The compliance status of the Sunrise Project (the Project) with its relevant approval conditions as at the end of the reporting period (31 December 2022) is provided in Table 1.

Table 1 Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
Development Consent DA 374-11-00	YES
Mining Lease (ML) 1769	YES
ML1770	YES

All the conditions of the relevant approvals (Table 1) were complied with during the reporting period therefore no non-compliances were identified.

2 INTRODUCTION

This Annual Review (AR) has been prepared by Sunrise Energy Metals Limited (SEM) for the Sunrise Project (the Project) for the 2022 calendar year from the 1st January 2022 through to 31st December 2022 (the reporting period).

This AR is generally consistent with the *Annual Review Guideline – Post-approval Requirements for State Significant Mining Developments* [1], *Annual Rehabilitation Report and Forward Program for Large Mines* [2] and also meets:

- the Annual Review requirements of the Department of Planning & Environment (DPE) (Schedule 5, Condition 5 of Development Consent DA 374-11-00 (the Development Consent) granted on 23rd May 2001);
- the Annual Rehabilitation Report requirements of the NSW Resources Regulator (NSW RR) under the Standard Conditions of Mining leases – Rehabilitation (condition 13); and
- the routine reporting expectations of the NSW Natural Resources Access Regulator (NRAR).

As the Project's security deposit is less than the minimum deposit prescribed under s 261BF of the *Mining Act 1992* and s 93 of the *Mining Regulation 2016*, an Annual Rehabilitation Report as required by s 13(2), 13(4), 15(2) and 16 of the *Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2021* is not required for the reporting period.

If required for future reporting periods, the ARR (and forward program) will form an attachment to this AR to avoid duplicating reporting requirements under the MLs held by SEM and the Development Consent.

2.1 CONDITIONS COMPLIANCE TABLE

Table 2 below lists the AR information requirements in Condition 5, Schedule 5 of the Development Consent and the corresponding section of this AR where the requirement is addressed.

Table 2 Annual Review Development Consent Information Requirements

Development Consent DA 374-11-00 Schedule 5 Condition 5	Section in this AR document
Annual Review <i>By the end of March each year, the Applicant must review the environmental performance of the development for the previous calendar year to the satisfaction of the Planning Secretary. This review must:</i>	This review
describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the current calendar year;	Sections 4, 8 and 12
include a comprehensive review of the monitoring results and complaints records of the development over the past year, which includes a comparison of these results against the: <ul style="list-style-type: none"> - relevant statutory requirements, limits or performance measures/criteria; - monitoring results of previous years; and - relevant predictions in the EIS; 	Sections 6 and 9
identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;	Section 6
identify any trends in the monitoring data over the life of the development;	Section 6
identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and	Section 6
describe what measures will be implemented over the next year to improve the environmental performance of the development.	Section 6

A request by SEM to change the annual submission date of the ARR for ML 1770 from 15 February to 31 March each year to align with the Annual Review was accepted by the Resources Regulator (letter dated 25 March 2020).

2.2 SUNRISE PROJECT BACKGROUND

SRL Ops Pty Ltd owns the rights to develop the Project and is a wholly owned subsidiary of SEM.

The Project is a nickel-cobalt-scandium open cut mining project situated near the village of Fifield, approximately 350 kilometres (km) west-northwest of Sydney (Figure 1). The Project includes the establishment and operation of the following:

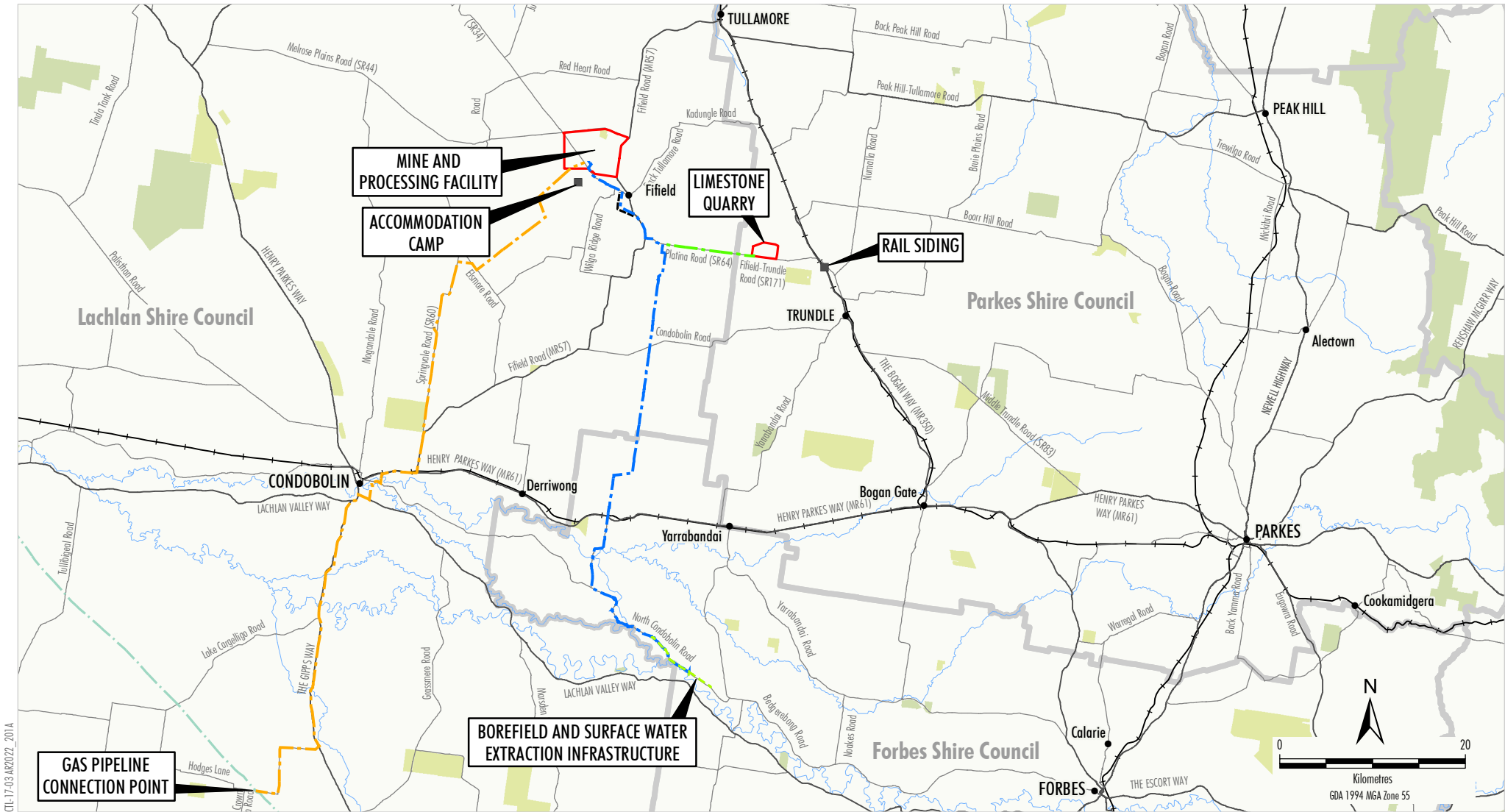
- mine (including the processing facility) on ML 1770;
- limestone quarry (including limestone processing facility) on ML 1769;
- rail siding;
- gas pipeline;
- borefields, surface water extraction infrastructure and water pipeline;
- accommodation camp; and
- associated transport activities and transport infrastructure (e.g. the Fifield Bypass, road and intersection upgrades).

The Development Consent for the Project was issued under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) in 2001. Seven modifications to the Development Consent have since been granted under the EP&A Act:

- 2005 - to allow for an increase of the autoclave feed rate, limestone quarry extraction rate and adjustments to ore processing operations;
- 2006 – to allow for the reconfiguration of the borefields;
- 2017 – to allow for the production of scandium oxide;
- 2017 – to amend hazard study requirements;
- 2018 – to relocate the accommodation camp;
- 2018 – to implement opportunities to improve the overall efficiency of the Project; and
- 2022 – to allow for design and operational changes that would improve the efficiency of the Project.

The Project was commenced in 2006 with the construction of components of the borefields (i.e. two production bores and associated monitoring wells), however recommencement of construction activities associated with the Project are yet to be initiated.

The land immediately adjacent to and surrounding the Project (ML 1770) consists of farming land and carbon sequestration offsets.



CLT-17-03 AR2022_2014



- LEGEND**
- National Park/Conservation Area
 - State Forest
 - Local Government Boundary
 - Railway
 - Existing Gas Pipeline
 - Mining Lease Boundary (ML)
 - Gas Pipeline
 - Water Pipeline
 - Borefield Infrastructure Corridor
 - Limestone Quarry Water Pipeline
 - Fifeild Bypass

Source: Sunrise Energy Metals (2021, 2022); Clean TeQ (2017, 2018, 2020); Black Range Minerals (2000); NSW Spatial Services (2023)


SUNRISE PROJECT
 Regional Location

Figure 1

2.3 KEY PERSONNEL CONTACTS

Contact details for SEM key personnel responsible for the environmental management of the Project are provided in Table 3:

Table 3 Key Personnel Contacts

Position	Name	Telephone	Email
Sunrise Regional Manager	Michael Wood	0418 818 372	mwood@sunriseem.com
Environment, Approvals and Community Lead	Bronwyn Flynn	0429 066 086	bflynn@sunriseem.com

The postal address for the Project is provided below:

Postal Address

PO Box 68
Flinders Lane
Melbourne VIC 8009

3 APPROVALS

3.1 CURRENT LIST OF CONSENTS, LEASES, LICENCES AND PERMITS

The key consents, leases, licences and permits current at the end of the reporting period for the Project are listed in Table 4. Any applicable changes to these approvals during the reporting period are also described in Table 4.

Table 4 Key Consents, Leases, Licences and Permits

Instrument	Description	Relevant Authority	Date of Grant	Expiry Date or Duration	Changes During AR Period
Project Approval					
DA 374-11-00	Development Consent	DPE	23/05/2001	21 years (from commencement of mining operations)	Modified (MOD7 determination) on the 21 January 2022
Mining Leases (ML)					
ML 1769	Mining Lease (389.7 ha)	MEG	15/2/2018	21 years	New standard rehabilitation conditions that were introduced by amendments to the <i>Mining Regulation 2016</i> (NSW) have been included
ML 1770	Mining Lease (2676 ha)	MEG	16/2/2018	21 years	New standard rehabilitation conditions that were introduced by amendments to the <i>Mining Regulation 2016</i> (NSW) have been included
Mining Operations Plan					
MOP	Mining Operations Plan – Care and Maintenance Amendment B (v3, 14 April 2022)	NSW RR	04/08/2020	02/07/2022	Amendment (MOP Amendment B) to allow a geological and soil sampling program
Environment Protection Licence					
EPL21146	Environment Protection Licence (EPL)	NSW EPA	09/01/2019	Until surrendered	No change
Exploration Licences (EL)					
EL8928	Exploration Lease (57.5 km ²)	NSW RR	06/01/2020	3 years	Renewal lodged during the reporting period
EL4573	Exploration Lease (22.7 km ²)	NSW RR	17/08/2021	3 years	No change
EL8833	Exploration Lease (112.5 km ²)	NSW RR	18/04/2022	3 years	EL renewed during the reporting period
EL8882	Exploration Lease (80.9 km ²)	NSW RR	14/08/2022	3 years	EL renewed during the reporting period
EL8883	Exploration Lease (138.4 km ²)	NSW RR	14/08/2022	3 years	EL renewed during the reporting period
EL9259	Exploration Lease (1229.4 km ²)	NSW RR	06/08/2021	3 years	No change
EL9317	Exploration Lease (72.5 km ²)	NSW RR	29/10/2021	3 years	No change

Table 4 (Cont.) Key Consents, Leases, Licences and Permits

Instrument	Description	Relevant Authority	Date of Grant	Expiry Date or Duration	Changes During AR Period
Permits/Agreements/Licences					
AHIP #C0003049	Aboriginal Heritage Impact Permit	BCS	10/10/2017	10 years	No change
AHIP #C0003887	Aboriginal Heritage Impact Permit	BCS	10/08/2018	23 years	No change
Agreement	Compensation Agreement	FCNSW	17/01/2019	-	No change
119039 v3	Class 2 - Heavy Vehicle Authorisation Permit	NHVR	02/05/2018	30/01/2024	No change
LN 603648	Crown Lands Licence	DPE-Crown Lands	06/08/2019	-	No change
Agreement	Mining Lease Compensation Agreement	DPE-Crown Lands and Central West LLS	20/03/2020	Until land becomes freehold or relinquishment of ML (and certificate to say rehab completed etc.)	No change
5099691	Radiation Management License	NSW EPA		01/10/2023	Licence renewed
5099494	Radiation User License	NSW EPA	25/09/2020	25/09/2024	No change
Water Licences					
WAL32068	Water Access Licence	NRAR	18/09/2018	Continuing	No change
WAL28681	Water Access Licence	NRAR	18/09/2018	Continuing	No change
WAL39837	Water Access Licence	NRAR	25/10/2018	Continuing	No change
WAL6679	Water Access Licence	NRAR	13/03/2019	Continuing	No change
WAL42370	Water Access Licence	NRAR	24/05/2019	Continuing	No change
WAL1798	Water Access Licence	NRAR	03/06/2019	Continuing	No change
Water Supply Works Approvals (WSWAs)					
70CA614098	WSWA	NRAR	14/09/2012	12/03/2026	Changes to licence conditions were issued on 19/9/2022 to incorporate the new metering requirements for the Upper Lachlan Alluvial Groundwater Source.
70WA617095	WSWA	NRAR	13/07/2020	09/07/2030	New metering and reporting conditions added on 13/10/2022 to incorporate the new water sharing plan conditions for the Lachlan Regulated River Water Source.

DPE: NSW Department of Planning and Environment.

EPA: NSW Environment Protection Agency – within the Department of Planning and Environment

NRAR: NSW Natural Resources Access Regulator – within the Department of Planning and Environment

MEG – Mining, Exploration and Geoscience

BCS: NSW Biodiversity, Conservation and Science Directorate – within the Department of Planning and Environment

FCNSW: Forestry Corporation of New South Wales

NHVR: National Heavy Vehicle Regulator NSW RR: NSW Resources Regulator - within the Department of Regional NSW

4 OPERATIONS SUMMARY

4.1 MINING

As mining (or construction) has not commenced, SEM did not extract or process any ore or limestone for the Project during the reporting period. Furthermore, no off-site product transport was undertaken from the mine. A production summary is shown in Table 5 below.

Table 5 Production Summary

Material		Approved Limit* (tonnes/calendar year)	Actuals		Forecast
			Previous Reporting Period	This Reporting Period	Next Reporting Period
Autoclave feed rate of ore		2.5 million	0	0	0
Off –site Product Transport	Ni and Co metal equivalents as sulphate precipitate products	40,000	0	0	0
	Scandium Oxide	180	0	0	0
	Ammonium Sulphate	100,000	0	0	0
Limestone	Extracted from ML 1769	790,000	0	0	0

*Source: Development Consent DA 374-11-00

4.2 EXPLORATION

Exploration activities during the reporting period included a small-scale, localised soil sampling program within ML1770, with the aim of mapping and sampling several polygons (Figure 2) identified as potential mineralised localities, or contacts between intrusions within the Tout Intrusive Complex. The samples were measured using handheld XRF.

Global Ore Discovery was sourced to provide detailed mapping and sampling within selected targeted areas of ML1770.

4.3 OTHER ACTIVITIES

No other activities occurred during the reporting period.

4.4 NEXT REPORTING PERIOD

No significant changes to operations are forecast for the next reporting period i.e. mining (or construction) are not forecast to commence in the next reporting period.

Exploration activities are expected to continue throughout 2023.

Four production bores and associated monitoring wells are expected to be constructed at the borefields.

10

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

The previous AR (2021 AR for the period 1 January 2021 to 31 December 2021) was submitted to the DPE on 31 March 2022.

The DPE responded to the 2021 AR submission (letter dated 04/04/2022) advising they had reviewed the AR and considered that it satisfied the reporting requirements of the Development Consent and the DPE's *Annual Review Guideline* (October 2015).

The DPE requested that a copy of the 2021 AR be made publicly available on the company website. SEM uploaded the 2021 AR to the company website in April 2022 (Table 6).

Actions required to be undertaken as an outcome of the previous AR and actions that have been undertaken and when they were completed are identified below in Table 6.

Table 6 Actions from the Previous Annual Review

Action required from previous AR	Requested by	Action taken by SEM	Where discussed in AR
Make a copy of the 2021 AR publicly available on the SEM website	DPE	A copy of the 2021 AR was made publicly available on the SEM website in April 2022.	This section (Section 5)

6 ENVIRONMENTAL PERFORMANCE

Environmental management at the Project during the reporting period was conducted under the guidance of the approved Mining Operations Plan (MOP) and approved Environmental Management Plans (EMPs). Risks associated with the proposed exploration activities are summarised in section 3.1 of the MOP as follows:

- Adverse noise impacts on surrounding residents;
- Unacceptable dust-related impacts;
- Surface water impacts associated with discharge of produced or other water; and
- Groundwater impacts associated with contamination of aquifers.

In accordance with Schedule 5, Condition 6 of the Development Consent, the plans and strategies were reviewed following the seventh modification (MOD 7) to the Development Consent. In concurrence with DPE, and due to the minor nature of some of the updates (e.g. updating figures as per MOD 7) several plans were revised and resubmitted to DPE for approval without undertaking consultation.

EMPs and strategies required under the Development Consent prepared (by SEM) and approved by the DPE are shown below in Table 7.

Table 7 Environmental Management Plans and Strategies

Description	Current Status		DPE Approval Date
	Revision	Dated	
Air Quality and Greenhouse Gas Management Plan	3	1/8/2022	12/8/2022
Blast Management Plan	2	24/6/2022	28/06/2022
Biodiversity Management Plan and Revegetation Strategy	3	12/5/2022	4/7/2022
Environmental Management Strategy	2	12/5/2022	1/7/2022
Heritage Management Plan	3	12/5/2022	16/6/2022
Noise Management Plan	4	11/5/2022	12/9/2022
Rehabilitation Management Plan*	2	11/07/2019	15/08/2019
Road Upgrade and Maintenance Strategy	2	03/11/2022	14/11/2022
Traffic Management Plan	1	8/07/2019	15/08/2019
Water Management Plan	2	12/5/2022	24/6/2022
- Appendix A Water Balance	2	12/5/2022	27/6/2022
- Appendix B Surface Water Management Plan	2	12/5/2022	27/6/2022
- Appendix C Groundwater Management Plan	2	11/5/2022	13/5/2022

* Note the Rehabilitation Management Plan was replaced by the Rehabilitation Strategy in Modification 7 and will be prepared during the next reporting period.

At the end of the reporting period, Revision 2 of the Traffic Management Plan (dated 11 May 2022) was awaiting feedback from Parkes Shire Council. The Traffic Management Plan was subsequently submitted to the DPE in February 2023 for approval.

All approved EMPs can be found on the SEM website at <https://www.sunriseem.com/sunrise-project/management-plans>.

6.1 AIR QUALITY

The Development Consent (Schedule 3, Condition 23) requires the preparation an Air Quality and Greenhouse Gas Management Plan (AQGGMP) for the Project. A construction phase AQGGMP was approved by DPIE on 29 August 2019. The AQGGMP outlines the control strategies for managing air quality, and the monitoring program to measure performance.

Revision 3 of the AQGGMP was re-submitted to DPE for approval on 1 August 2022, and was approved on the 12 August 2022. This version was updated to include references to MOD 7.

6.1.1 Environmental Management

Control Strategies

Dust from exploration activities on ML 1770 and vehicle movements on unsealed roads was identified in the MOP as a potential impact to sensitive receivers surrounding the mine site. Therefore, SEM implemented the following air quality management measures to minimise and mitigate these impacts:

- All drill rigs were fitted with an effective dust suppression and collection system and rigs only operated when that dust suppression system was functional;
- Drilling ceased immediately if dust emissions were visible from more than 250 metres (m) from the drill rig; and
- Vehicle speeds on-site were limited to 40 kilometres per hour (km/h) on formed tracks and 20 km/h on unformed tracks.

Effectiveness of Control Strategies

No drilling took place during the reporting period, therefore the control strategies implemented were considered to be effective.

Variations from Proposed Control Strategies

There were no variations from the proposed control strategies during the reporting period.

Monitoring Programme

As required by the Development Consent (Schedule 3, Condition 23) and subsequently described in the approved AQGGMP, the air quality monitoring program for the Project includes the monitoring of:

- PM₁₀ (particulate matter with an aerodynamic diameter less than or equal to 10 micrometres [μm]);
- PM_{2.5} (particulate matter with an aerodynamic diameter less than or equal to 2.5 μm); and
- Depositional dust (insoluble solids).

The location of the monitoring stations is shown in Figure 3.

The real time (continuous) particulate monitors (PM₁₀ and PM_{2.5}) were required to be in place prior to the commencement of construction activities on ML 1770, in accordance with Condition M2.2 of EPL 21146. Two solar powered T640x monitors were installed at two locations in the vicinity of the Project in December 2019. One was installed adjacent to the Automatic Weather Station (AWS) and approved accommodation camp location, and the other on the northern boundary of the mine site (Figure 3). Both monitors have been operating since they were installed in December 2019. This allows time for collection of background data, and calibration of the units prior to the commencement of construction activities on ML 1770.

Depositional dust monitoring is undertaken at locations representative of nearby sensitive receivers, via a network of four static dust deposition gauges. In accordance with the approved AQGGMP, four dust deposition gauges were installed in January 2019 (Figure 3), prior to exploration or construction activities being undertaken. Monitoring was undertaken monthly from the four locations during the reporting period.

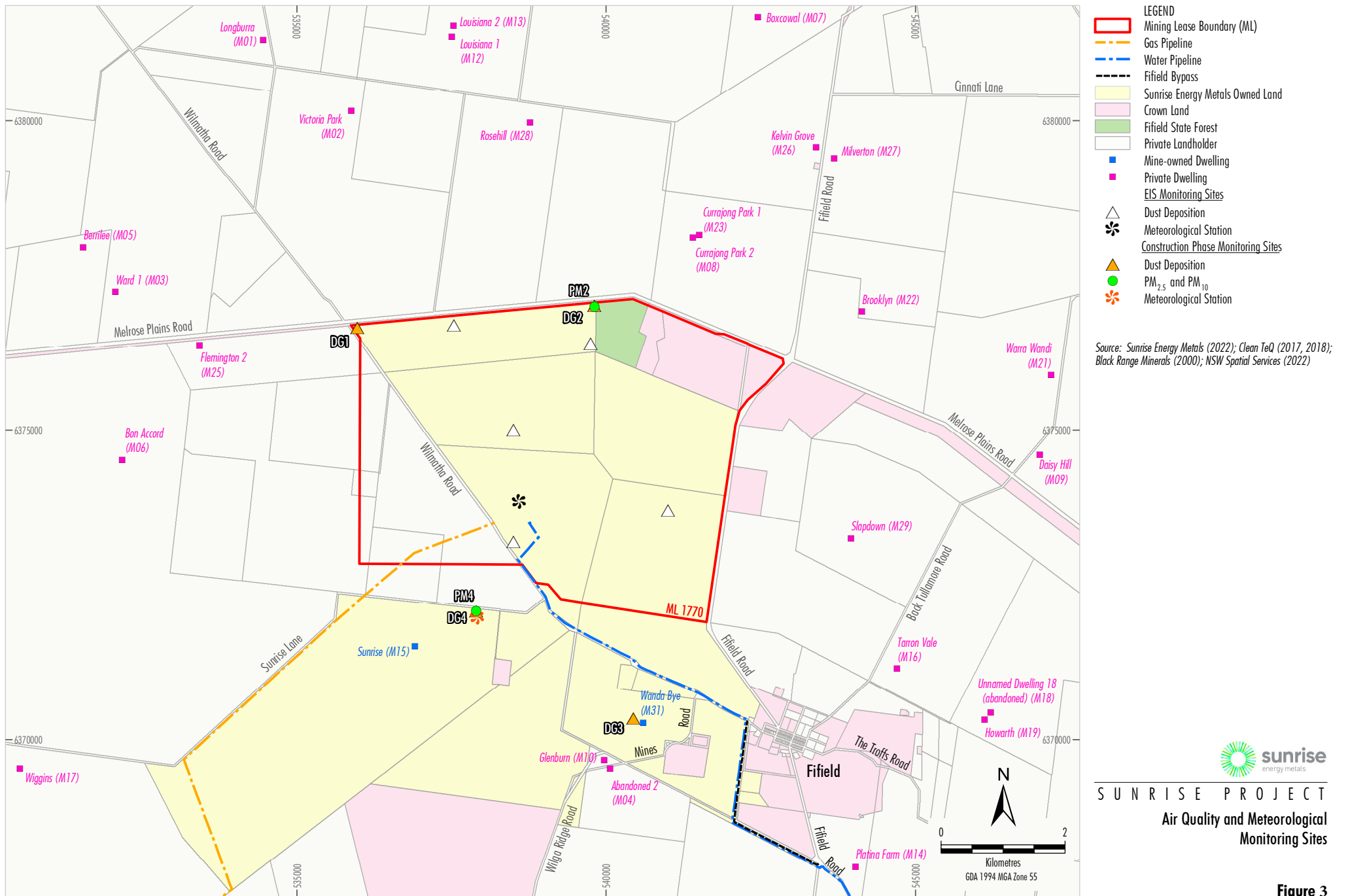


Figure 3

6.1.2 Environmental Performance

Depositional Dust Monitoring

Dust deposition results were generally quite low during 2022. Only November and December had elevated levels of dust, which has been assumed to be as a result of agricultural activities (e.g. ploughing, harvesting and/or harvesting truck movements). The below average dust deposition rates were reduced in 2022 due to the above average rainfall throughout the year. Heavy vehicle movements along the public roads are assumed to be the reason that DG1 consistently showed higher dust levels in most months. DG2 was significantly elevated in November and December and is assumed to be as a result of agricultural activities (i.e. harvesting) at the neighbouring property. Results for each month have been published on the SEM website at <https://www.sunriseem.com/sunrise-project/reports/> and are presented below in Figure 4.

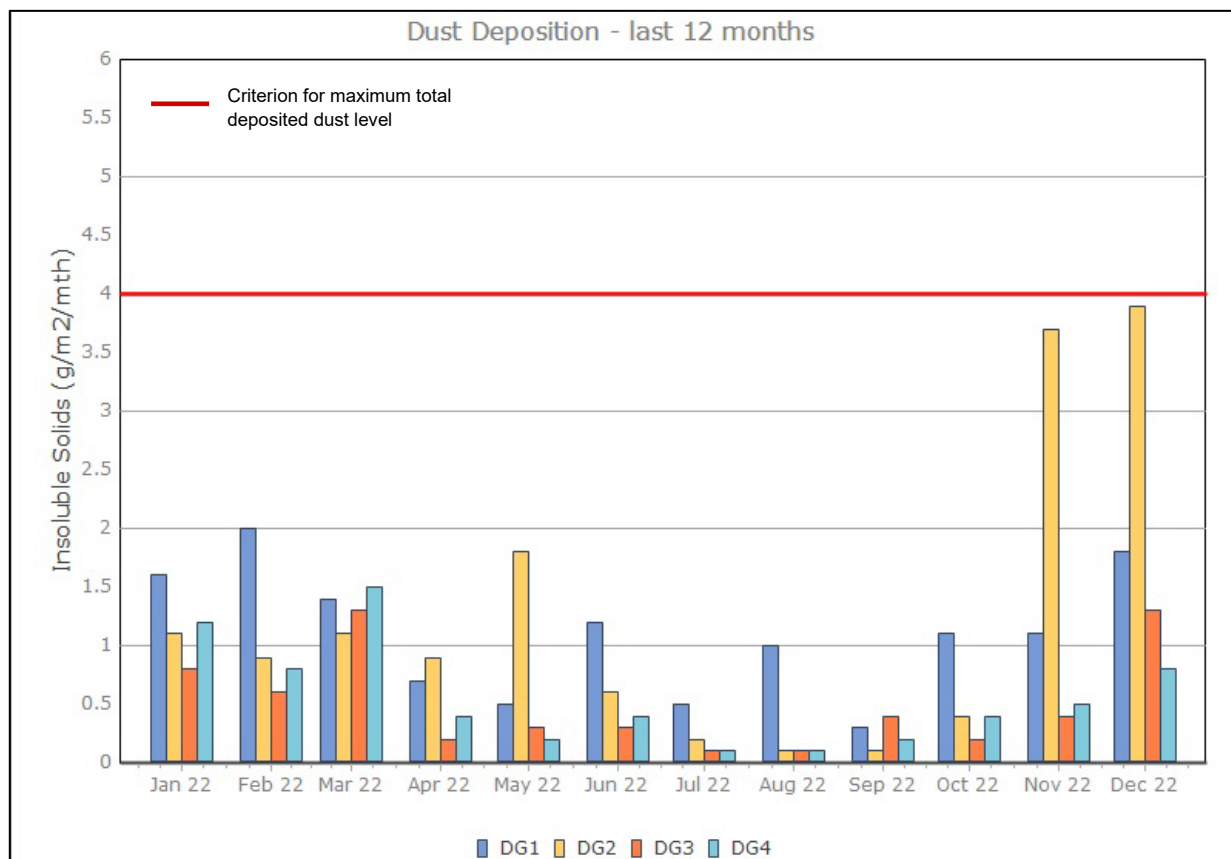


Figure 4 Dust Deposition (Insoluble Solids) 2022

Table 8 in Condition 21, Schedule 3 of the Development Consent sets the long-term criteria for deposited dust (insoluble solids). The permitted maximum total deposited dust level averaged over a year is 4 grams per metres squared per month ($\text{g/m}^2/\text{month}$), while the maximum increase (incremental increase due to the development on its own) is $2 \text{ g/m}^2/\text{month}$. Table 8 shows the 2022 reporting period annual average, along with the previous data. The baseline monitoring data collected for the Environmental Impact Statement (EIS) (September 1997 – August 2000) is also shown as a comparison.

Table 8 Maximum Total Deposited Dust Level - Annual Average

Year	Criterion	DG1	DG2	DG3	DG4	ALL
2022	4g/m²/month	1.1	1.3	0.5	0.6	0.9
2021		2.1	1.0	3.7	1.8	2.1
2020		3.1	2.6	2.3	3.2	2.8
2019		3.4	2.8	2.5	3.0	2.9
EIS (2000)						2.5

Particulate Matter Monitors

Monitoring results have been reviewed (as per Section 11.1 of the approved AQGGMP) and a summary is presented below. Daily data for PM₁₀ and PM_{2.5} is shown in Appendix 1B, 1C and 1D and graphically in Figures 5 and 6 below. One exceedance of the 24-hour average criteria for PM₁₀ and for PM_{2.5} occurred at the monitoring site PM2 on different days (see Table 9). As there were no activities on site at the time that could have contributed to these exceedances, and as agricultural activities at neighbouring properties were taking place, it has been assumed these exceedances were not caused by activities on ML 1770.

Table 9 Short term impact assessment criterion for particulate matter - 2022 exceedances

Pollutant	Averaging Period	Criterion	PM2	PM4
PM ₁₀	24 hour	50 µg/m ³	113.64 µg/m ³ on 6/12/2022	nil
PM _{2.5}	24 hour	25 µg/m ³	28.79 µg/m ³ on 6/4/2022	nil

a - excluding extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.

Table 6 in Condition 21, Schedule 3 of the Development Consent sets the long-term criteria for particulate matter (excluding extraordinary events such as bushfires, dust storms etc.). Table 10 shows the 2022 results against the criterion. Total Suspended Particles (TSP) is derived from PM₁₀ data, calculated based on an assumption that 40% of TSP is PM₁₀ (NSW Minerals Council, 2000).

Table 10 Long term impact assessment criteria for particulate matter - 2022 results

Year	PM ₁₀ (µg/m ³)		PM _{2.5} (µg/m ³)		TSP ¹ (µg/m ³)	
	PM2	PM4	PM2	PM4	PM2	PM4
2022	9.14	8.88	3.19	3.14	22.82	22.66
2021	12.5	11.8	4.2	3.9	31	30
2020	10.4	12.9	3.6	4.25	26	32
Criterion	25		8		90	

¹ Estimated based on PM₁₀ being 40% of TSP levels (NSW Minerals Council, 2000).

a - excluding extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.

6.1.3 Reportable Incidents

There were no reportable incidents during the reporting period, however there were two days where the 24-hour average for PM₁₀ did exceed the criteria. Upon investigation these exceedances were assumed to be caused by agricultural activity on neighbouring properties as no activities were being undertaken on ML 1770 on the days in question (these records are highlighted in the data tables presented in Appendix 1B and 1C and shown in Table 9). The elevated PM_{2.5} result in April was caused by a prescribed burn in the neighbouring paddock. The elevated PM₁₀ reading in December occurred in the evening while harvesting in the neighbouring paddock was being carried out.

Furthermore, no community complaints were received regarding air quality from nearby sensitive receivers at any time during the reporting period.

6.1.4 Management Issues and Implemented Actions

Management Issue:

A system failure caused a loss of data for one of the monitors (PM 4) during the reporting period. Particulate matter (PM₁₀ and PM_{2.5}) was not recorded by the monitor for a 32-day period (5th March - 5th April 2022). A plug on the power supply board had been found to be arcing and caused damage to the connector on the PCB. The instrument was turned off as the connector was too badly damaged on the PCB and was not replaceable.

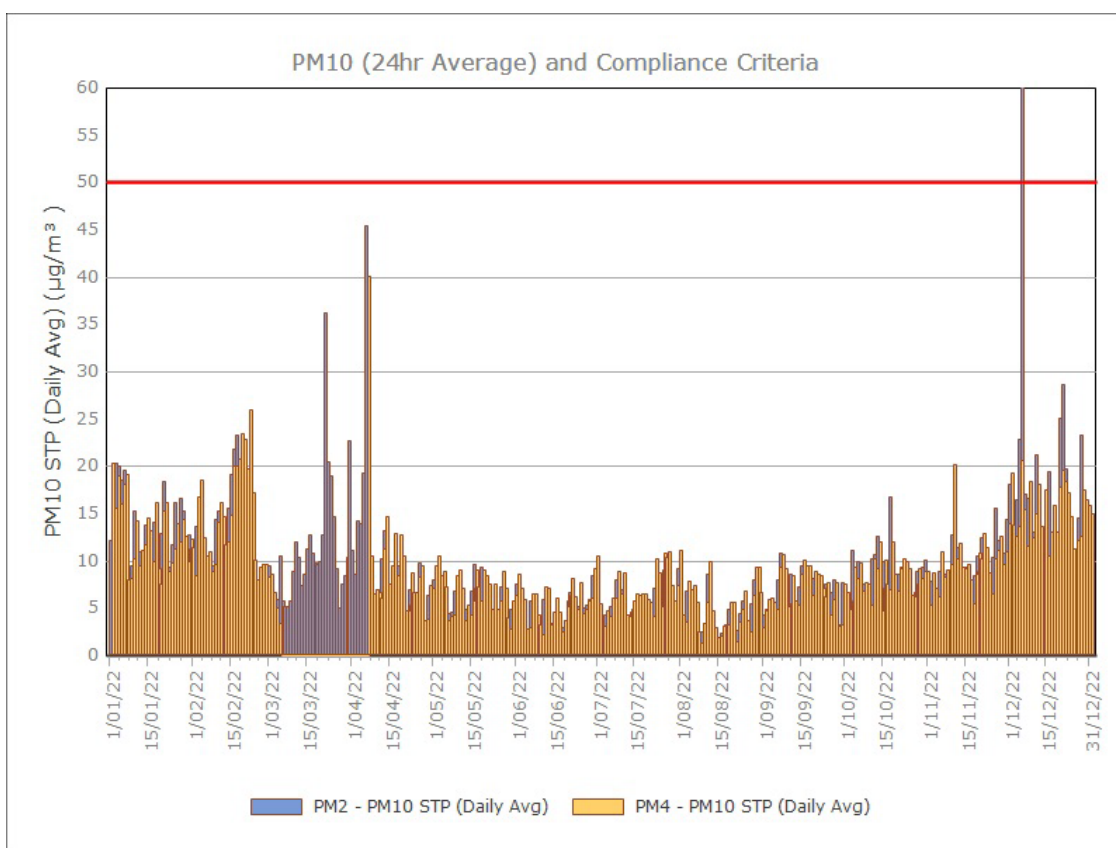


Figure 5 PM10 Monitoring results 2022

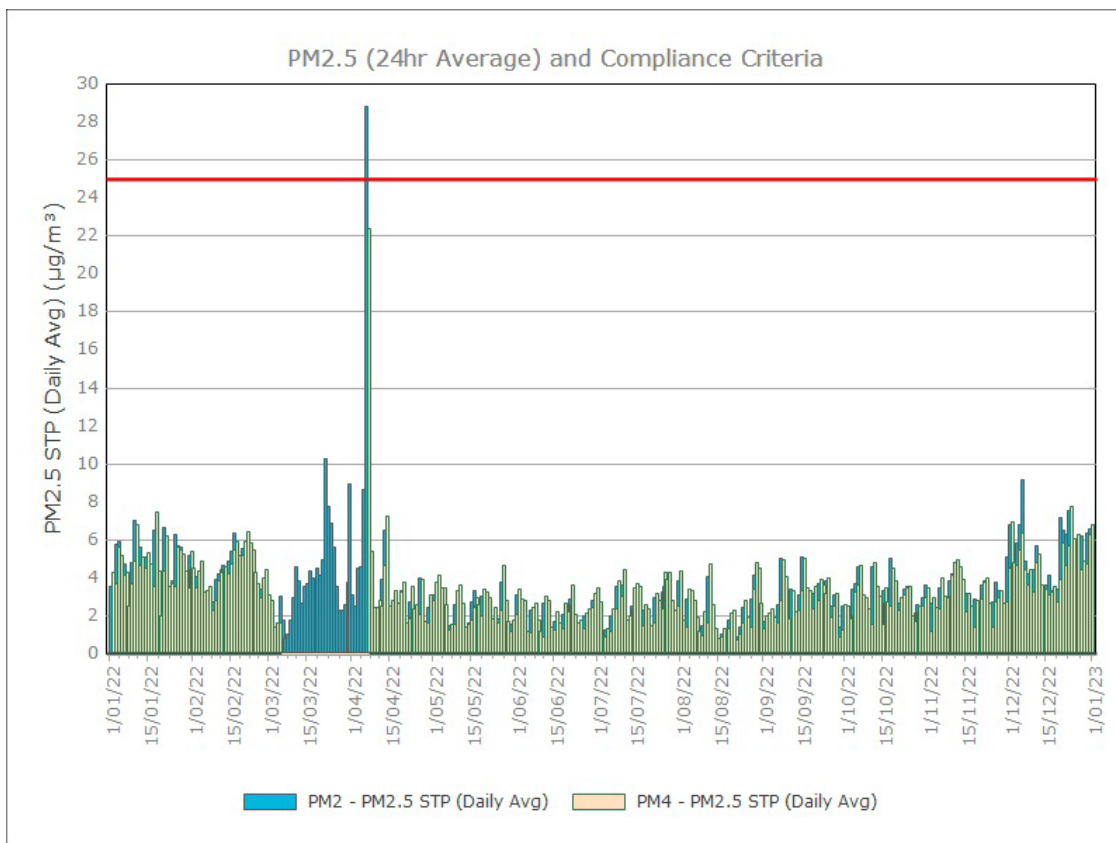


Figure 6 PM2.5 Monitoring results 2022

Implemented Action:

A new board from overseas was ordered, arriving one month later. Continuous monitoring of particulate matter continued at the other monitoring point (PM 2) for the duration of the system outage. As mine operations have not yet commenced and the monitoring is establishing background levels, no adverse effects resulted from this technical non-compliance. A new modified version of the cable that plugs into the board was installed to prevent the issue happening again. This was also installed at the other monitor. A spare power board was purchased to prevent any future delays in replacement.

6.1.5 Further Improvements

No further improvements are proposed.

6.2 METEOROLOGICAL MONITORING

The Development Consent (Schedule 3, Condition 25) requires a meteorological station to operate in the vicinity of the mine site for the life of the development (after establishment). Other than described below, no meteorological monitoring was required to be undertaken at other Project areas (e.g. ML 1769) during the reporting period.

6.2.1 Environmental Management***Monitoring Programme***

The AWS [meteorological station] (Figure 3), located on property owned by SEM (in close proximity to ML 1770), continued to collect meteorological data during the reporting period in accordance with the required parameters listed in Condition M4 of the EPL. The AWS (installed in 2018) measures real time wind speed and direction (at 10 m), temperature (at 2 m and 10 m), barometric pressure, humidity, solar radiation and rainfall.

Real time meteorological data from the AWS can be accessed remotely. The data has been used to undertake noise modelling for MOD 7 as well as proactive rainfall runoff predictions and thereby surface water monitoring opportunities.

Six monthly independent maintenance and calibration of the AWS is also undertaken to ensure valid data is being recorded.

Effectiveness of Monitoring Programme

The strategies implemented during the reporting period were considered to be effective.

Variations from Proposed Control Strategies

There were no variations from the proposed control strategies during the reporting period.

6.2.2 Environmental Performance***Temperature***

Average monthly maximum and minimum temperatures from data recorded (temperature at 2m) by the AWS are shown below in Figure 7. The highest mean monthly maximum temperature (24.5 degrees Celsius [°C]) occurred in January and the lowest mean monthly minimum temperature (4.3°C) occurred in July. This compares to 33.4°C (January) and 2.6°C (July) stated in the Project Environmental Impact Statement (EIS) as recorded at the Condobolin Agricultural Research Station (Station #50052) (Appendix 2). The maximum and minimum daily temperatures for the year were generally lower than average.

The highest maximum daily temperature of 35.9 °C was recorded in January and the lowest minimum daily temperature in July of -2.6 °C.

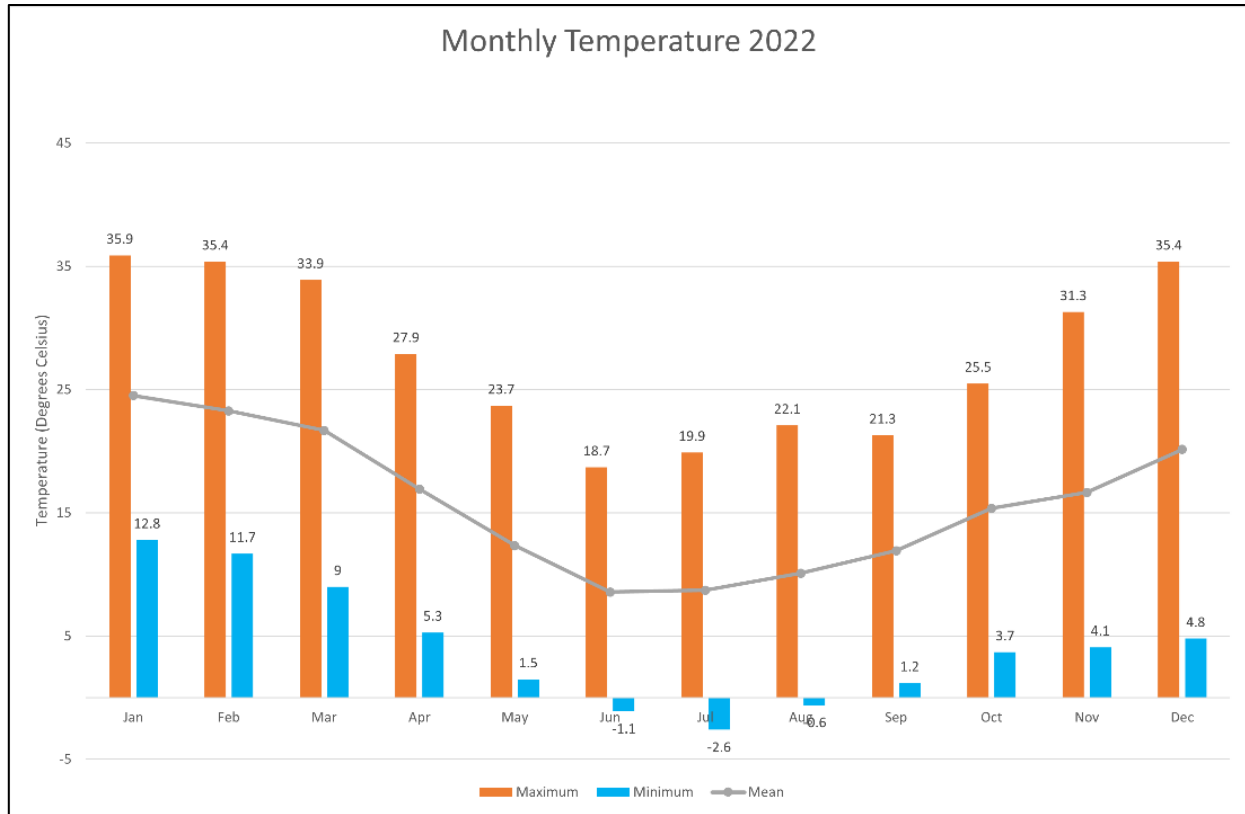


Figure 7 Monthly Temperature Records for 2022 at the Sunrise AWS

Rainfall

Total rainfall of 1019.2 mm was recorded by the AWS during the 2022 reporting period as shown in Figure 8. This total is well above the mean annual rainfall described in the EIS of 480 mm recorded at the Murrumbogie Station at Trundle (Murrumbogie Station (#50028) is the nearest long-record daily rainfall station located approximately 30 km southeast of the mine site). Monthly totals are shown in Table 11.

Rainfall was greater than the regional average in most months, except for February, June and December.

Annual rainfall recorded by the AWS over the period 2019 – 2022 is shown in Figure 9.

Table 11 Monthly rainfall recorded by the AWS (2019-2022)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2019	50	62	13	0	29	14	19	9	6	13	20	0	236
2020	24	60	96	143	15	48	73	68	35	90	28	115	795
2021	93	116	200	0	16	89	72	37	51	28	179	87	968
2022	108	15	83	132	115	9	54	88	116	180	101	17	1019
Average (Murrumbogie Station 50028)	51	43	41	37	39	39	36	37	33	42	38	44	480

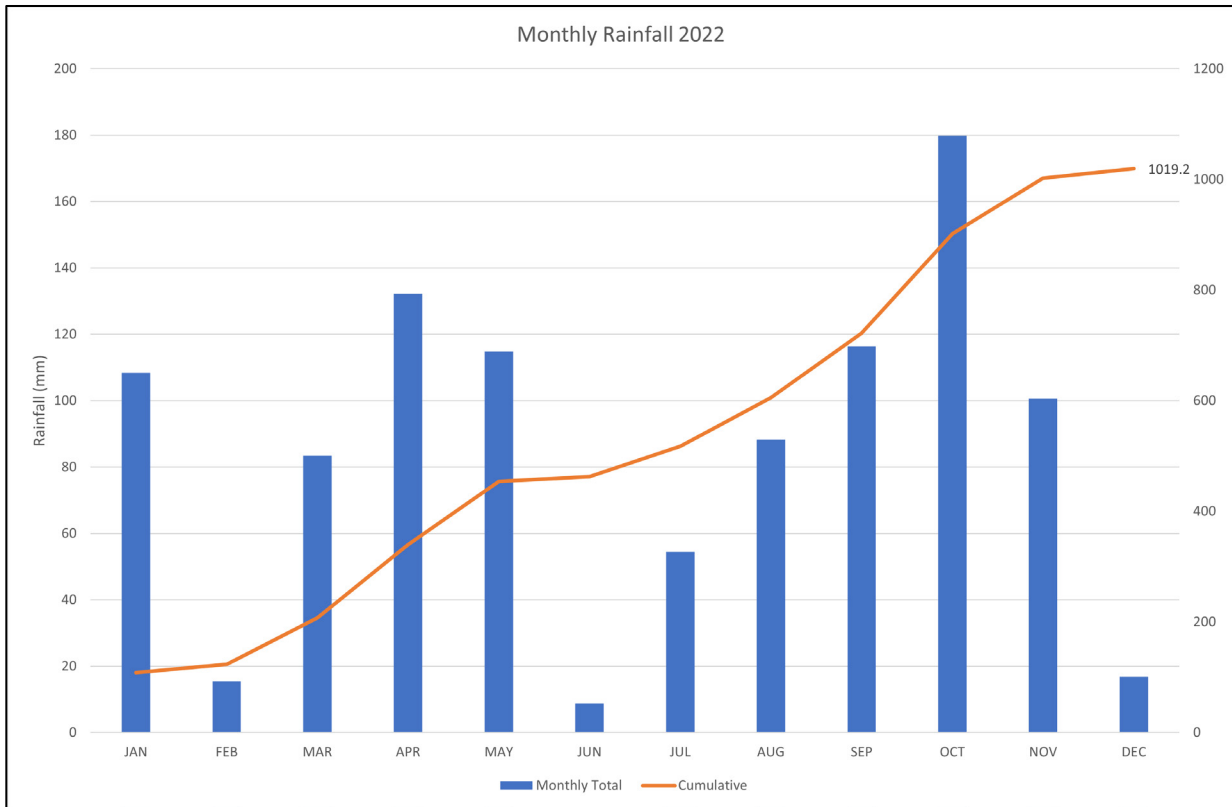


Figure 8 Monthly Rainfall Records for 2022 at the Sunrise AWS

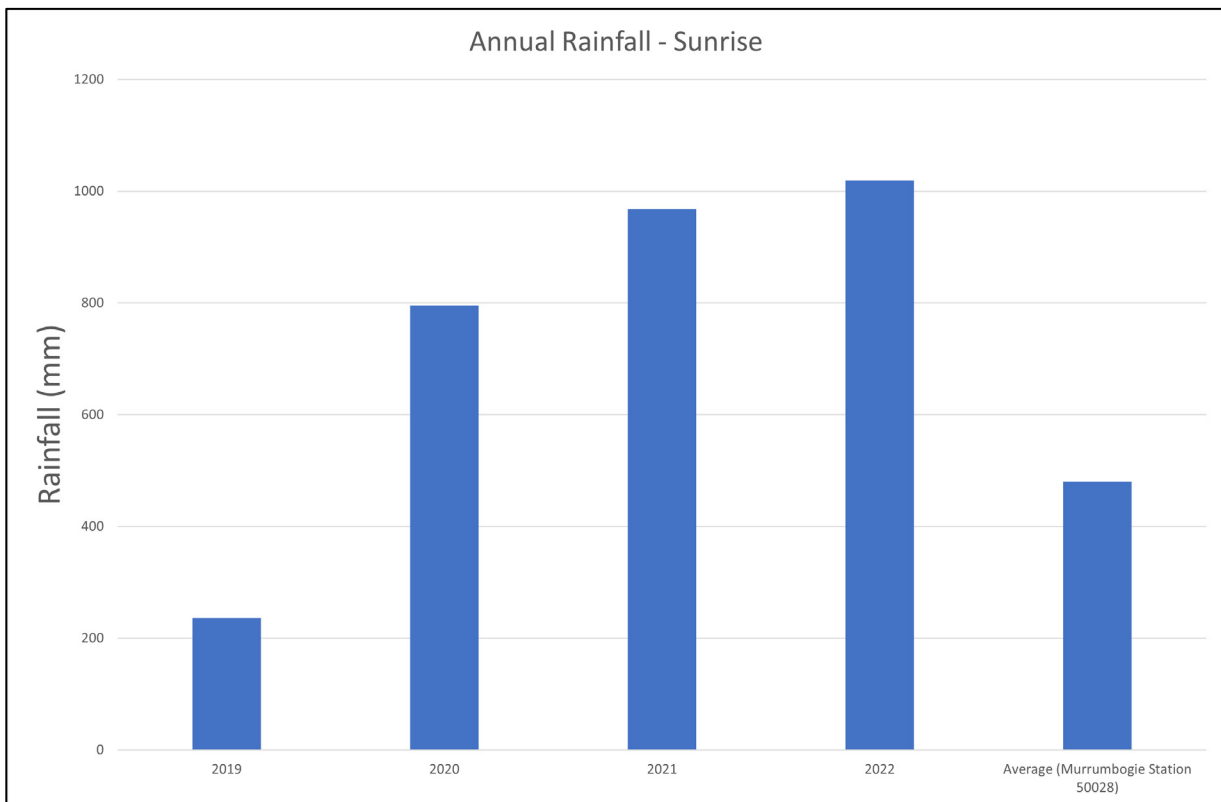


Figure 9 Annual Rainfall Trend (2019-2022)

Wind

Wind speed and direction (blowing from) data for the 2022 reporting period are presented in the wind rose in Figure 10. Wind speed values are displayed as metres per second (m/s). Monthly wind roses are presented in Appendix 2A.

Analysis of data reveals that winds during the 2022 reporting period were predominantly from the southeast (SE/ESE 19%). Consistent with the EIS, the three prevailing wind directions during the reporting period were winds blowing from the north-east, south-east and south-west directions. Winds blowing from the south-east were more prevalent during the 2022 reporting period than in previous years. Summer months had more north-east and south-east winds, winter was predominantly south-west, and spring had north-west and strong south-east winds.

An average wind speed of 2.96 m/s was calculated for the period. The daily average wind speed range was between 0.76 m/s (14/6/2022) and 7.56 m/s (31/5/2022). The majority of wind speeds were recorded between 1.5 and 5 m/s (1.5 – 3 m/s (34%) 3 and 5 m/s (64%)). Calm winds (wind speed <0.5m/s) were experienced 5% of the time. The maximum recorded wind speed (15 min average) was 14.3 m/s, (6/1/2022 at 6pm and 11/1/2022 at 10pm) and wind speeds above 8.3 m/s occurred only 0.76% of the time. Wind speeds between 5 and 8.3 m/s (18 and 30 km/hr) were recorded 12.3% of the time in 2022, predominantly in the afternoons.

6.2.3 Reportable Incidents

There were no reportable incidents during the reporting period,

6.2.4 Further Improvements

No further improvements are proposed for the next reporting year.

6.3 CONSTRUCTION NOISE

The Development Consent (Schedule 3, Condition 9) requires development of a Noise Management Plan (NMP) for the Project. The construction phase NMP (Revision 3) was approved by the DPIE on the 15 June 2020.

Revision 4 of the NMP was re-submitted to DPE for approval on 11 May 2022, and was approved on the 12 September 2022. This version was updated to include references to MOD 7.

Other than described below, no noise monitoring was required to be undertaken at other Project areas (e.g. ML 1769) during the reporting period.

6.3.1 Environmental Management

Control Strategies

Noise from the drilling program was identified in the MOP as a potential impact to sensitive receivers surrounding the mine site. SEM informed surrounding residents of the potential noise emissions and was prepared to implement the following noise-management measures during exploration activities to minimise and mitigate these impacts:

- Limit the number, type and location of drill rigs operating concurrently;
- Install noise barriers at the drill site; and/or
- Modify the hours and/or days of operation.

Effectiveness of Control Strategies

None of the control strategies listed above were required to be implemented during the reporting period. No noise complaints were received during the reporting period.

Variations from Proposed Strategies

There were no variations from the proposed control strategies during the reporting period.

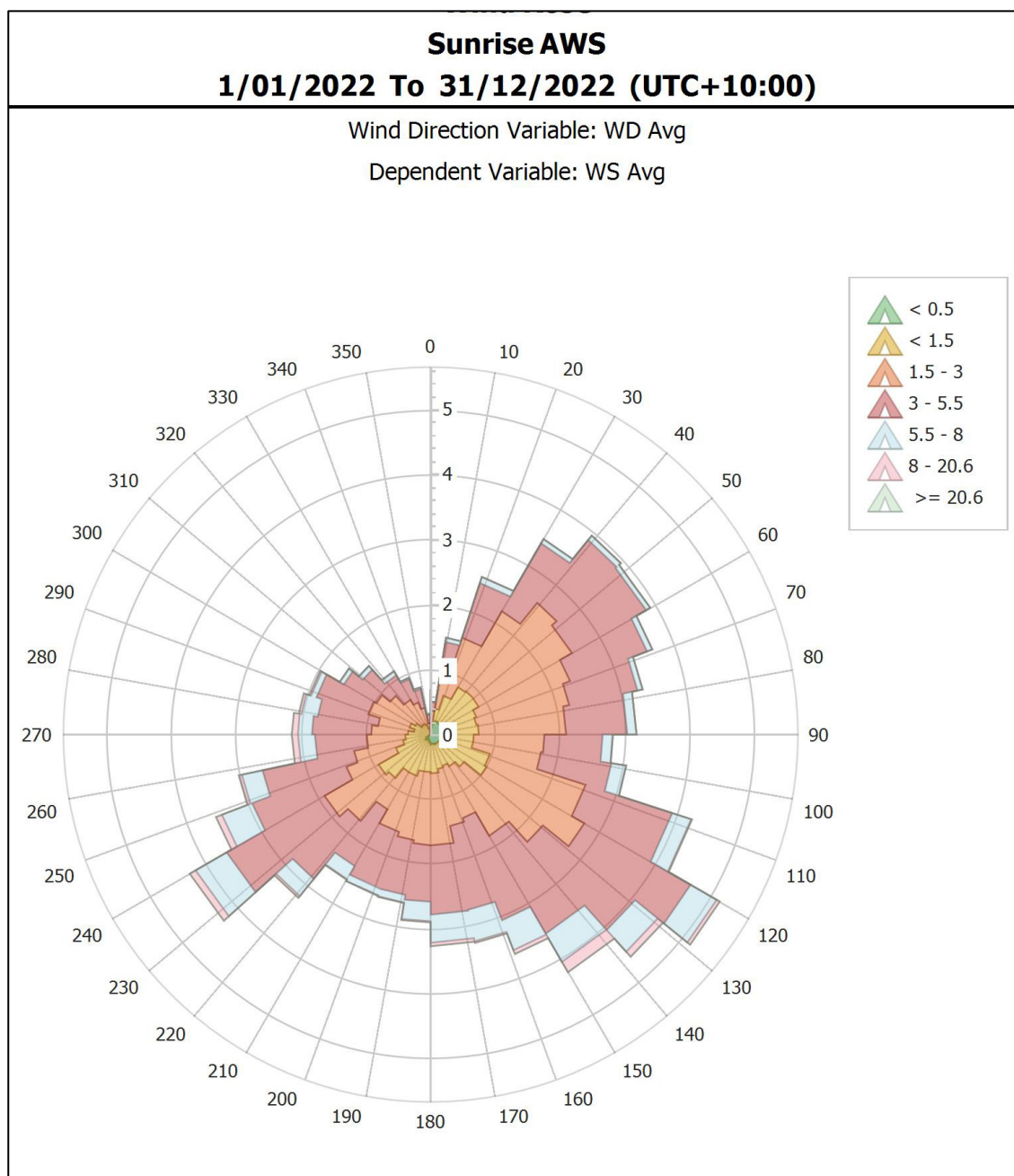


Figure 10 Annual Wind Rose 2022

Monitoring Programme

The NMP states the noise monitoring program will commence prior to the commencement of Project construction activities. Attended noise monitoring will be conducted at various locations considered representative of sensitive receivers in the areas that may be potentially influenced by initial construction activities.

Operator-attended noise monitoring will be conducted on a quarterly basis at four locations representative of the privately-owned receivers most likely to be affected by noise generated by the initial construction activities. Monitoring would be conducted in accordance with *Australian Standard 1055:2018 Acoustics – Description and measurement of*

environmental noise, the Noise Policy for Industry and the requirements (including applicable meteorological conditions) of Condition 6, Schedule 3 of the Development Consent.

Quarterly attended noise monitoring was commenced in Q1 in 2019 and ceased in Q1 in 2020 at four nearby sensitive receivers.

Variations from Proposed Monitoring Programme

No construction activities were planned for 2022, and as more than 12 months of monitoring had already been conducted as a baseline, further monitoring was not deemed necessary. The attended noise monitoring programme will recommence prior to the start of construction activities.

The NMP was updated to reflect this change, and subsequently approved by the DPIE in June 2020.

6.3.2 Environmental Performance

Monitoring Results

Noise monitoring was not undertaken during 2022.

6.3.3 Reportable Incidents

There were no reportable incidents during the reporting period.

6.3.4 Further Improvements

No further improvements are proposed.

6.4 EROSION AND SEDIMENT

The Development Consent (Schedule 3, Condition 30(b)) requires a detailed description of erosion and sediment control strategies in the Surface Water Management Plan (SWMP). A construction phase SWMP for the Project was approved by the DPIE on the 21 January 2020.

Revision 2 of the SWMP was re-submitted to DPE for approval on 12 May 2022, and was approved on the 24 June 2022. This version was updated to include references to MOD 7.

The Resources Regulator undertook a site inspection of ML 1770 in November 2022 to inspect potential erosion and sediment control issues associated with a new fence line. The Resources Regulator inspected the fence, and found no issues with erosion or sediment control.

6.4.1 Reportable Incidents

There were no reportable incidents during the reporting period.

6.4.2 Further Improvements

The erosion control measures outlined in the SWMP will be implemented prior to commencement of initial Project construction activities, including the construction of sediment ponds and installation of silt fences and hay bales where necessary to control erosion. Disturbance areas will also be kept to a minimum to minimise erosion and sedimentation issues.

6.5 FLORA

Management of flora for the initial Project construction activities is described in the approved construction phase Biodiversity Management Plan and Revegetation Strategy (BMP-RS). The BMP-RS is required by Conditions 33 and 35, Schedule 3 of the Development Consent.

6.5.1 Environmental Management

Control Strategies

Vegetation clearance activities are managed using the Ground Disturbance Permit process and Vegetation Clearance Protocol (VCP) as outlined in the BMP-RS. The VCP involves:

- Clearing restrictions;
- Pre-clearance fauna surveys;
- Applying clearing methods to minimise impact on fauna;
- Salvaging of material for habitat enhancement;
- Installation of artificial bat roosts; and
- Reporting.

Vegetation clearance activities associated with construction of the Project will commence during the next reporting period and will be implemented using the Ground Disturbance Permit process and VCP as outlined in the BMP-RS.

Effectiveness of Control Strategies

No control strategies were required to be implemented during the reporting period.

Variations from proposed Control Strategies

There were no variations from the proposed control strategies during the reporting period.

6.5.2 Reportable Incidents

There were no reportable incidents during the reporting period.

6.6 FAUNA

Management of fauna for the initial Project construction activities is described in the approved construction phase BMP-RS. The BMP-RS is required by Schedule 3, Conditions 33 and 35 of the Development Consent.

6.6.1 Environmental Management

Control Strategies

Vegetation clearance activities are managed using the Ground Disturbance Permit process and VCP as outlined in the BMP-RS. No vegetation clearing activities were undertaken during the reporting period.

Vegetation clearance activities associated with construction of the Project will commence during the next reporting period and will be implemented using the Ground Disturbance Permit process and VCP as outlined in the BMP-RS.

The Development Consent (Schedule 3, Condition 35(c)) requires measures to identify and manage significant impacts on threatened fauna species not identified in the EIS. As described in the BMP-RS, no threatened fauna species are likely to be significantly affected by the Project, therefore measures to manage significant impacts are not required and general measures to manage impacts on threatened species will be applied (e.g. implementing the VCP).

Effectiveness of Control Strategies

No control strategies were required to be implemented during the reporting period.

Variations from proposed Control Strategies

There were no variations from the proposed control strategies during the reporting period.

6.7 WEEDS AND PESTS

Weeds and pests were managed as per the approved construction phase BMP-RS.

6.7.1 Environmental Management

Control Strategies

In accordance with the BMP-RS, control strategies for weed management on SEM-owned land include the following:

- identification of weeds by regular site inspections;
- mechanical removal of identified noxious weeds and/or the application of approved herbicides in authorised areas;
- implementing follow-up site inspections to determine the effectiveness of weed control measures; and
- where practicable, prevention of the establishment of new weeds on SEM-owned land by minimising seed transport of weed species to and from the Project using a vehicle inspection process (primarily for use on agricultural and earthmoving equipment that are likely to carry weed seeds),

The implementation of weed management strategies occur according to seasonal and climatic requirements.

The pest control activities within the Project areas are described in the BMP-RS and include the following measures:

- regular property inspections to assess the status of pest populations within SEM owned- land;
- implement pest control methods for declared pests (i.e. rabbits, pigs and wild dogs) in accordance with Pest Control Orders under the NSW *Local Land Services Act, 2013*; and
- inspections to assess the effectiveness of control measures implemented and review these if necessary.

Effectiveness of Control Strategies

Weeds

The control strategies implemented during the reporting period were considered effective.

As in the previous year, rainfall events during 2022 (Figure 8) provided ideal conditions for weeds to flourish.

Several weed spraying events occurred during the reporting period including:

- a total of 75-man hours of weed spraying to control Bathurst Burr weed; and
- broad acre spraying of weeds on cultivated land on properties located within the MLs held by SEM (Syerston, Kingsdale and Slapdown).

Property inspections resulted in no sightings of the African Boxthorn and Apple of Sodom weeds.

Feral Pests

Two coordinated fox control programs were conducted with surrounding landholders in March and October 2022. Both programs were deemed successful with a 100% and 92% “take up”, respectively. Aerial feral pig eradication program organized and run by the Condobolin office of the Local Lands Service, was conducted over two days in September 2022. Five hundred and thirty (530) feral pigs were eradicated from five surrounding properties including the SEM owned properties associated with the Project (94) and Syerston (a property located within ML 1770 held by SEM) (32).

Variations from Proposed Control Strategies

There were no variations from the proposed control strategies during the reporting period.

6.7.2 Environmental Performance

Monitoring

Weekly and monthly monitoring of weeds and pests continued as described in the BMP-RS.

6.7.3 Performance Outcomes

Weed Management

The performance indicator for weed management is the extent of weed species, which will be reduced then maintained at 40% below the baseline weed abundance percentage across the mine site, and that no new priority weed species will be introduced. Weed control actions undertaken, as described above, were considered effective, however the performance indicator was not applicable due to insufficient baseline data, as described in Section 6.7.5.

Pest Management

The performance indicator is the extent of feral animal species, which will be reduced then maintained at 25% below the feral animal abundance baseline across the mine site. Feral animal control actions undertaken, as described above, were considered effective however, the performance indicator was not applicable due to insufficient baseline data, as described in Section 6.7.5.

6.7.4 Reportable Incidents

There were no reportable incidents during the reporting period.

6.7.5 Further Improvements

Consideration will be given to conducting an additional baseline survey in the future (prior to commencement of construction activities on ML 1770) as the 2019 “drought” baseline survey [4] is not considered representative. This was confirmed by the baseline survey’s findings:

- *Overall the study areas exhibited a low abundance of weeds in line with the presence of stock, the time of year surveys were conducted and the drought conditions.*
- *In general, populations of vertebrate pest species were in low concentrations across the two study sites. This was due mainly to the severe drought conditions experienced translating to meagre food and water available to support significant populations.*

6.8 ABORIGINAL HERITAGE

The Development Consent (Schedule 3, Condition 40) requires the development of a Heritage Management Plan (HMP) for the Project. The HMP was submitted to the DPIE for approval and subsequently approved on the 13 June 2019.

Revision 3 of the HMP was re-submitted to DPE for approval on 12 May 2022, and was approved on the 16 June 2022. This version was updated to include references to MOD 7.

Aboriginal Heritage Impact Permits (AHIPs) (#C0003049 and #C0003887) are issued for the Project. AHIP #C0003049 was issued by the NSW Office of Environment and Heritage (OEH) on the 10th October 2017 for a period of 10 years and covers ML 1770 and other components of the Project (e.g. limestone quarry, rail siding etc) [5]. AHIP #C0003887 was issued by the OEH on the 10th August 2018 for a period of 23 years and covers the accommodation camp on the Sunrise property [6].

6.8.1 Environmental Management

Control Strategies

The HMP and AHIPs set out the salvage, excavation, monitoring and other management measures required to be undertaken for each of the registered archaeological sites and other Aboriginal objects within the Project area. In general, the strategies include protection, investigation, collection, excavation, documentation and storage of Aboriginal objects in an on-site temporary “Keeping Place”.

Effectiveness of Control Strategies

No control strategies were required to be implemented during the reporting period.

Variations from Proposed Control Strategies

There were no variations from the proposed control strategies during the reporting period.

6.8.2 Environmental Performance

Monitoring

No activities were undertaken during the reporting period.

Performance Outcomes

No non-compliance issues were identified during the reporting period.

6.8.3 Reportable Incidents

There were no reportable incidents during the reporting period.

6.8.4 Further Improvements

No further improvements are proposed for the next reporting period.

6.9 EUROPEAN HERITAGE

The Development Consent (Schedule 3, Condition 40) requires the preparation of a HMP for the Project. The HMP was submitted to the DPIE for approval and subsequently approved on the 13 June 2019.

Revision 3 of the HMP was re-submitted to DPE for approval on 12 May 2022, and was approved on the 16 June 2022. This version was updated to include references to MOD 7.

Sites of known and potential historic heritage have been identified within the Project area and are described in the HMP. These sites include the old magnesite mining area on ML 1770; the pastoral outstation on ML 1770; and pine trunk telephone poles and a log hut along the gas pipeline route. All of these sites have been assessed as being significant on the local level, however no sites of State significance have been identified in the Project area.

No impact to any sites of historic heritage occurred during the reporting period. Prior to the commencement of construction activities, sites recommended for avoidance (such as the pastoral outstation) will be temporarily fenced to avoid any inadvertent disturbance.

6.9.1 Reportable Incidents

There were no reportable incidents during the reporting period.

6.9.2 Further Improvements

No further improvements are proposed for the next reporting period.

7 WATER MANAGEMENT

7.1 WATER SUPPLY

SEM did not extract any water for the Project during the reporting period (1 January 2022 – 31 December 2022). A summary of the Water Access Licences (WALs) held by SEM is shown in Table 12 below.

Table 12 Summary of Project Water Access Licences

Water Licence #	Water Sharing Plan, Source, Management Zone	Entitlement (Share component - Units)	Passive Take/Inflows (ML)	Active Pumping (ML)	TOTAL (ML)
Groundwater					
WAL32068	<i>Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020.</i> Upper Lachlan Alluvial Groundwater Source. Upper Lachlan Alluvial Zone 5 Management Zone	3,154	-	0	0
WAL28681 (pit dewatering)	<i>Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2011.</i> Lachlan Fold Belt Murray Darling Basin Groundwater Source. Lachlan Fold Belt MDB (Other) Management Zone	243	0	0	0
Surface Water					
WAL6679	<i>Water Sharing Plan for the Lachlan Regulated River Water Source 2016.</i> Lachlan Regulated River Water Source.	123 ¹	-	0	0
WAL42370		0 ²	-	0	0
WAL1798		300 ¹	-	0	0

Notes:

ML – megalitre for the previous water year

¹ General Security

² High Security

In addition, SEM also holds WAL39837 (766 units) in the Upper Lachlan Alluvial Groundwater Source, Upper Lachlan Alluvial Zone 5 Management Zone however, this WAL does not form part of the Project water supply.

7.1.1 Surface Water

No surface water was extracted or used during the previous water year as shown in Table 12 above.

SEM holds Water Supply Works Approval (WSWA 70WA617095) for surface water extraction infrastructure located next to the Project borefields. The WSWA was amended (13/10/2022) by DPE-Water to include new metering and reporting conditions to incorporate the new water sharing plan conditions for the Lachlan Regulated River Water Source.

7.1.2 Groundwater

No groundwater was extracted from the Project borefields during the previous water year (Table 12). As shown in section 7.1 above, SEM holds three groundwater Water Access Licences:

- WAL 32068 in the Upper Lachlan Alluvial Groundwater Source (Upper Lachlan Alluvial Zone 5 Management Zone) for 3,154 share components under the Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2020;
- WAL 39837 in the Upper Lachlan Alluvial Groundwater Source (Upper Lachlan Alluvial Zone 5 Management Zone) for 766 share components under the Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2020 (does not form part of the Project water supply); and
- WAL 28681 in the Lachlan Fold Belt Murray-Darling Basin (MDB) Groundwater Source (Lachlan Fold Belt MDB [Other] Management Zone), for 243 share components under the Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020.

SEM holds Water Supply Works Approval (WSWA 70CA614098) for groundwater bores located at the Project borefields. The WSWA was amended (19/9/2022) by DPE-Water to include a new metering equipment condition and related recording and reporting conditions to apply from 1 December 2022. The commencement of these new conditions was subsequently delayed by DPE Water until 1 June 2023.

7.2 SURFACE WATER

The Development Consent (Schedule 3, Condition 30) requires the development of a Water Management Plan (WMP) which must include a SWMP for the Project (Schedule 3, Condition 30(b) of the Development Consent). The construction phase WMP, including the construction phase SWMP, was approved by DPE on 21 January 2020.

Revision 2 of the SWMP was re-submitted to DPE for approval on 12 May 2022, and was approved on the 24 June 2022. This version was updated to include references to MOD 7.

7.2.1 Environmental Management

Monitoring Programme

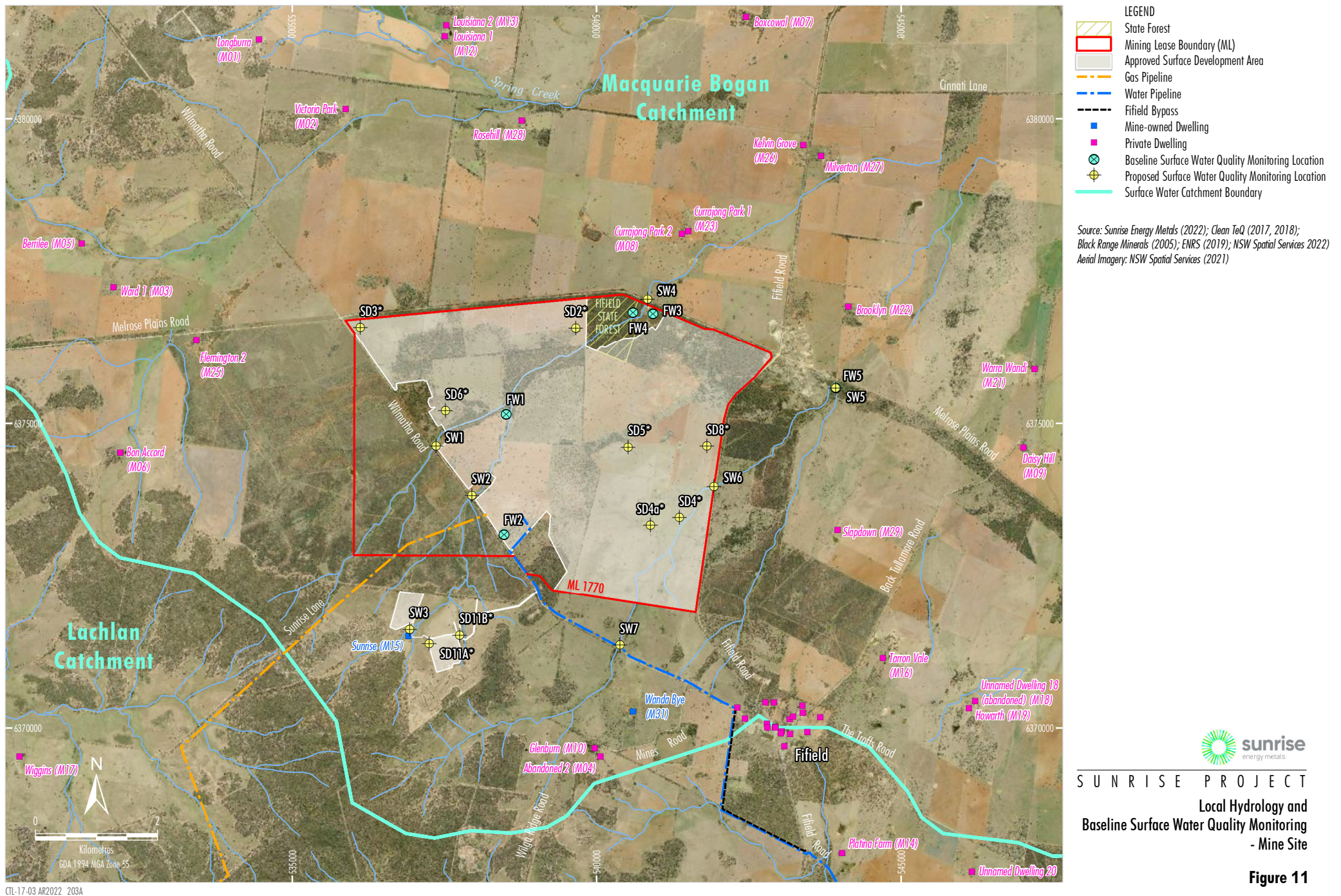
There were 23 rainfall events during the year that generated enough surface water flow to enable surface water monitoring to take place. Nine of these events had flowing water at all seven monitoring points. Water quality results from the sampling events are shown in Appendix 4.

Surface water monitoring locations within and surrounding ML 1770 are shown in Figure 11.

These surface water samples have provided important baseline water quality information for the site and will be used to generate site specific trigger levels for water quality prior to the commencement of construction activities within ML 1770.

7.2.2 Reportable Incidents

There were no reportable incidents to DPE for the reporting period. However, there was an exceedance of the EPL 21146 water quality criteria (Condition L2.4) for total suspended solids (TSS) at the downstream location SW6. The sample was collected on 20th October 2022, and sent to the laboratory for analysis. The sample returned a TSS reading of 140 mg/L compared to the EPL limit of 50 mg/L. This sampling event was following 23.6mm of rainfall in the preceding 15 hours. This followed multiple rainfall events in the previous seven weeks (sufficient flow for sampling at the ephemeral stream location of SW6 was recorded for the previous seven weeks). There were no project related works being undertaken onsite at the time of the exceedance, so activities related to the Project have not contributed to this exceedance. No adverse effects of the elevated TSS reading have been as a result of our activities as construction has not yet commenced. The recorded elevated TSS is most likely a result of existing agricultural activities in proximity to the Project, and intense rainfall in a saturated catchment. The monitoring point (i.e. SW6) may need to be relocated slightly downstream, as the current site of the monitoring point appears to have two streams of water merging. One has more sediment than the other and is draining an active paddock.



7.2.3 Further Improvements

The location of SW6 will be reviewed in consultation with the NSW EPA.

7.3 GROUNDWATER

The Development Consent (Schedule 3, Condition 30) requires the development of a WMP which must include a Groundwater Management Plan for the Project (Schedule 3, Condition 30 (c) of the Development Consent). The construction phase WMP, including the construction phase Groundwater Management Plan, was approved by DPE on 21 January 2020.

Revision 2 of the Groundwater Management Plan was re-submitted to DPE for approval on 11 May 2022, and was approved on 13 May 2022. This version was updated to include references to MOD 7 and includes trigger levels at several bores surrounding the Project borefield, that have been agreed between SEM and DPE Water.

7.3.1 Environmental Performance

Monitoring – Mining Lease

Two groundwater monitoring events occurred in ML 1770 during the reporting period. Water samples were collected for analysis and standing water levels (SWLs) were measured in April and December 2022. The second monitoring event was delayed due to heavy rainfall making many bores inaccessible. Groundwater monitoring locations within and surrounding ML 1770 are shown on Figure 12. Manually gauged and recorded standing water level results as well as results of continuous measurements recorded by automatic SWL dataloggers are shown in Appendix 5A. Groundwater quality results from the sampling events are shown in Appendix 5B.

The standing water level measurements and water quality data have provided important baseline information for the site.

Monitoring – Borefields

Two groundwater monitoring events at the borefields occurred during the reporting period, with water samples collected for analysis and SWLs measured in April 2022 and January 2023 (delayed due to the bores being inaccessible due to the Lachlan River flooding). Manually gauged and recorded SWL results and results of continuous measurements recorded by automatic SWL dataloggers are shown in Appendix 5A. Groundwater monitoring locations within the borefields are shown in Figure 13. Groundwater quality results from both monitoring events are shown in Appendix 5B.

The groundwater standing water level measurements and water quality results have provided important baseline information on the borefields.

7.3.2 Reportable Incidents

There were no reportable incidents during the reporting period. However, the monitoring scheduled for October 2022 could not be undertaken due to access restrictions to both the mine site and the borefield. The mine site was inaccessible due to wet ground conditions, and the borefield was not accessible due to road closures associated with the ongoing major flood event in the Lachlan River.

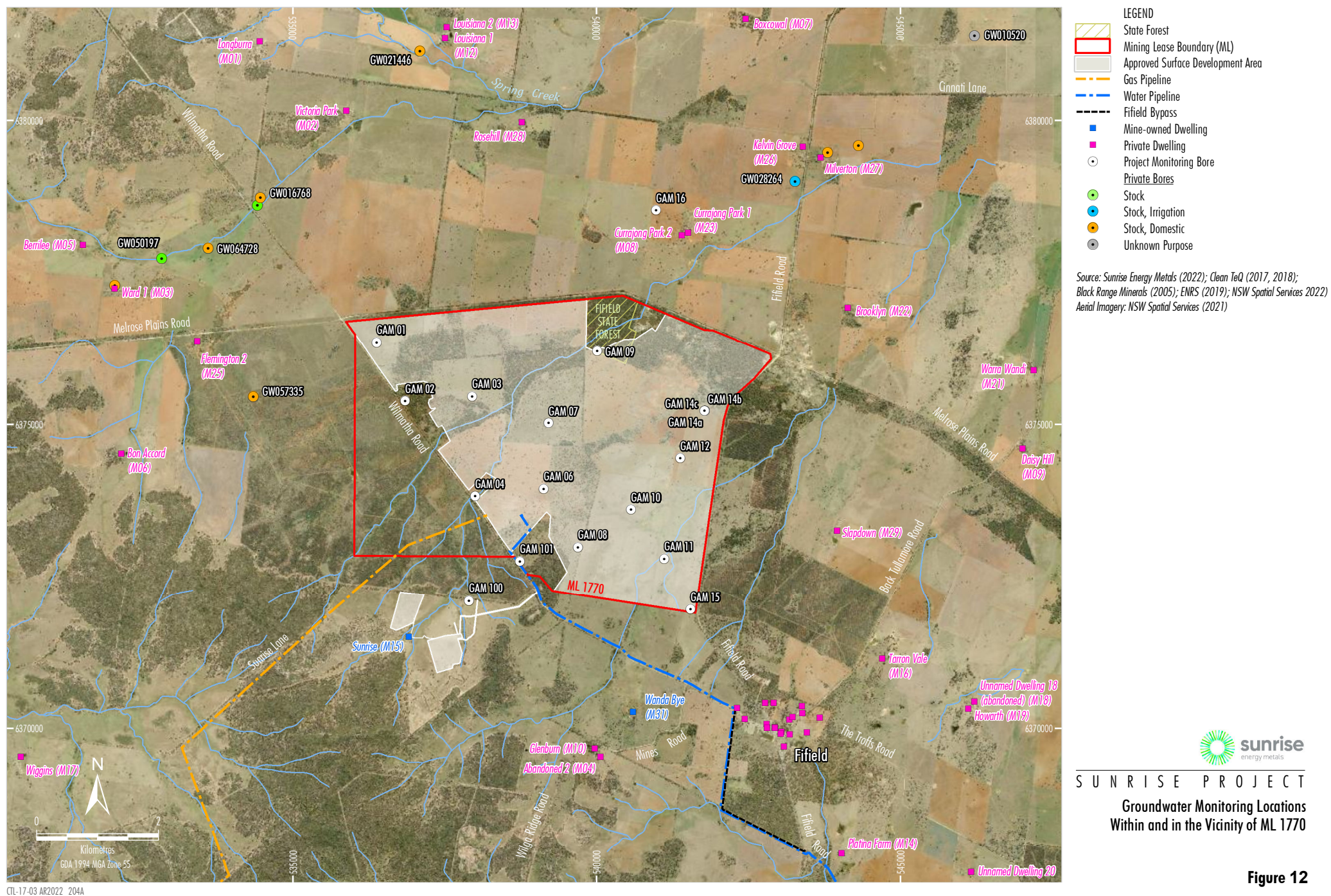
The required groundwater monitoring at both the mine site and borefield were carried out as soon as conditions improved and safe access was obtained (December 2022 for the mine site bores, January 2023 for the borefields).

SEM does not believe the delay of this groundwater monitoring event is an incident as it did not create a set of circumstances that would:

- a) cause or threaten to cause material harm to the environment; and/or
- b) breach or exceed the limits or performance measures/criteria.

7.3.3 Further Improvements

No further improvements were implemented during the reporting period.





- LEGEND**
- Water Pipeline
 - Borefield Infrastructure Corridor *
 - Borefield Location
 - Production Bore (not constructed)
 - Production Bore (constructed)
 - Existing Borefield Monitoring Piezometer
 - Proposed Borefield Monitoring Piezometer
 - Regional Monitoring Bore (Existing)
 - Regional Trigger Level Monitoring Bores (Existing)
 - Regional Monitoring Bore (Proposed) ^
 - Surface Water Flow Gauge

* Infrastructure Corridor includes linking pipeline, access road and electricity transmission line.

^ Indicative Location Only — Location to be confirmed in consultation with Natural Resources Access Regulator and relevant landholders.

Source: Sunrise Energy Metals (2022); Ivanplats Syerston (2005); NSW Spatial Services (2022); NSW DPI - Water (2018)
Aerial Imagery: Esri, DigitalGlobe (2022)

Figure 13

7.3.4 Management Issues and Implemented Actions

Management Issue:

Four of the installed water level loggers at the mine site (within GAM9, GAM11, GAM12 and GAM14A) had been found to have failed during the previous reporting period. The loggers stopped recording data at various times during the monitoring interval between May 2021 and July 2021.

Another five water level data loggers in monitoring bores at the mine site (GAM2, GAM4, GAM10, GAM14C and GAM15) were found to have failed in this reporting period. Data from these could not be retrieved for the period April 2022 to December 2022.

An attempt was made to collect a sample from a Production Bore (ISPB01) situated within the Borefields using the permanently fitted diesel powered turbine pump. The diesel motor had mechanical issues related to riverine flooding in the period prior to the monitoring round.

Implemented Action:

New water level loggers were installed at GAM9, GAM11, GAM12 and GAM14A at the time of the April 2022 baseline monitoring round. The new loggers are Solinst Levellogger 5. A second Solinst Barologger was installed at GAM7 to allow for automated correction of data from the new loggers in subsequent monitoring rounds.

New loggers were installed in GAM2, GAM4, GAM10, GAM14C and GAM15 bores on 16 January 2023. ISPB01 pump will not be replaced at this time because the bore is to be declared as “inactive” on the WSWA 70CA14098 until such time as the compliant metering equipment has been installed. No sample will be able to be taken from this bore. The adjacent monitoring bore will be utilised for the purposes of monitoring.

8 REHABILITATION

The Development Consent (Schedule 3, Condition 57) requires the preparation of a Rehabilitation Strategy for the Project. Previously, a construction phase Rehabilitation Management Plan (required under the Mod 4 Development Consent) was prepared and approved by DPE on 15 August 2019. Prior to any construction activities being undertaken, a Rehabilitation Strategy for the Project will be prepared and approved by DPE. Changes to the Mining Regulations during 2022 impose a new requirement for a Rehabilitation Management Plan for the Mining Leases once the security bond increases above the minimum amount. SEM will prepare this Rehabilitation Management Plan and associated documents when required, during a future reporting period.

8.1 REHABILITATION OF DISTURBED LAND

Exploration activities during the reporting period included a small-scale, localised soil sampling program within ML 1770. No rehabilitation was required as a result of the soil sampling program.

8.2 REHABILITATION MONITORING

Visual monitoring of rehabilitation resulting from previous exploration activities was undertaken during the reporting period. Due to the higher than average rainfall recorded during the year, significant natural regeneration was observed.

8.3 PERFORMANCE INDICATORS

Performance indicators and completion/relinquishment criteria for each rehabilitation phase are described in Section 6 of the approved MOP. Exploration areas disturbed during the 2019 exploration drilling and the 2021 diamonding drilling areas reached the phase 6 performance indicator (land relinquishment phase) during the reporting period. An ESF2 form was submitted to the Resources Regulator for formal sign off of this rehabilitation.

The Resources Regulator undertook a site inspection of ML 1770 in November 2022 to inspect an exploration bag farm. The Resources Regulator instructed SEM to remove the bag farm from site as it was showing signs of degradation. Due to the ongoing wet weather, material from the bag farm was removed from site in the 2023 reporting period.

During the next reporting period, rehabilitation activities will continue in accordance with the approved MOP/RMP and ML conditions.

9 COMMUNITY RELATIONS

SEM communicates with respect and works hard to listen to our communities and achieve constructive dialogue. The company has a [Community Engagement Policy](#), available on its website, that defines the principles guiding the company's interactions with its communities. The policy outlines SEM's commitment to active engagement, clear communication, community investment, dispute resolution and how it works with its local indigenous communities.

SEM actively interacts with the community to leverage its combined capabilities and create mutually beneficial outcomes. The company's intention is to work together with communities to achieve long-term shared value.

SEM also engages with communities early and regularly, listens to their input and aims to communicate with respect and achieve constructive dialogue. Multiple, audience-appropriate communication channels are used to deliver consistent and timely information.

9.1 COMMUNITY COMPLAINTS

The Project Development Consent requires SEM to implement a procedure to receive, handle, respond to and record complaints, and resolve any disputes that may arise. SEM responds quickly to community dissatisfaction. It aims to resolve complaints at the lowest level, as quickly as possible and to deliver long-term resolutions.

SEM has a toll-free, 24-hour community complaint line (1800 952 277) in place to receive community concerns. The phone number is publicised on the SEM Sunrise website and in all community publications. Telephone calls are answered by an operator who records details (date and time of call, name, contact details, details of the complaint and whether an immediate response is required) and emails the record to SEM via community@sunriseem.com. Calls that require an immediate response outside business hours are sent to the Environment, Approvals & Community Lead for immediate response. SEM responds to calls within 24 hours or on the next business day. SEM investigates all complaints thoroughly, always working towards a mutually agreeable and long-lasting solution.

Complaints may also be submitted through stakeholder interactions that may occur between SEM personnel and community members from time to time. All employees and contractors receive information about the SEM Sunrise Complaints Management Process during the general induction process.

Zero community complaints were received during the reporting period.

9.2 COMMUNITY LIAISON

Community Consultative Committee

The Community Consultative Committee (CCC) was re-established in October 2017 and provides a forum for discussion between SEM and representatives of the local community, stakeholder groups and the local councils on issues directly relating to the Project.

During the reporting period, biannual meetings (held in March and October 2022) of the CCC were conducted in accordance with the Development Consent (Schedule 5, Condition 7). The meetings were offered online and in person.

The CCC met in the Project local government area (Condobolin township, Lachlan Shire). At the meetings, SEM provided Project updates, information relating to environmental management and community engagement activities and addressed questions and concerns raised by CCC members. Minutes were taken from each meeting and published on the SEM webpage (<https://www.sunriseem.com/sunrise-project/community-consultative-committee/>) along with copies of all presentations.

Community Consultation

SEM has a detailed Community Engagement Plan in place, which supports the Community Engagement Policy and provides more detail around the company's commitment to proactive listening, consultation, and communication.

SEM engages through a range of consultation tools including individual stakeholder and public meetings, advertised community events, newsletters and the operation of shop fronts in Condobolin and Parkes as required. SEM policies and guidelines inform interactions with communities affected by SEM's activities.

Unfortunately, due to COVID-19, the number of community meetings during the year were restricted and SEM activities were modified in line with NSW state government guidance. Notwithstanding, during the reporting period, SEM managed to attend meetings with many stakeholders, such as:

- Individual stakeholders;
- Landholders;
- Near neighbours; and
- Local Government and State agencies.

SEM also provided Project update presentations and or briefings to various groups during the reporting period, including:

- Lachlan, Parkes and Forbes Shire Councils; and
- Various State agencies.

Aboriginal Consultation

SEM acknowledges the Indigenous people on whose land the company operates. SEM is committed to working with organisations representing Indigenous people to form partnerships that build capacity and generate long-term value. This commitment is outlined in SEM's Community Engagement Policy.

Through membership on the CCC, the Wiradjuri Condobolin Corporation is provided with regular updates on the Project and SEM has contact with this organisation outside of the CCC meetings.

9.3 COMMUNITY INVESTMENT

SEM's guiding principle for community investment is to achieve meaningful outcomes that benefit as many people as possible in the community. For SEM, the definition of community investment includes financial and non-financial contributions.

The current pre-construction investment program includes small-scope direct financial contributions, complemented by important non-financial contributions such as time spent supporting schools and community organisations.

SEM provided financial support during the reporting period to primary schools, the Trundle Bush Tucker Day, the Trundle Back in Time event and the local agricultural shows, which had been cancelled during the previous two years due to Covid 19. SEM attended a number of local agricultural shows in the region (Tullamore, Trundle, Bedgerabong, Parkes, Condobolin and Forbes) and had a lot of interest from attendees of these events.

10 INDEPENDENT ENVIRONMENTAL AUDIT

The Development Consent (Schedule 5, Condition 10) requires an Independent Environmental Audit (IEA) to be commissioned within one year of the commencement of the development after 6 May 2017. As the Project has not yet commenced development after 6 May 2017, the IEA is a future requirement that has not been met during this reporting period and therefore has not been triggered.

11 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

No reportable incidents or non-compliances occurred during the reporting period.

12 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

12.1 EXPLORATION

Additional soil sampling may be required across ML 1770 to delineate the boundaries of the ultramafic intrusions and their associated lateritic profile development. Following completion of this, future drilling targets within ML 1770 may be identified across the boundaries of ultramafic intrusions within the Tout Intrusive Complex.

12.2 PROJECT EARLY WORKS

The following activities are proposed during the next reporting period:

- Minor preparatory works, including installation of services and ancillary infrastructure;
- Further works associated with the partial replacement of the ML 1770 boundary fence; and
- Installation of production bores and monitoring wells at the borefield (excluding pipelines and other associated infrastructure).

12.3 PROJECT DEVELOPMENT

SEM is proposing to commence initial Project construction activities subject to a final investment decision and completion of a financing package. Initial construction activities associated with ML 1770 include commencement of the following:

- Development of the mine, including:
 - Site establishment and earthworks;
 - Construction of site access roads and haul roads;
 - Processing facility earthworks;
 - Establishment of temporary facilities required for construction activities (e.g. offices, laydown areas, communications infrastructure);
 - Construction of the mine infrastructure area including the offices, workshops, warehouse, laboratory and amenities buildings, fuel storage areas, potable water treatment plant and car parking facilities;
 - Construction of the tailings storage facility and evaporation pond;
 - Construction of water management infrastructure including the raw water dam, water storage dam and sediment dams;
 - Construction and operation of the concrete batch plant;
 - Development of gravel and clay borrow pits (including blasting and crushing);
 - Installation of appropriate fencing and barriers for public safety and security for mining and construction; and
 - Other associated minor infrastructure, plant, equipment and activities.
- Development and operation of the accommodation camp;
- Installation of the borefields infrastructure;
- Installation and operation of the surface water extraction and associated infrastructure and water pipeline;
- Road upgrades; and
- Upgrades to the proposed oversized transport route.

A new RMP will be prepared and submitted to the Resources Regulator prior to construction activities commencing.

13 REFERENCES

- [1] NSW Government, “Annual Review Guideline – Post-approval Requirements for State Significant Mining Developments,” 2015.
- [2] NSW Resources Regulator, “Annual Rehabilitation Report and Forward Program for Large Mines,” 2021. [Online]. Available: <https://www.resourcesregulator.nsw.gov.au/sites/default/files/documents/form-and-way-annual-rehabilitation-report-and-forward-program-for-large-mines.pdf>
- [3] Corkery RW, “Fourth Annual Exploration Report for ML 1770 “Sunrise Project” - 16 February 2021 to 15 February 2022.,” 2022.
- [4] Area Environmental, “Weeds and Vertebrate Pests Baseline Survey Report ML1770 and Sunrise Accommodation Camp,” 2019.
- [5] Landskape, “Analysis of Aboriginal Lithic Assemblages Aboriginal Heritage Impact Permit C0003887,” 2019.
- [6] Landskape, “Analysis of Aboriginal Stone Quarry Aboriginal Heritage Impact Permit C0003049,” 2020.
- [7] NSW Department of Planning and Environment, Division of Resources and Geoscience, “Exploration Code of Practice: Rehabilitation,” 2015.

APPENDIX 1: AIR QUALITY MONITORING RESULTS

1A – Depositional Dust Results

1B – PM_{2.5} Daily Average Results

1C – PM₁₀ Daily Average Results

1D – Particulate Matter Results (Graphs) 24hr Average

1A – Depositional Dust Results

Table A-1. Summary of depositional dust (insoluble solids) monitoring results 2022

Month			Insoluble Solids (g/m ² /month)			
	Start	End	DG1	DG2	DG3	DG4
JAN	31/12/21 -	31/01/2022	1.6	1.1	0.8	1.2
FEB	31/01/22 -	1/03/2022	2.0	0.9	0.6	0.8
MAR	1/03/22 -	5/04/2022	1.4	1.1	1.3	1.5
APR	5/04/22 -	2/05/2022	0.7	0.9	0.2	0.4
MAY	2/04/22 -	1/06/2022	0.5	1.8	0.3	0.2
JUN	1/06/2022	1/07/2022	1.2	0.6	0.3	0.4
JUL	1/07/2022	1/08/2022	0.5	0.2	0.1	<0.1
AUG	1/08/2022 -	1/09/2022	1.0	0.1	0.1	0.1
SEP	1/9/2022 -	30/09/2022	0.3	<0.1	0.4	0.2
OCT	30/9/2022 -	31/10/2022	1.1	0.4	0.2	0.4
NOV	31/10/2022	1/12/2022	1.1	3.7	0.4	0.5
DEC	1/12/2022	1/01/2023	1.8	3.9	1.3	0.8
ANNUAL AVERAGE (Mean)			1.1	1.3	0.5	0.6
MEDIAN			1.1	0.9	0.4	0.4
MAXIMUM			2.0	3.9	1.3	1.5
MINIMUM			0.3	0.1	0.1	0.1

1B – PM2.5 Daily Average Results

Table A-2. Annual Summary - Daily AVG For PM2.5 STP (µg/m³) - Site PM2



Excluded - Equipment Failure



Agricultural activities by neighbours

Jan 2022 to Dec 2022

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	3.54	3.17	2.82	3.1	3.13	3.09	2.57	1.56	1.67	2.54	1.11	6.78	
2	3.48	4.06	1.19	2.53	3.43	2.77	0.82	1.15	1.72	1.7	2.66	4.58	
3	5.74	4.38	1.36	4.47	3.21	2.31	0.8	2.87	1.98	2.13	2.39	4.69	
4	5.93	3.23	1.61	4.6	2.9	1.1	1.24	2.91	1.6	3.37	2.05	5.81	
5	4.42	3.19	3.05	8.67	2.32	0.94	1.01	2.47	1.36	3.66	3.49	6.8	
6	4.7	3.33	1.8	28.79	1.19	2.26	1.98	1.6	2.58	4.61	2.76	9.2	
7	2.53	2.22	0.83	4.95	1.5	2.44	2.02	0.91	5.04	3.23	2.94	4.87	
8	3.63	2.77	1.07	1.92	1.58	1.61	3.53	0.85	4.13	2.95	2.73	4.18	
9	4.8	3.9	1.77	2.15	2.61	1.01	2.7	1.49	1.85	2.29	3.87	3.17	
10	7.02	4.18	2.94	2.45	3.16	0.76	3.6	1.24	1.69	1.38	4.21	4.42	
11	4.88	4.45	4.58	2.39	2.25	2.66	1.48	4.09	3.38	4.57	4.82	5.7	
12	5.6	4.63	3.85	3.91	1.18	2.48	1.57	2.09	2.2	3.7	4.45	3.54	
13	4.68	4.31	2.67	6.51	1.33	1.08	2	0.96	2.21	3.06	4.21	3.09	
14	5.13	4.85	3.52	2.11	1.61	1.06	2.51	0.76	3.11	1.47	2.28	3.21	
15	4.56	5.42	3.67	2.37	2.73	1.71	3.01	0.78	5.1	3.35	3.16	3.66	
16	3.29	6.34	4.36	2.48	3.34	1.45	2.48	1.04	3.38	2.65	2.42	4.15	
17	6.47	5.87	3.98	2.13	2.53	0.99	1.27	1.04	3.28	2.48	1.37	3.36	
18	4.38	4.81	3.9	2.68	1.85	2.09	2.3	1.25	2.42	5.04	2.89	2.34	
19	1.78	5.55	4.52	3.29	3.02	1.65	2.05	1.79	3.15	3.76	2.63	3.42	
20	4.19	5.86	4.11	1.27	2.85	2.23	1.2	2.02	2.28	2.16	2.59	7.13	
21	6.66	4.25	4.95	1.41	2.47	2.88	1.38	0.85	3.71	2.65	3.63	6.47	
22	4.06	5.23	10.23	2.77	1.68	2.07	2.93	0.89	3.25	2.98	3.84	6.3	
23	3.57	3.46	7.77	1.93	1.47	1.61	2.18	1.42	3.4	3.39	2.75	7.51	
24	3.83	2.63	6.84	2.27	1.52	1.46	1.94	2.43	3.84	3.52	1.5	5.95	
25	6.26	2.12	5.63	1.6	1.83	1.54	3.27	1.59	1.91	2.01	2.71	4.32	
26	5.67	3.39	3.55	3.98	3.77	1.98	3.56	1.23	2.53	1.64	3.78	5.79	
27	5.63	3.73	2.29	1.51	2.77	2.04	3.92	2.88	3.11	2.14	3.34	4.66	
28	4.97	2.55	2.27	1.41	1.4	2.24	2.53	4.12	0.98	2.59	2.77	6.19	
29	3.19		2.61	2.47	1.16	2.81	2.37	3.88	1.38	2.43	2.68	4.84	
30	5.18		3.77	2.47	1.58	3.02	1.79	2.33	2.52	2.93	5.09	6.37	
31	4.42		8.93		1.73		3.84	1.01		3.61		6.54	
AVG	4.65	4.07	3.76	3.82	2.23	1.91	2.25	1.79	2.69	2.9	3.04	5.13	3.19

Table A-3. Annual Summary - Daily AVG For PM2.5 STP (µg/m³) - Site PM4



Excluded - Equipment Failure



Agricultural activities by neighbours

Jan 2022 to Dec 2022

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	4.28	3.44	2.8		3.77	3.4	2.74	1.77	2	2.54	1.18	6.98	
2	3.68	4.38	1.37		4.14	2.92	0.99	1.38	2.12	1.84	2.94	4.77	
3	5.6	4.85	1.61		3.51	2.78	0.92	3.42	2.36	2	2.46	4.67	
4	5.16	3.22	1.63		3.46	1.18	1.35	3.32	1.91	3.22	2.35	5.44	
5	4.13	3.32			2.62	1.14	1.18	2.78	1.63	3.64	3.98	6.35	
6	4.3	3.55		22.38	1.23	2.43	2.37	1.95	2.8	4.67	3.05	4.42	
7	2.52	2.31		5.4	1.55	2.64	2.35	1.17	4.98	3.13	2.92	3.62	
8	3.67	2.81		2.42	1.54	1.75	3.88	0.97	4.07	2.94	3.06	4.42	
9	4.88	3.83		2.45	3.32	1.22	3.02	2.25	1.84	2.38	4.12	3.27	
10	6.77	4.3		2.79	3.64	0.92	4.47	1.66	1.81	1.58	4.82	4.82	
11	4.68	4.42		2.49	2.69	3.01	1.77	4.75	3.31	4.8	4.96	5.22	
12	5.11	4.55		4.68	1.37	2.78	1.99	2.56	2.21	3.53	4.58	3.61	
13	4.54	4.19		7.26	1.55	1.38	2.4	1.3	2.31	3.06	3.89	3.28	
14	5.35	4.75		2.52	1.75	1.27	3.44	0.79	3.31	1.54	2.24	3.42	
15	4.71	5.44		2.81	2.42	2.22	3.67	0.92	4.99	3.44	3.21	3.12	
16	3.58	5.94		3.33	2.96	1.61	3.52	1.29	3.45	2.75	2.5	3.25	
17	7.46	5.14		2.67	2.59	1.33	1.51	1.13	3.36	2.49	1.44	3.56	
18	4.35	5.2		3.23	1.99	2.64	2.61	1.36	2.37	4.53	2.82	2.77	
19	1.99	5.88		3.78	3.43	2.19	2.35	2.17	3.56	3.84	2.61	3.89	
20	4.38	6.44		1.66	3.27	2.56	1.49	2.32	2.8	2.25	2.89	5.85	
21	6.24	5.83		1.88	2.97	3.65	1.62	0.73	3.88	2.93	3.78	4.65	
22	3.52	5.48		3.55	1.85	2.08	3.15	1.03	3.6	3.1	4.03	5.72	
23	3.68	4.3		2.35	2.41	1.61	2.81	1.61	3.21	3.44	2.63	7.78	
24	3.52	3.66		2.56	1.61	1.74	2.36	2.77	3.98	3.57	1.44	6.04	
25	5.58	2.96		2.1	2.3	1.32	4.29	1.91	1.92	1.98	2.71	4.51	
26	5.48	3.97		3.94	4.66	2.11	3.89	1.4	2.52	1.74	2.95	6.31	
27	5.28	4.42		1.72	2.83	2.34	4.3	3.41	3.2	2.23	3.35	4.44	
28	4.35	3.12		1.64	1.67	2.42	2.8	4.78	0.9	2.5	2.69	4.86	
29	3.51			3.09	1.18	3.19	2.31	4.5	1.25	2.54	2.73	4.77	
30	5.37			2.77	1.77	3.47	2.53	2.63	2.57	2.94	4.49	6.31	
31	4.54				2.06		4.36	1.31		3.48		6.78	
AVG	4.59	4.35	1.85	3.81	2.52	2.18	2.66	2.11	2.81	2.92	3.09	4.8	3.14

1C – PM10 Daily Average Results

Table A-4. Annual Summary - Daily AVG For PM10 STP (µg/m³) - Site PM2



Excluded - Equipment Failure



Agricultural activities by neighbours

Jan 2022 to Dec 2022

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	12.17	7.72	9.5	11.07	8	7.62	5.27	3.65	4.36	7.32	4.75	18.08	
2	12.86	13.62	5.22	8.61	8.33	6.8	2.04	2.82	4.84	4.98	7.8	12.79	
3	20.3	14.66	6.15	14.29	7.51	5.45	2.76	6.77	5.48	6.24	6.51	13.32	
4	20.09	11.65	5.98	13.95	7.55	2.54	4.34	5.77	4.71	11.18	5.57	16.47	
5	18.57	9.83	10.56	19.36	6.34	2.62	3.09	5.94	3.92	8.18	8.93	22.81	
6	19.63	10.12	5.82	45.44	3.57	5.85	5.19	4.57	8.09	9.89	7.83	113.64	
7	7.62	8.29	5.19	9.65	4.42	5.78	5.05	2.41	10.81	7.54	8.54	17.12	
8	8.23	9.48	5.17	5.12	4.57	4.05	8.01	1.47	9.49	7.58	7.82	16.7	
9	9.49	14.39	5.86	6.56	6.83	2.69	5.98	2.55	5.8	7.22	8.99	12.32	
10	15.25	15.37	8.97	7.01	6.53	1.73	7.01	3.43	4.67	4.86	12.72	13.13	
11	9.63	15.08	12.05	6.6	5.57	5.94	3.61	8.57	8.54	10.27	10.16	21.29	
12	10.94	11.72	10.47	10.27	2.93	6.11	3.43	3.83	5.83	10.63	11.42	12.82	
13	10.97	12.72	7.42	13.15	4.87	2.56	4.37	2.46	5.07	12.59	10.1	10.01	
14	13.84	15.6	8.59	5.77	4.78	3.38	4.66	1.76	7.26	4.44	9.2	11.78	
15	12.73	19.19	11.35	7.04	6.85	4.33	5.47	1.87	9.5	10.01	9.3	15.53	
16	8.26	21.8	12.77	6.84	9.67	4.01	4.7	2.37	9.17	7.18	7.42	19.49	
17	14.16	23.35	10.88	6.5	7.09	2.04	4.89	1.86	9.09	6.71	4.59	12.96	
18	9.44	20.6	9.83	9.46	5.22	2.98	6	3.21	6.6	16.75	8.46	9.64	
19	5.79	20.24	9.71	9.95	9.41	3.71	5.12	4.9	8.22	8.3	10.59	12.85	
20	12.87	18.32	9.89	3.32	8.2	5.75	3.51	4.71	6.94	5.5	8.93	25.09	
21	18.34	14.54	12.7	3.54	6.28	6.67	3.9	1.74	8.02	8.61	12.4	28.67	
22	11.39	15.12	36.21	7.01	4.49	6.07	7.11	2.69	6.32	9.32	10.76	19.77	
23	9.37	7.83	20.47	5.38	4.27	5.15	5.2	4.44	7.3	8.99	8.61	14.13	
24	11.76	6.16	19.05	5.15	4.19	5.2	4.6	5.84	7.64	8.75	7.07	11.62	
25	16.23	6.11	14.69	5.88	4.13	5.55	7.69	3.27	5.09	6.61	10.35	8.5	
26	13.09	8.45	9.25	9.75	7.24	5.09	9.06	2.2	6.63	5.62	15.57	11.28	
27	16.65	7.96	5.02	3.2	6.42	5.33	9.88	5.44	8.02	6.71	12.17	14.54	
28	15.27	6.29	7.62	3.77	3.28	5.93	7.22	7.98	3.56	8.87	9.45	23.35	
29	8.51		8.47	6.4	2.85	8.48	6.95	7.59	3.3	7.96	10.78	16.79	
30	12.78		10.47	6.2	4.93	8.92	5.58	5.95	7.67	9.29	14.47	15.9	
31	11.23		22.8		4.89		9.2	2.55		10.04		14.2	
AVG	12.82	13.08	10.91	9.21	5.85	4.94	5.51	4.02	6.73	8.33	9.38	18.92	9.14

Table A-5. Annual Summary - Daily AVG For PM10 STP (µg/m³) - Site PM4



Excluded - Equipment Failure



Agricultural activities by neighbours

Jan 2022 to Dec 2022

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Day
1	20.37	8.44	8.57		9.55	8.62	5.52	4.28	4.76	6.75	5.32	19.33	
2	15.62	16.79	6.7		10.5	7.09	2.42	3.6	5.94	4.91	8.74	13.88	
3	19.02	18.5	5.08		8.51	5.97	3.15	7.91	6.09	5.83	7.09	12.65	
4	16.07	12.44	3.44		8.86	2.79	4.71	7	5.58	9.43	6.19	13.71	
5	18.07	10.62			7.3	3	4.17	7.43	4.87	8.12	10.94	20.64	
6	19.16	10.99		40.11	3.77	6.55	6.14	5.6	9.33	9.85	8.36	15.42	
7	8.02	8.98		10.55	4.22	6.53	6.06	2.54	10.63	6.79	8.99	11.6	
8	8.2	9.71		6.61	4.38	4.25	8.97	1.37	9.17	7.68	9	18.35	
9	10.28	14.12		6.97	8.52	3.28	6.54	3.44	5.16	7.54	9.66	12.49	
10	14.3	16.16		6.74	9.06	2.16	8.76	5.58	5.45	5.32	20.2	14.93	
11	9.54	14.68		6.05	7.09	7.2	4.3	9.96	8.48	10.21	10.32	18.17	
12	11.15	11.68		11.28	3.65	7.09	4.09	4.78	5.81	9.27	11.88	13.61	
13	11.71	12.04		14.74	5.28	3.34	4.87	3.01	5.39	12	9.34	11.27	
14	14.54	14.79		7.59	4.23	4.65	5.74	1.99	8.58	4.72	9.22	17.59	
15	13.2	20.05		9.52	5.74	6.1	6.6	2.14	10.03	10.09	9.68	10.58	
16	9.99	20.09		12.96	8.99	4.6	6.45	3.1	9.56	7.64	7.99	13.14	
17	16.23	20.78		8.45	7.24	2.48	6.55	1.97	9.47	6.91	5.43	15.87	
18	9.25	23.45		12.73	5.85	3.72	6.56	3.27	6.37	12.04	8.59	13.06	
19	7.6	22.92		10.49	9.1	5.23	5.91	5.7	8.98	8.55	10.83	17.76	
20	15.25	19.72		4.72	8.39	6.45	5.7	5.62	8.62	6.9	10.19	19.56	
21	16.2	25.99		4.73	7.58	8.21	4.2	1.49	8.39	9.26	12.88	18.41	
22	8.88	17.24		8.76	4.97	6.2	10.3	3.61	7.16	10.18	11.43	17.16	
23	9.79	10.05		6.68	7.62	4.97	8.81	4.83	6.25	10	8.69	14.76	
24	11.22	8		6.75	4.87	7.71	5.22	6.89	7.66	9.21	6.54	11.35	
25	13.9	9.36		8.29	5.86	4.45	10.8	3.78	4.24	6.45	10.26	8.79	
26	12.02	9.64		9.51	8.9	4.96	10.34	2.54	6.01	6.2	11.2	12.18	
27	14.34	9.72		3.76	7.16	5.74	10.95	6.43	7.79	7.52	12.66	12.62	
28	12.65	8.29		3.81	3.97	6.04	7.44	9.32	3.06	9.28	9.73	17.51	
29	9.98			7.39	2.75	9.26	5.75	9.33	3.29	8.19	11	16.54	
30	12.31			7.13	5.74	10.56	7.44	6.74	7.55	8.93	13.92	15.89	
31	11.36				6.39		11.07	2.95		8.95		15	
AVG	12.91	14.47	5.95	9.45	6.65	5.64	6.63	4.78	6.99	8.22	9.88	14.96	8.88

1D – Particulate Matter Results (Graphs) 24hr Average

Figure A-1 Particulate Matter (PM10) 24 hour average and compliance criteria

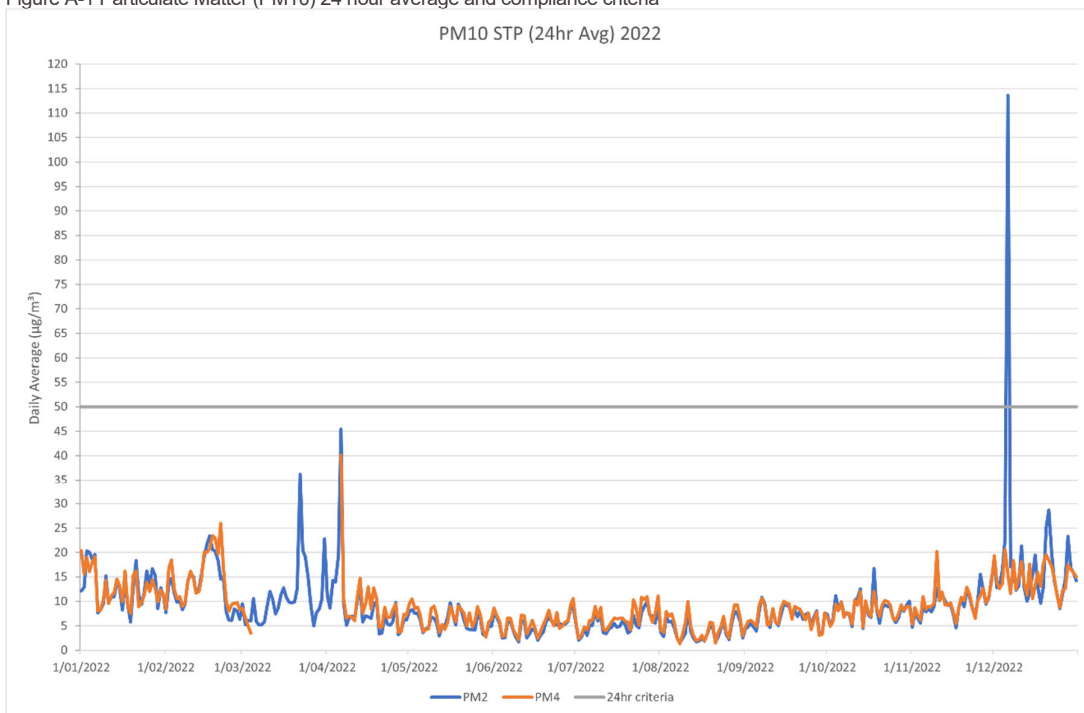
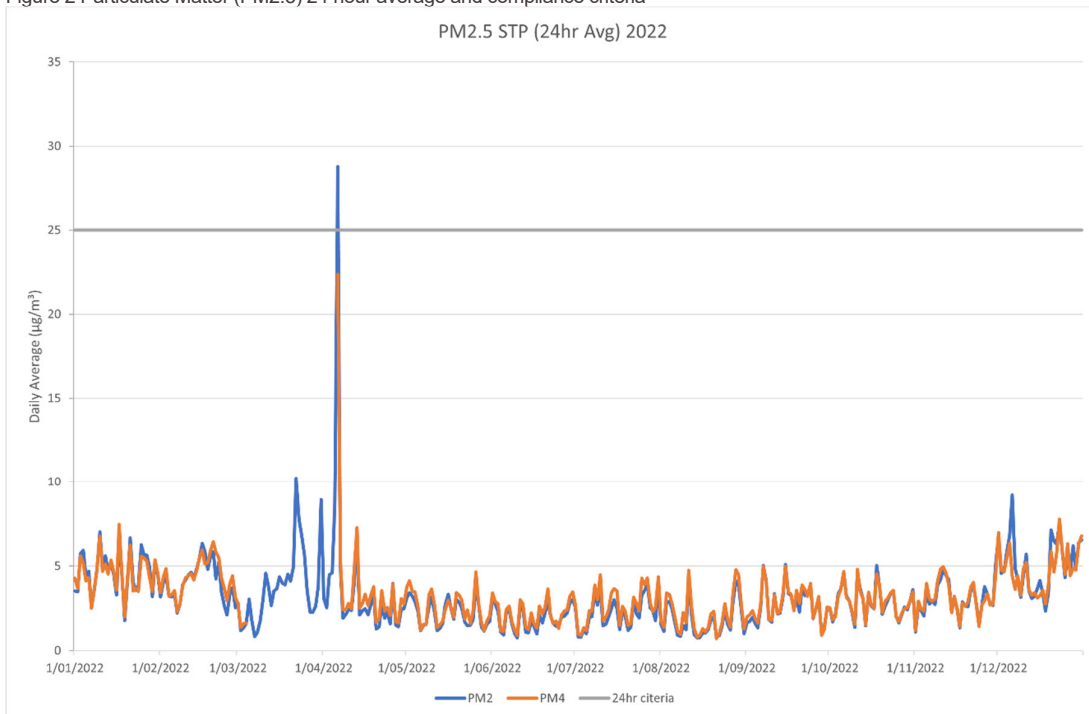
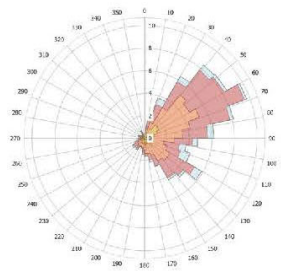


Figure 2 Particulate Matter (PM2.5) 24 hour average and compliance criteria

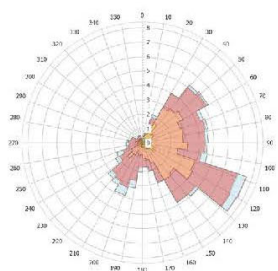


APPENDIX 2: METEOROLOGICAL MONITORING RESULTS

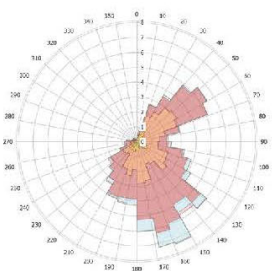
2A – Wind Roses Monthly



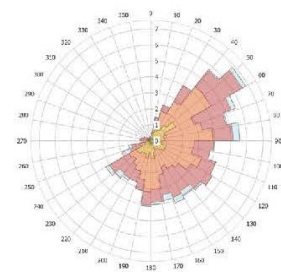
January



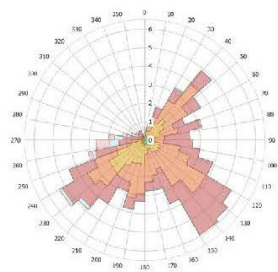
February



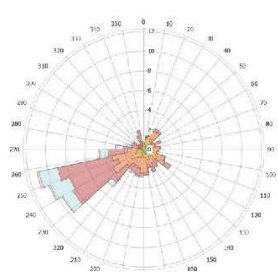
March



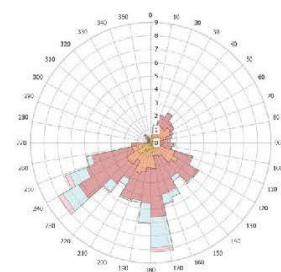
April



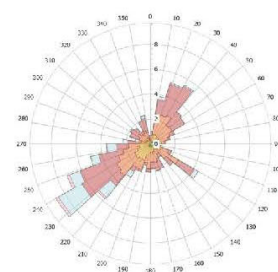
May



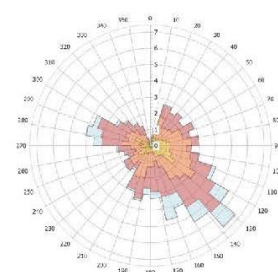
June



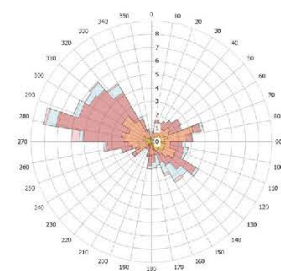
July



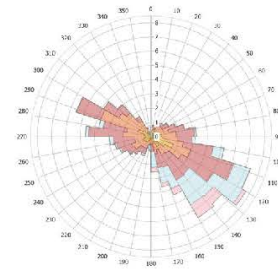
August



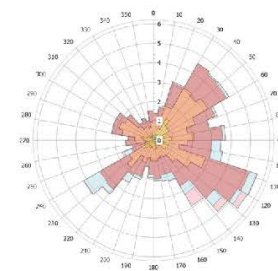
September



October



November



December

Wind Speed



2B – Temperature - Monthly

Table A-6 Summary of Mean Daily Temperatures

Month	Mean Daily Temperature							
	EIS (Station #50052)		AWS 2020		AWS 2021		AWS 2022	
	Maximum (°C)	Minimum (°C)	Maximum (°C)	Minimum (°C)	Maximum (°C)	Minimum (°C)	Maximum (°C)	Minimum (°C)
January	33.4	17.6	36.7	22.2	31.4	17.0	35.9	12.8
February	32.5	17.8	29.3	19.3	29.9	16.1	35.4	11.7
March	29.3	14.8	26.5	15.7	26.4	13.4	33.9	9
April	24.3	9.7	21.3	10.3	22.9	7.1	27.9	5.3
May	19.4	6.8	17.2	6.6	18.8	5.2	23.7	1.5
June	15.6	3.8	15.1	4.2	15.1	3.5	18.7	-1.1
July	14.9	2.6	14.1	4.4	13.8	2.8	19.9	-2.6
August	16.8	3.4	14.4	3.5	16.8	3.4	22.1	-0.6
September	19.7	5.4	20.8	6.91	20.0	4.9	21.3	1.2
October	24.5	9.2	25.4	10.2	22.3	7.7	25.5	3.7
November	28.2	12.6	30.7	14.3	24.4	12.8	31.3	4.1
December	31.7	15.5	29.9	14.8	29.5	14.3	35.4	4.8

APPENDIX 3: NOISE MONITORING RESULTS

No noise monitoring undertaken in 2022

APPENDIX 4: SURFACE WATER MONITORING RESULTS

Table A-7 Surface Water Monitoring – Analytical Results 2022

LOC ID	Analytes	Units	LOR	SW1	SW1	SW1	SW1	SW1	SW1	SW1	SW1	SW1	SW1	SW1	SW1
Sampling Date				12/05/2022	6/07/2022	15/08/2022	29/08/2022	9/09/2022	16/09/2022	23/09/2022	6/10/2022	14/10/2022	20/10/2022	2/11/2022	14/11/2022
Major Cations (mg/L)	Calcium	mg/L	0.5	2	1	2	1	4	2	5	3	4	3	8.9	3
	Magnesium	mg/L	0.5	0.8	0.6	1	0.5	1	0.9	2	1	2	1	4	1
	Sodium	mg/L	0.5	3	5	5	2	3	4	7.3	5	5.3	2	9.1	4
	Potassium	mg/L	0.5	6.1	6.8	9.1	5	5.7	4	5.6	5.6	6.7	4	7.5	5.2
Major Anions (mg/L)	Sulphate	mg/L	5	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1
	Chloride	mg/L	1	5	8	9	1	3	5	10	6	4	2	9	5
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	14	22	21	6	24	16	25	20	32	16	51	14
	Carbonate Alkalinity (as CaCO3)	mg/L	10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Total Alkalinity (as CaCO3)	mg/L	20	14	22	21	6	24	16	25	20	32	16	51	14
Heavy Metals (TOTAL) (mg/L)	Aluminium	mg/L	0.05	1.8	2	2.2	1.2	2.5	2	1	4.8	0.51	0.7	0.87	1.4
	Arsenic	mg/L	0.001	0.001	0.001	0.001	<0.001	<0.001	0.002	0.001	0.001	<0.001	<0.001	<0.001	<0.001
	Cadmium	mg/L	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	0.002	0.003	0.003	0.003	0.005	0.003	0.002	0.004	0.001	0.003	0.002	0.002
	Cobalt	mg/L	0.001	<0.001	<0.001	0.001	0.001	0.002	0.003	<0.001	<0.001	<0.001	0.001	0.002	<0.001
	Copper	mg/L	0.001	0.002	0.005	0.005	0.006	0.007	<0.001	0.003	0.003	0.001	0.005	0.004	0.003
	Iron	mg/L	0.05	1.9	2.2	2.3	1	2.2	2.3	1.1	2.9	0.69	1.4	2.1	1.5
	Lead	mg/L	0.001	0.001	0.001	0.001	<0.001	0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005	0.021	0.027	0.04	0.04	0.067	0.02	0.02	0.02	0.02	0.05	0.073	0.02
	Nickel	mg/L	0.001	0.002	0.003	0.003	0.002	0.003	0.002	0.002	0.002	0.001	0.002	0.004	0.002
	Zinc	mg/L	0.005	0.006	0.007	0.008	0.006	0.006	0.006	0.005	0.007	0.004	0.005	0.005	0.005
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05	2	0.69	1.1	0.34	0.64	0.86	0.42	0.89	0.08	0.04	0.02	1.6
	Arsenic	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
	Cadmium	mg/L	0.0002	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	0.001	0.001	0.001	<0.001	0.002	0.002	<0.001	0.001	<0.001	<0.001	<0.001	0.001
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.002	0.003	0.003	0.003	0.005	<0.001	0.002	0.002	0.002	0.003	0.003	0.002
	Iron	mg/L	0.05	1.1	0.69	0.96	0.26	0.57	0.68	0.43	0.47	0.18	0.21	0.33	0.97
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005	<0.005	<0.005	0.009	0.03	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Nickel	mg/L	0.001	0.002	0.002	0.002	0.001	0.002	0.001	0.002	0.001	0.003	0.001	0.003	0.002
	Zinc	mg/L	0.005	0.004	0.003	0.004	0.003	0.002	0.004	0.003	0.003	0.003	0.002	0.002	0.002
Others	pH (Lab)	pH units	0.1	6.3	6.8	6.9	5.3	6.1	6.3	6.8	6.6	6.9	6.6	7	6.4
	EC (Lab)			45	73	79	43	58	53	93	61	71	42	130	55
	TDS	mg/L	10	190	54	47	26	150	31	150	61	100	26	77	33
	TSS	mg/L	5	24	8	11	28	25	15	12	22	8	32	11	28
	Hardness mg equivalent CaCO3/L		1	7.4	6.3	9.1	5.6	15	9.7	21	14	18	11	37	11
Field	Turbidity (Field)	NTU		86.4*	5.2	62	88	70	81	38	52	9.1	15	18	51
	pH (Field)	pH units		8.62	6.68	6.98	7.44	6.68	7.02	7.14	7.13	7.19	7.18	7.07	7.41
	EC (Field)			54.5	155.9	96.5	468	775	61.6	107.9	118	78.6	245	92.8	182.3
	Temperature	C°		16.6	13.4	11.5	11.9	16.8	11.4	19.7	13.3	20.7	18.2	16.5	18.6

Table A-7. Surface Water Monitoring – Analytical Results 2022 cont.

LOC ID	Analytes	Units	LOR	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2	SW2
Sampling Date				12/01/2022	30/04/2022	12/05/2022	31/05/2022	4/07/2022	5/08/2022	15/08/2022	29/08/2022	9/09/2022	16/09/2022	23/09/2022	6/10/2022
Major Cations (mg/L)	Calcium	mg/L	0.5	3.8	0.9	2	4	1	4	1	5	3	2	3	2
	Magnesium	mg/L	0.5	2.6	0.6	0.9	2	0.9	2	1	2	2	1	2	1
	Sodium	mg/L	0.5	7	6	5.7	12	9.1	13	11	9.9	11	6	8.6	6.6
	Potassium	mg/L	0.5	9.9	11	6.4	9.1	7.4	9.4	6.7	7.2	6.7	4	5.6	5.4
Major Anions (mg/L)	Sulphate	mg/L	5	<2	<1	1	2	2	2	1	<1	1	<1	<1	<1
	Chloride	mg/L	1	8.6	9	7	21	15	22	15	12	13	6	8	5
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	23	22	17	22	20	10	19	34	24	19	24	21
	Carbonate Alkalinity (as CaCO3)	mg/L	10	< 10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	< 20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Total Alkalinity (as CaCO3)	mg/L	20	23	22	17	22	20	10	19	34	24	19	24	21
Heavy Metals (TOTAL) (mg/L)	Aluminium	mg/L	0.05		4.6	3.1	7.7	8.9	6.9	5.6	4.2	6.8	3.7	2.7	3.3
	Arsenic	mg/L	0.001	0.004	0.002	0.002	0.003	0.003	0.003	0.003	0.001	0.003	0.002	0.001	0.001
	Cadmium	mg/L	0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	0.01	0.005	0.003	0.007	0.007	0.009	0.008	0.006	0.008	0.004	0.003	0.004
	Cobalt	mg/L	0.001		0.001	0.001	0.002	0.002	0.003	0.002	0.003	0.002	0.005	<0.001	0.001
	Copper	mg/L	0.001	0.007	0.004	0.003	0.006	0.011	0.007	0.006	0.008	0.007	0.001	0.004	0.004
	Iron	mg/L	0.05		5	3.1	6.6	7.4	7.9	6	3.9	6	3.8	2.4	3.7
	Lead	mg/L	0.001	0.004	0.002	0.002	0.004	0.004	0.004	0.003	0.002	0.003	0.002	0.001	0.002
	Manganese	mg/L	0.005		0.021	0.019	0.035	0.036	0.063	0.04	0.14	0.05	0.03	0.02	0.02
	Nickel	mg/L	0.001	<0.001	0.004	0.003	0.006	0.005	0.007	0.006	0.005	0.006	0.003	0.004	0.003
	Zinc	mg/L	0.005	0.015	0.011	0.007	0.018	0.013	0.019	0.016	0.018	0.028	0.008	0.008	0.01
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05		1.7	2.3	2.9	4.5	0.73	4	0.37	3.3	1.9	2.3	1.7
	Arsenic	mg/L	0.001	0.001	0.001	<0.001	0.002	<0.001	<0.001	0.001	0.001	0.001	<0.001	<0.001	0.001
	Cadmium	mg/L	0.0002	<0.0002	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	0.001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	<0.001	0.001	0.001	0.003	0.001	0.001	0.003	0.002	0.003	0.002	0.002	0.002
	Cobalt	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.002	<0.001	<0.001
	Copper	mg/L	0.001	0.002	0.002	0.002	0.004	0.002	0.003	0.003	0.004	0.004	<0.001	0.003	0.002
	Iron	mg/L	0.05		1.1	1.3	1.8	2.7	1.2	2.4	0.41	1.7	1.1	1.1	0.94
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005		<0.005	<0.005	0.008	<0.005	0.011	0.009	0.02	0.009	<0.005	<0.005	<0.005
	Nickel	mg/L	0.001	<0.001	0.002	0.002	0.004	0.002	0.003	0.003	0.003	0.003	0.002	0.003	0.002
	Zinc	mg/L	0.005	<0.005	0.003	0.005	0.008	0.005	0.01	0.006	0.016	0.007	0.005	0.004	0.005
Others	pH (Lab)	pH units	0.1	5.6	6.8	6.4	6.6	6.8	5.6	6.9	7	6.4	6.4	6.9	6.7
	EC (Lab)			86	80	57	120	100	140	97	110	97	60	84	62
	TDS	mg/L	10	210	200	420	420	82	390	58	66	360	36	200	43
	Total Suspended Solids	mg/L	5	43	49	34	38	22	36	9	40	19	19	19	34
	Hardness mg equivalent CaCO3/L	mg/L	1	20	4.9	7.7	19	6.9	18	8.3	21	14	8.9	13	12
Field	Turbidity (Field)	NTU		210*	183*	138*	255*	160	230	170	120	190	120	110	110
	pH (Field)	pH units		7.01	8.32	7.37	7.42	7.2	6.96	7.6	6.95	7.72	7.06	7.33	7.08
	EC (Field)			100.1	98.8	75.2	128.3	179.4	199.7	142.4	331	108.7	70.5	114.7	88.3
	Temperature	C°		21.6	19.2	16	13.4	10.2	12	6.1	11.8	17.2	11.2	22.5	13.2

Table A-7. Surface Water Monitoring – Analytical Results 2022 cont.

LOC ID	Analytes	Units	LOR	SW2	SW2	SW2	SW2	SW3	SW3	SW3	SW3	SW3	SW3
Sampling Date				14/10/2022	20/10/2022	2/11/2022	14/11/2022	11/01/2022	30/04/2022	12/05/2022	1/06/2022	4/07/2022	5/08/2022
Major Cations (mg/L)	Calcium	mg/L	0.5	3	4	4	2	0.7	<0.5	0.8	2	0.7	2
	Magnesium	mg/L	0.5	1	2	3	1	0.8	0.6	0.9	2	1	2
	Sodium	mg/L	0.5	8.1	5.4	13	4	3.8	5.6	5.9	12	10	13
	Potassium	mg/L	0.5	5.6	5.6	7	5.6	5.8	6.2	5	6.6	5	5.7
Major Anions (mg/L)	Sulphate	mg/L	5	1	<1	<1	<1	<2	<1	1	2	2	2
	Chloride	mg/L	1	8	3	8	3	4	8	8	18	14	17
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	26	28	39	16	<20	12	11	16	13	13
	Carbonate Alkalinity (as CaCO3)	mg/L	10	<5	<5	<5	<5	< 10	<5	<5	<5	<5	<5
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<5	<5	<5	<5	< 20	<5	<5	<5	<5	<5
	Total Alkalinity (as CaCO3)	mg/L	20	26	28	39	16	<20	12	11	16	13	13
Heavy Metals (TOTAL) (mg/L)	Aluminium	mg/L	0.05	4.7	5.9	1.8	1.4		4.6	4	10	8.9	9.4
	Arsenic	mg/L	0.001	0.002	0.001	0.002	<0.001	0.003	0.002	0.002	0.005	0.004	0.005
	Cadmium	mg/L	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	0.006	0.006	0.003	0.002	0.002	0.004	0.003	0.01	0.009	0.01
	Cobalt	mg/L	0.001	0.001	0.003	<0.001	<0.001		0.001	0.001	0.002	0.002	0.003
	Copper	mg/L	0.001	0.002	0.005	0.004	0.003	0.002	0.003	0.003	0.007	0.007	0.008
	Iron	mg/L	0.05	3.3	4.5	3.2	1.5		4.6	3.8	10	8.9	11
	Lead	mg/L	0.001	0.002	0.002	0.001	0.001	0.001	0.002	0.002	0.005	0.005	0.006
	Manganese	mg/L	0.005	0.02	0.19	0.03	0.01		0.024	0.024	0.043	0.043	0.049
	Nickel	mg/L	0.001	0.004	0.004	0.005	0.002	<0.001	0.006	0.004	0.008	0.007	0.008
	Zinc	mg/L	0.005	0.008	0.012	0.008	0.009	0.006	0.007	0.007	0.016	0.016	0.021
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05	0.98	0.25	0.13	0.98		2.7	3.2	6.1	6.8	2.8
	Arsenic	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001	0.002	0.001	0.002
	Cadmium	mg/L	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.002	0.004	0.002	0.003
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.002	0.002	0.003	0.002	0.001	0.001	0.002	0.003	0.002	0.003
	Iron	mg/L	0.05	0.76	0.28	0.43	0.64		1.6	1.7	3.5	4	2.5
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.001
	Manganese	mg/L	0.005	<0.005	<0.005	<0.005	<0.005		<0.005	0.005	0.011	0.008	0.009
	Nickel	mg/L	0.001	0.004	0.002	0.003	0.002	<0.001	0.002	0.003	0.005	0.003	0.003
	Zinc	mg/L	0.005	0.003	0.003	0.003	0.004	<0.005	0.002	0.005	0.001	0.005	0.006
Others	pH (Lab)	pH units	0.1	6.9	6.7	7.1	6.4	5.2	6.4	6.1	6.4	6.4	6
	EC (Lab)			74	71	110	51	43	57	49	99	88	96
	TDS	mg/L	10	190	43	65	31	28	180	230	430	52	410
	Total Suspended Solids	mg/L	5	23	110	21	30	50	38	32	32	21	49
	Hardness mg equivalent CaCO3/L	mg/L	1	12	16	23	9	4.8	0	5.9	13	5.7	11
Field	Turbidity (Field)	NTU		78	83	56	60	112*	166*	166*	292*	240	240
	pH (Field)	pH units		7.51	7.11	7.28	7.24	6.76	7.83	7.63	6.93	6.89	6.61
	EC (Field)			87	104.3	101.7	108.2	71.4	67.4	54.2	113.3	139.1	116.3
	Temperature	C0		20	18.3	19.3	18.9	21.8	20.6	15.9	10.9	11.1	13.9

Table A-7. Surface Water Monitoring – Analytical Results 2022 cont.

LOC ID	Analytes	Units	LOR	SW3	SW3	SW3	SW3	SW3	SW3	SW3	SW3	SW3	SW3
Sampling Date				15/08/2022	29/08/2022	9/09/2022	16/09/22	23/09/22	6/10/2022	14/10/2022	20/10/2022	2/11/2022	14/11/2022
Major Cations (mg/L)	Calcium	mg/L	0.5	0.8	1	2	1	2	1	1	2	2	1
	Magnesium	mg/L	0.5	1	0.9	1	1	2	1	1	1	2	1
	Sodium	mg/L	0.5	12	7.9	11	6.6	9.9	7.6	7.8	7.1	11	6.1
	Potassium	mg/L	0.5	5.3	4	5	4	4	4	4	5	5.6	5.5
Major Anions (mg/L)	Sulphate	mg/L	5	2	1	2	<1	<1	<1	1	<1	1	1
	Chloride	mg/L	1	16	9	13	7	9	7	7	7	10	5
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	14	14	15	13	22	17	17	16	22	12
	Carbonate Alkalinity (as CaCO3)	mg/L	10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Total Alkalinity (as CaCO3)	mg/L	20	14	14	15	13	22	17	17	16	22	12
Heavy Metals (TOTAL) (mg/L)	Aluminium	mg/L	0.05	7.1	5.8	8	4	8.1	5	3.2	4.1	3.7	2.7
	Arsenic	mg/L	0.001	0.004	0.003	0.004	0.003	0.003	0.002	0.002	0.002	0.003	0.002
	Cadmium	mg/L	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	0.007	0.006	0.008	0.004	0.007	0.005	0.004	0.004	0.004	0.004
	Cobalt	mg/L	0.001	0.002	0.002	0.002	0.005	0.002	0.001	0.001	0.001	0.002	0.001
	Copper	mg/L	0.001	0.006	0.005	0.006	0.001	0.004	0.005	0.001	0.004	0.004	0.003
	Iron	mg/L	0.05	7.9	6	7.3	4.2	5.3	5.4	2.9	4.3	4.8	3.2
	Lead	mg/L	0.001	0.004	0.004	0.004	0.002	0.002	0.003	0.002	0.002	0.002	0.002
	Manganese	mg/L	0.005	0.05	0.05	0.04	0.02	0.04	0.02	0.02	0.03	0.052	0.02
	Nickel	mg/L	0.001	0.006	0.005	0.006	0.004	0.006	0.006	0.004	0.004	0.006	0.005
	Zinc	mg/L	0.005	0.017	0.012	0.015	0.009	0.009	0.01	0.026	0.011	0.01	0.008
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05	5.8	2.9	5.1	3.6	1.6	1.1	0.46	1.3	1.4	3.1
	Arsenic	mg/L	0.001	0.002	0.001	0.002	0.001	0.001	0.001	<0.001	0.001	0.002	<0.001
	Cadmium	mg/L	0.0002	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	0.005	0.002	0.004	0.002	0.002	0.001	0.002	0.002	0.001	0.003
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.003	0.002	0.003	<0.001	0.002	0.002	0.002	0.002	0.002	0.002
	Iron	mg/L	0.05	3.7	1.8	2.5	1.8	1.2	0.81	0.52	1.2	1.4	1.8
	Lead	mg/L	0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005	0.01	0.01	0.01	0.007	0.006	<0.005	<0.005	0.005	<0.005	0.006
	Nickel	mg/L	0.001	0.004	0.003	0.003	0.003	0.003	0.002	0.004	0.003	0.004	0.004
	Zinc	mg/L	0.005	0.007	0.007	0.006	0.004	0.003	0.003	0.002	0.005	0.004	0.004
Others	pH (Lab)	pH units	0.1	6.7	6.7	6.2	6	6.6	6.6	6.6	6.6	6.8	6.2
	EC (Lab)			92	63	84	59	86	60	60	67	87	61
	TDS	mg/L	10	55	38	450	35	270	40	220	120	52	36
	Total Suspended Solids	mg/L	5	14	66	30	22	48	41	20	40	52	35
	Hardness mg equivalent CaCO3/L	mg/L	1	6.7	6.3	9.9	7.2	12	9	8.2	9.4	14	9.7
Field	Turbidity (Field)	NTU		210	220	240	170	150	150	120	86	98	98
	pH (Field)	pH units		7.02	7.33	6.52	6.78	7.4	7.01	7.64	7.22	7.55	7.13
	EC (Field)			105.2	97.4	186.4	75.5	91.8	64.8	77.2	79.3	101.7	69.4
	Temperature	C°		8.3	12.2	18.3	12.2	20.8	13.7	18.1	18.3	17.4	19.9

Table A-7. Surface Water Monitoring – Analytical Results 2022 cont.

LOC ID	Analytes	Units	LOR	SW4	SW4	SW4	SW4	SW4	SW4	SW4	SW4	SW4	SW4	SW4	SW4	SW4
Sampling Date				12/05/2022	3/06/2022	5/07/2022	15/08/2022	30/08/22	9/09/22	16/09/22	23/09/22	6/10/2022	14/10/2022	20/10/22	1/11/2022	14/11/2022
Major Cations (mg/L)	Calcium	mg/L	0.5	5	6.3	3	3	5	9.2	4	6.9	6.1	10	13	16	4
	Magnesium	mg/L	0.5	2	3	1	2	2	4	2	3	2	4	5	6.3	1
	Sodium	mg/L	0.5	6.1	8.6	9.1	8.7	7.1	10	5.9	6.5	6.2	7.5	7.2	9.2	3
	Potassium	mg/L	0.5	8.8	8.9	8.2	8.6	8.1	9.7	5.9	7.3	7.3	8.8	8.5	10	6.1
Major Anions (mg/L)	Sulphate	mg/L	5	1	2	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chloride	mg/L	1	9	16	15	14	8	13	7	7	6	7	7	9	2
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	29	35	29	29	31	56	27	46	36	65	68	84	20
	Carbonate Alkalinity (as CaCO3)	mg/L	10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Total Alkalinity (as CaCO3)	mg/L	20	29	35	29	29	31	56	27	46	36	65	68	84	20
Heavy Metals (TOTAL) (mg/L)	Aluminium	mg/L	0.05	2.7	6	5.6	4.6	19	0.76	4.1	2.8	2.8	0.6	0.27	0.15	1.3
	Arsenic	mg/L	0.001	0.002	0.002	0.002	0.002	0.002	<0.001	0.002	0.001	0.001	<0.001	<0.001	<0.001	<0.001
	Cadmium	mg/L	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	0.003	0.008	0.007	0.008	0.018	0.002	0.005	0.004	0.005	0.002	0.001	<0.001	0.003
	Cobalt	mg/L	0.001	0.001	0.002	0.002	0.002	0.002	<0.001	0.007	<0.001	0.001	<0.001	0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.004	0.007	0.005	0.007	0.008	0.002	0.002	0.003	0.005	<0.001	0.002	0.002	0.003
	Iron	mg/L	0.05	2.7	5.9	5.1	5.1	8.5	0.57	4.6	2.2	3.5	0.75	0.5	0.63	1.4
	Lead	mg/L	0.001	0.002	0.002	0.002	0.003	0.003	<0.001	0.002	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005	0.026	0.033	0.029	0.04	0.04	0.01	0.04	0.02	0.03	0.04	0.096	0.065	0.02
	Nickel	mg/L	0.001	0.004	0.007	0.006	0.006	0.014	0.003	0.005	0.004	0.005	0.004	0.004	0.006	0.003
	Zinc	mg/L	0.005	0.006	0.011	0.008	0.011	0.015	0.004	0.008	0.004	0.014	<0.001	0.003	0.001	0.003
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05	2.1	3.6	3.2	2.7	0.74	0.01	1.3	0.27	1.3	0.03	<0.01	<0.01	0.79
	Arsenic	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
	Cadmium	mg/L	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	0.002	0.004	0.003	0.003	0.001	<0.001	0.002	<0.001	0.002	<0.001	<0.001	<0.001	<0.001
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.003	0.004	0.003	0.003	0.002	0.001	<0.001	0.002	0.002	0.002	0.001	0.002	0.002
	Iron	mg/L	0.05	1.3	2.2	1.9	1.7	0.55	0.05	0.9	0.29	0.8	0.13	0.1	0.23	0.57
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005	<0.005	0.01	0.007	0.008	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Nickel	mg/L	0.001	0.003	0.004	0.003	0.004	0.002	0.002	0.003	0.002	0.003	0.005	0.003	0.005	0.002
	Zinc	mg/L	0.005	0.003	0.009	0.003	0.003	0.002	<0.001	0.001	<0.001	0.002	<0.001	0.001	0.002	0.001
Others	pH (Lab)	pH units	0.1	6.5	7	6.9	7.2	6.8	6.8	6.4	7	7	7.3	7.2	7.5	6.4
	EC (Lab)			87	120	120	110	43	150	81	120	88	140	160	190	58
	TDS	mg/L	10	270	470	280	65	26	160	49	180	55	160	140	110	35
	Total Suspended Solids	mg/L	5	22	20	16	15	17	<5	23	12	24	<5	6	<5	25
	Hardness mg equivalent CaCO3/L	mg/L	1	20	27	11	15	19	40	17	30	24	42	53	66	14
Field	Turbidity (Field)	NTU		105*		140	160	120	6.5	140	59	91	10	4.1	3.9	48
	pH (Field)	pH units		7.49	7.45	7.19	7.17	7.82	7.63	7.2	7.58	7.37	7.48	7.77	7.58	7.61
	EC (Field)			101	235	145	126.6	132.9	282	97.4	117.8	94.3	146.7	159.5	193.8	57.1
	Temperature	C°		17.7	11.4	11.7	11.2	14.3	15	13.2	19.9	14.3	19.5	19.9	17.8	19

Table A-7. Surface Water Monitoring – Analytical Results 2022 cont.

LOC ID	Analytes	Units	LOR	SW5	SW5	SW5	SW5	SW5	SW5	SW5	SW5	SW5	SW5	SW5	SW5
Sampling Date				12/05/2022	1/06/2022	4/07/2022	30/08/2022	9/09/2022	16/09/22	23/09/22	6/10/2022	14/10/2022	20/10/2022	1/11/2022	14/11/2022
Major Cations (mg/L)	Calcium	mg/L	0.5	2	4	1	2	4	3	4	5	5.8	9	9.8	3
	Magnesium	mg/L	0.5	2	4	1	2	3	2	3	3	3	5	5.4	2
	Sodium	mg/L	0.5	6	5.4	5.3	7.4	6.3	6	5	5.9	5.4	5.6	6.5	3
	Potassium	mg/L	0.5	7	7.6	7.8	7.1	11	6.1	10	9	10	11	11	10
Major Anions (mg/L)	Sulphate	mg/L	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chloride	mg/L	1	5	4	6	5	7	5	5	4	4	5	5	3
	Bicarbonate Alkalinity (as CaCO ₃)	mg/L	20	25	43	30	21	35	29	39	40	48	58	63	28
	Carbonate Alkalinity (as CaCO ₃)	mg/L	10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Hydroxide Alkalinity (as CaCO ₃)	mg/L	20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Total Alkalinity (as CaCO ₃)	mg/L	20	25	43	30	21	35	29	39	40	48	58	63	28
Heavy Metals (TOTAL) (mg/L)	Aluminium	mg/L	0.05	1.7	0.36	1.4	4.5	2.3	2.9	1.1	0.9	0.92	0.38	0.65	0.85
	Arsenic	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Cadmium	mg/L	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	0.002	<0.001	0.003	0.005	0.004	0.005	0.002	0.002	0.002	0.001	0.001	0.002
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.005	0.002	0.006	0.006	0.006	0.001	0.003	0.005	0.004	0.003	0.002	0.003
	Iron	mg/L	0.05	1.8	1	4	3.9	2.2	3.2	1.2	1.8	0.9	0.74	0.84	1.3
	Lead	mg/L	0.001	<0.001	<0.001	0.001	0.001	0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005	0.037	0.013	0.032	0.04	0.03	0.051	0.02	0.03	0.02	0.05	0.04	0.03
	Nickel	mg/L	0.001	0.003	0.002	0.003	0.004	0.003	0.004	0.002	0.004	0.005	0.003	0.003	0.002
	Zinc	mg/L	0.005	0.006	<0.001	0.004	0.008	0.009	0.008	0.003	0.005	0.026	0.01	0.004	0.003
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05	1	0.03	1.1	0.9	0.49	0.62	0.3	0.26	0.06	0.02	0.02	0.26
	Arsenic	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Cadmium	mg/L	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	0.001	<0.001	<0.001	0.001	0.001	0.003	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.004	0.001	0.003	0.003	0.004	<0.001	0.002	0.002	0.003	0.002	0.002	0.002
	Iron	mg/L	0.05	0.77	0.27	1.8	0.78	0.53	0.58	0.38	0.37	0.18	0.21	0.21	0.37
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Nickel	mg/L	0.001	0.003	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.001
	Zinc	mg/L	0.005	0.003	<0.001	0.002	0.002	<0.001	0.004	0.001	0.001	<0.001	0.002	0.001	0.001
Others	pH (Lab)	pH units	0.1	6.4	7.1	6.9	6.9	6.6	6.4	6.9	7.1	7.3	7.3	7.5	6.6
	EC (Lab)			65	95	85	35	96	76	96	91	100	140	140	80
	TDS	mg/L	10	170	57	51	21	210	45	130	74	130	48	86	48
	Total Suspended Solids	mg/L	5	16	8	10	16	10	38	13	16	10	8	6	26
	Hardness mg equivalent CaCO ₃ /L	mg/L	1	11	25	7.4	12	23	14	22	25	27	42	47	17
Field	Turbidity (Field)	NTU		63*	12.12*	45	69	62	130	36	31	22	4.9	6	29
	pH (Field)	pH units		7.21	7.47	7.15	7.67	7.83	7.19	7.48	7.34	7.83	7.72	7.59	7.51
	EC (Field)			77.6	107.4	92.4	89.5	585	83.7	112.4	96.1	394	138	146.3	76.4
	Temperature	C°		17.7	11.4	10.9	14.9	12.4	14.3	18.8	15	17.4	20.5	16.9	19.6

Table A-7. Surface Water Monitoring – Analytical Results 2022 cont.

LOC ID	Analytes	Units	LOR	SW6	SW6	SW6	SW6	SW6	SW6	SW6	SW6	SW6	SW6	SW6	SW6
Sampling Date				12/05/2022	1/06/2022	4/07/2022	19/08/2022	29/08/22	9/09/2022	16/09/22	23/09/22	6/10/2022	14/10/2022	20/10/2022	1/11/2022
Major Cations (mg/L)	Calcium	mg/L	0.5	3	6.8	1	2	2	5.9	4	5	5	7.5	5	10
	Magnesium	mg/L	0.5	2	3	1	2	1	3	2	2	3	3	2	5
	Sodium	mg/L	0.5	5	5	3	5.8	3	5.2	5	4	3	5	2	4
	Potassium	mg/L	0.5	13	9.5	10	12	6.8	13	9.5	12	13	12	9.7	13
Major Anions (mg/L)	Sulphate	mg/L	5	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	Chloride	mg/L	1	8	7	5	10	2	6	6	4	4	4	3	4
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	28	38	28	39	20	45	36	42	40	49	33	64
	Carbonate Alkalinity (as CaCO3)	mg/L	10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Total Alkalinity (as CaCO3)	mg/L	20	28	38	28	39	20	45	36	42	40	49	33	64
Heavy Metals (TOTAL) (mg/L)	Aluminium	mg/L	0.05	2.1	0.89	1.4	1.5	0.73	0.35	1.3	1.5	1.2	0.52	2.8	1.5
	Arsenic	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Cadmium	mg/L	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	0.002	0.003	0.002	0.003	0.002	<0.001	0.004	0.002	0.003	0.001	0.014	0.004
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.005	0.005
	Copper	mg/L	0.001	0.006	0.005	0.005	0.005	0.003	0.002	<0.001	0.003	0.006	<0.001	0.007	0.005
	Iron	mg/L	0.05	2.2	1.1	1.5	2	0.66	0.29	1.6	1	1.6	0.56	5.6	2.4
	Lead	mg/L	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
	Manganese	mg/L	0.005	0.034	0.016	0.031	0.02	0.02	0.01	0.03	0.009	0.03	0.01	0.2	0.36
	Nickel	mg/L	0.001	0.003	0.004	0.003	0.003	0.003	0.002	0.002	0.002	0.004	0.002	0.008	0.006
	Zinc	mg/L	0.005	0.008	0.006	0.006	0.006	0.005	0.004	0.005	0.006	0.008	0.007	0.011	0.007
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05	1.2	0.14	0.62	0.39	0.12	0.01	0.25	0.2	0.21	0.04	0.04	0.01
	Arsenic	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Cadmium	mg/L	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.005	0.004	0.003	0.003	0.002	0.002	<0.001	0.002	0.003	0.002	0.003	0.002
	Iron	mg/L	0.05	0.75	0.24	0.51	0.51	0.1	0.05	0.25	0.25	0.25	0.16	0.12	0.14
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Nickel	mg/L	0.001	0.003	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.003	0.002	0.003
	Zinc	mg/L	0.005	0.003	<0.001	0.003	0.002	0.003	<0.001	0.002	0.003	0.002	<0.001	0.002	0.001
Others	pH (Lab)	pH units	0.1	6.5	6.9	6.9	7.3	7.1	6.7	6.6	6.9	7	7.2	6.8	7.3
	EC (Lab)			88	100	83	120	47	110	92	100	88	110	80	140
	TDS	mg/L	10	220	110	50	180	28	110	55	110	70	130	48	83
	Total Suspended Solids	mg/L	5	25	7	12	7	16	<5	12	8	18	<5	140	33
	Hardness mg equivalent CaCO3/L	mg/L	1	15	28	7.4	13	8.7	27	18	23	23	33	20	46
Field	Turbidity (Field)	NTU		105*	40.4*	53	35	17	4.8	40	24	35	6.2	48	49
	pH (Field)	pH units		7.27	7.29	7.19	7.49	7.36	7.52	7.38	7.36	7.31	7.72	7.5	7.42
	EC (Field)			104.1	118.6	94.1	279	57.3	95.6	99.2	108.2	91.6	141.7	84	167.8
	Temperature	C°		19.2	9.6	10.6	15.3	12.4	14.8	14.6	20.1	14	17.7	20.8	15

Table A-7. Surface Water Monitoring – Analytical Results 2022 cont.

LOC ID	Analytes	Units	LOR	SW6	SW7	SW7	SW7	SW7	SW7	SW7	SW7	SW7	SW7	SW7	SW7
Sampling Date				14/11/2022	12/05/2022	1/06/2022	4/07/2022	5/08/2022	15/08/22	29/08/22	9/09/2022	16/09/2022	23/09/2022	6/10/2022	14/10/2022
Major Cations (mg/L)	Calcium	mg/L	0.5	3	3	7.1	4	47	3	6.8	11	3	4	5.7	6.7
	Magnesium	mg/L	0.5	1	2	3	2	22	1	3	5	1	2	2	2
	Sodium	mg/L	0.5	3	2	5	5	17	6	5.2	6.6	5	5.2	5.4	5
	Potassium	mg/L	0.5	11	13	15	12	8.9	12	7.9	11	7.7	7.7	9.6	10
Major Anions (mg/L)	Sulphate	mg/L	5	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1
	Chloride	mg/L	1	3	3	9	8	12	11	4	7	7	6	5	5
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	27	33	48	53	260	33	45	62	23	28	34	43
	Carbonate Alkalinity (as CaCO3)	mg/L	10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Total Alkalinity (as CaCO3)	mg/L	20	27	33	48	53	260	33	45	62	23	28	34	43
Heavy Metals (TOTAL) (mg/L)	Aluminium	mg/L	0.05	0.84	2.7	1.1	0.74	9.4	2.7	2.1	1.2	3.5	1.6	1.2	0.93
	Arsenic	mg/L	0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.002	0.001	0.001	0.002	0.001	0.001	<0.001
	Cadmium	mg/L	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	0.002	0.007	0.002	0.001	<0.001	0.004	0.005	0.002	0.004	0.002	0.002	0.002
	Cobalt	mg/L	0.001	<0.001	0.001	<0.001	<0.001	0.005	<0.001	0.003	0.002	0.004	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.004	0.009	0.003	0.003	0.001	0.005	0.006	0.003	<0.001	0.003	0.004	<0.001
	Iron	mg/L	0.05	0.92	2.6	1.5	1.3	0.55	3.5	2.4	1.8	3.8	1.8	2.6	1.5
	Lead	mg/L	0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.002	0.002	<0.001	0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005	0.01	0.063	0.023	0.11	1.4	0.04	0.17	0.17	0.03	0.02	0.03	0.02
	Nickel	mg/L	0.001	0.002	0.007	0.003	0.002	0.004	0.004	0.005	0.003	0.004	0.003	0.005	0.003
	Zinc	mg/L	0.005	0.003	0.008	0.006	0.003	0.002	0.009	0.01	0.006	0.007	0.005	0.003	0.002
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05	0.35	1.8	0.11	0.03	0.03	1.1	0.05	0.02	1.1	0.66	0.56	0.14
	Arsenic	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
	Cadmium	mg/L	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	<0.001	0.003	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.003	0.001	0.001	<0.001
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	0.004	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.003	0.006	0.002	0.001	<0.001	0.002	0.002	0.002	<0.001	0.002	0.003	0.002
	Iron	mg/L	0.05	0.33	0.97	0.29	0.26	0.08	1.3	0.16	0.2	1.1	0.61	0.77	0.47
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005	<0.005	0.005	<0.005	<0.005	1.3	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Nickel	mg/L	0.001	0.001	0.005	0.002	0.002	0.004	0.003	0.002	0.002	0.002	0.002	0.002	0.004
	Zinc	mg/L	0.005	0.002	0.003	<0.001	0.001	0.004	0.004	0.002	<0.001	0.006	0.002	0.003	<0.001
Others	pH (Lab)	pH units	0.1	6.6	6.5	6.9	7	7.1	7.2	7.2	6.7	6.3	6.6	6.8	7.1
	EC (Lab)			73	74	130	140	480	110	110	150	76	84	89	98
	TDS	mg/L	10	44	180	130	82	300	65	64	180	45	150	83	150
	Total Suspended Solids	mg/L	5	20	34	7	10	<5	11	100	12	24	16	21	7
	Hardness mg equivalent CaCO3/L	mg/L	1	14	16	30	19	210	13	31	46	14	18	23	27
Field	Turbidity (Field)	NTU		20	154*	34.8*	20	2.8	59	190	31	96	54	33	26
	pH (Field)	pH units		7.34	7.33	7.6	7.11	7.27	7.15	7.44	7.84	6.94	7.08	7.31	7.58
	EC (Field)			71.9	77.7	162.6	143.7	502.8	127	114.9	208	105.7	90.1	92.6	113.4
	Temperature	C°		20	16.3	10.9	10.6	14	10.3	12.2	12.2	11.4	20.3	14	19.1

Table A-7. Surface Water Monitoring – Analytical Results 2022 cont.

LOC ID	Analytes	Units	LOR	SW7	SW7	SW7	Lachlan River	Lachlan River
Sampling Date				20/10/2022	1/11/2022	14/11/2022	28/04/2022	16/01/2023
Major Cations (mg/L)	Calcium	mg/L	0.5	5.4	18	3	14	52
	Magnesium	mg/L	0.5	2	7.6	1	10	31
	Sodium	mg/L	0.5	2	9.9	3	22	69
	Potassium	mg/L	0.5	10	11	7.7	3	4
Major Anions (mg/L)	Sulphate	mg/L	5	<1	<1	<1	14	45
	Chloride	mg/L	1	3	8	2		130
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	32	95	20		220
	Carbonate Alkalinity (as CaCO3)	mg/L	10	<5	<5	<5		<5
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<5	<5	<5	<5	<5
	Total Alkalinity (as CaCO3)	mg/L	20	32	95	20	74	220
Heavy Metals (TOTAL) (mg/L)	Aluminium	mg/L	0.05	1.2	0.43	0.71		
	Arsenic	mg/L	0.001	<0.001	0.001	<0.001		
	Cadmium	mg/L	0.0002	<0.0001	<0.0001	0.0018		
	Chromium	mg/L	0.001	0.004	<0.001	0.001		
	Cobalt	mg/L	0.001	0.002	0.003	<0.001		
	Copper	mg/L	0.001	0.004	0.001	0.002		
	Iron	mg/L	0.05	2	2.2	0.9		
	Lead	mg/L	0.001	<0.001	<0.001	0.001		
	Manganese	mg/L	0.005	0.33	0.61	0.01		
	Nickel	mg/L	0.001	0.004	0.005	0.001		
	Zinc	mg/L	0.005	0.008	0.003	0.003		
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05	0.11	0.02	0.43	1.3	0.02
	Arsenic	mg/L	0.001	<0.001	<0.001	<0.001	0.002	0.002
	Cadmium	mg/L	0.0002	<0.0001	<0.0001	<0.0001	<0.1	<0.0001
	Chromium	mg/L	0.001	<0.001	<0.001	<0.001	0.001	<0.001
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	0.001	<0.001
	Copper	mg/L	0.001	0.002	0.001	0.002	0.004	0.001
	Iron	mg/L	0.05	0.29	0.72	0.46	1.6	0.04
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	0.001	<0.001
	Manganese	mg/L	0.005	<0.005	0.006	<0.005	0.12	0.084
	Nickel	mg/L	0.001	0.002	0.004	0.001	0.002	0.001
	Zinc	mg/L	0.005	0.002	0.002	0.002	0.003	0.002
Others	pH (Lab)	pH units	0.1	6.8	7.5	6.4	7.5	7.7
	EC (Lab)			80	210	55	218	938
	TDS	mg/L	10	110	220	33	230	600
	Total Suspended Solids	mg/L	5	30	8	25		
	Hardness mg equivalent CaCO3/L	mg/L	1	21	76	11	79	260
Field	Turbidity (Field)	NTU		24	7.6	20		
	pH (Field)	pH units		7.25	7.47	7.09	7.32	7.87
	EC (Field)			83.8	405	63.2	290	910
	Temperature	°C		19	14.2	20.3	16	27.2

APPENDIX 5: GROUNDWATER MONITORING RESULTS

5A - Groundwater Bores – Standing Water Level

5B - Groundwater Monitoring - Water Chemistry

5A - Groundwater Bores – Standing Water Level

Table A-8 Minesite Groundwater monitoring – Standing Water Levels

Monitoring Bore ID	Standing Water Level (m AHD)							
	July 2019	Nov 2019	Mar2020	Sept 2020	April 2021	Oct 2021	April 2022	Dec2022
GAM01	272.63	272.34	272.04	271.87	271.95	272.43	275.18	286.93
GAM02	269.96	269.98	269.88	269.82	269.75	269.79	270.07	270.96
GAM03	248.63	248.67	248.64	248.65	248.68	248.75	248.76	248.88
GAM04	263.14	263.07	262.67	262.46	262.7	263.69	264.76	267.68
GAM05	252.67	252.76	252.65	252.59	252.58	252.65	252.65	252.89
GAM06	250.45	250.63	250.49	250.55	250.55	250.64	250.68	250.67
GAM07	243.69	243.93	243.87	244.00	244.15	244.34	244.33	244.5
GAM08	249.47	249.64	249.53	249.67	249.69	249.76	249.81	249.79
GAM09	239.92	240.03	240.02	240.13	240.18	240.32	240.43	240.5
GAM10	250.84	250.90	250.84	250.90	250.95	251.03	251.12	251.76
GAM11	243.70	243.75	243.69	243.74	243.8	243.93	244.11	246.04
GAM12	252.00	251.98	251.89	251.86	251.85	251.87	251.79	252.55
GAM14A	245.37	245.45	245.44	245.44	245.47	245.52	245.47	245.69
GAM14B	234.58	234.81	235.01	248.39	248.21	248.14	248.09	251.51
GAM14C	248.79	248.65	248.42	248.26	248.11	248.09	248.04	251.57
GAM15	240.64	240.71	240.71	239.28	240.85	240.91	240.97	241.02
GAM16	218.24	218.45	218.29	218.46	218.6	218.77	218.78	218.95
GAM100	257.37	257.40	257.39	257.45	257.49	257.55	257.57	257.56
GAM101	257.27	257.48	257.32	257.39	257.4	257.5	257.52	257.49

Table A-9 Borefields Groundwater monitoring – Standing Water Levels

Monitoring Bore ID	Standing Water Level (m AHD)							
	July 2019	Nov 2019	Mar2020	Sept 2020	April 2021	Oct 2021	April 2022	Jan 2023
Borefields Monitoring Bores - West								
ISMW01	193.58	189.86	185.35	197.02	196.94	199.56	199.76	203.27
MWW1	198.39	198.22	188.78	199.18	199.23	201.81	202.48	205.68
Borefields Monitoring Bores - East								
ISMW02	196.01	189.79	189.86	199.40	199.39	201.12	202.08	205.35
MWE1	197.39	188.99	200.31	200.57	200.22	202.65	202.99	206.11

Chart C1
Depth to Water (m AHD) vs Time - Mine Site Monitoring Bores

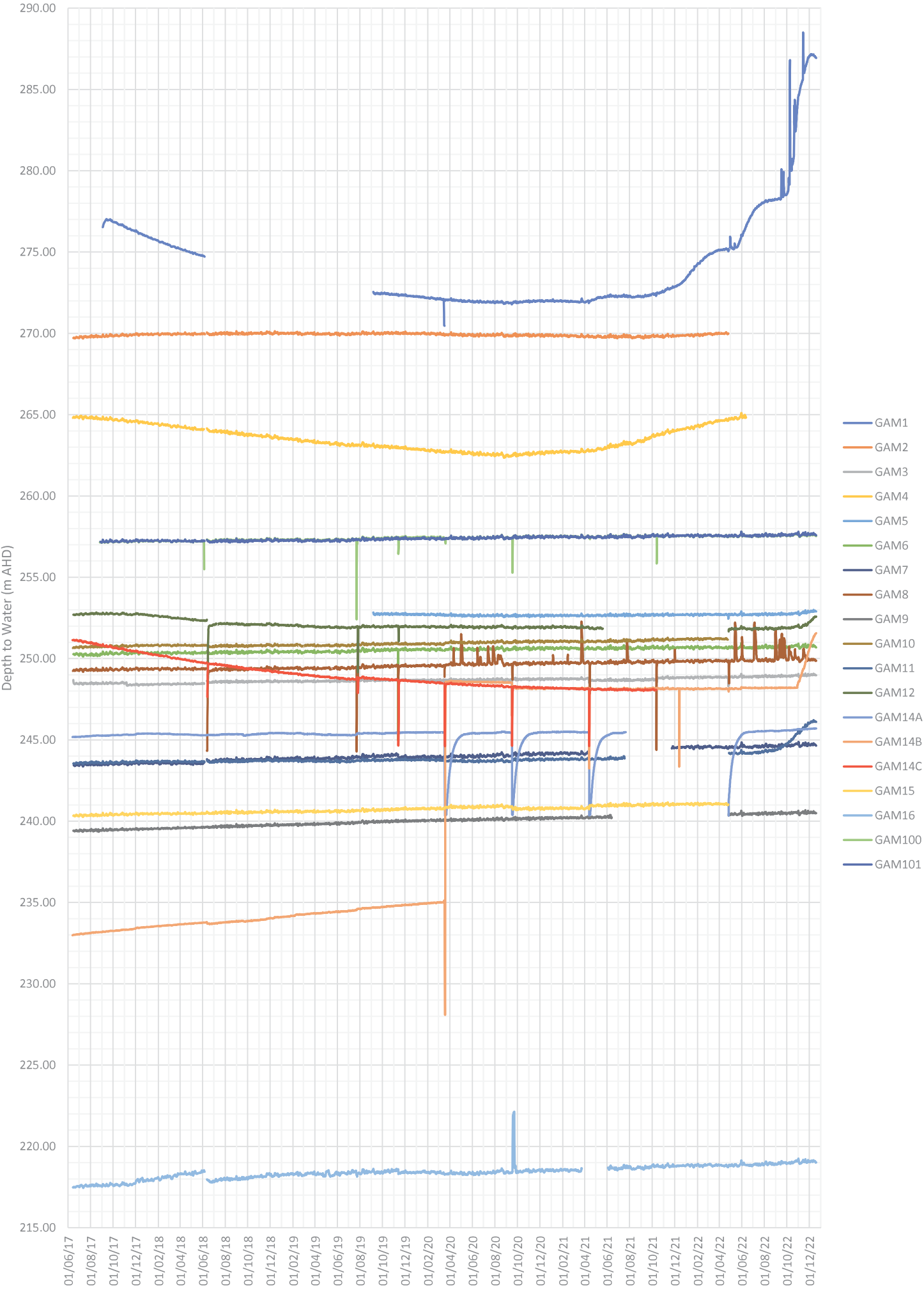


Chart D2
Depth to Water (m AHD) vs Time - East Borefield Monitoring Bores

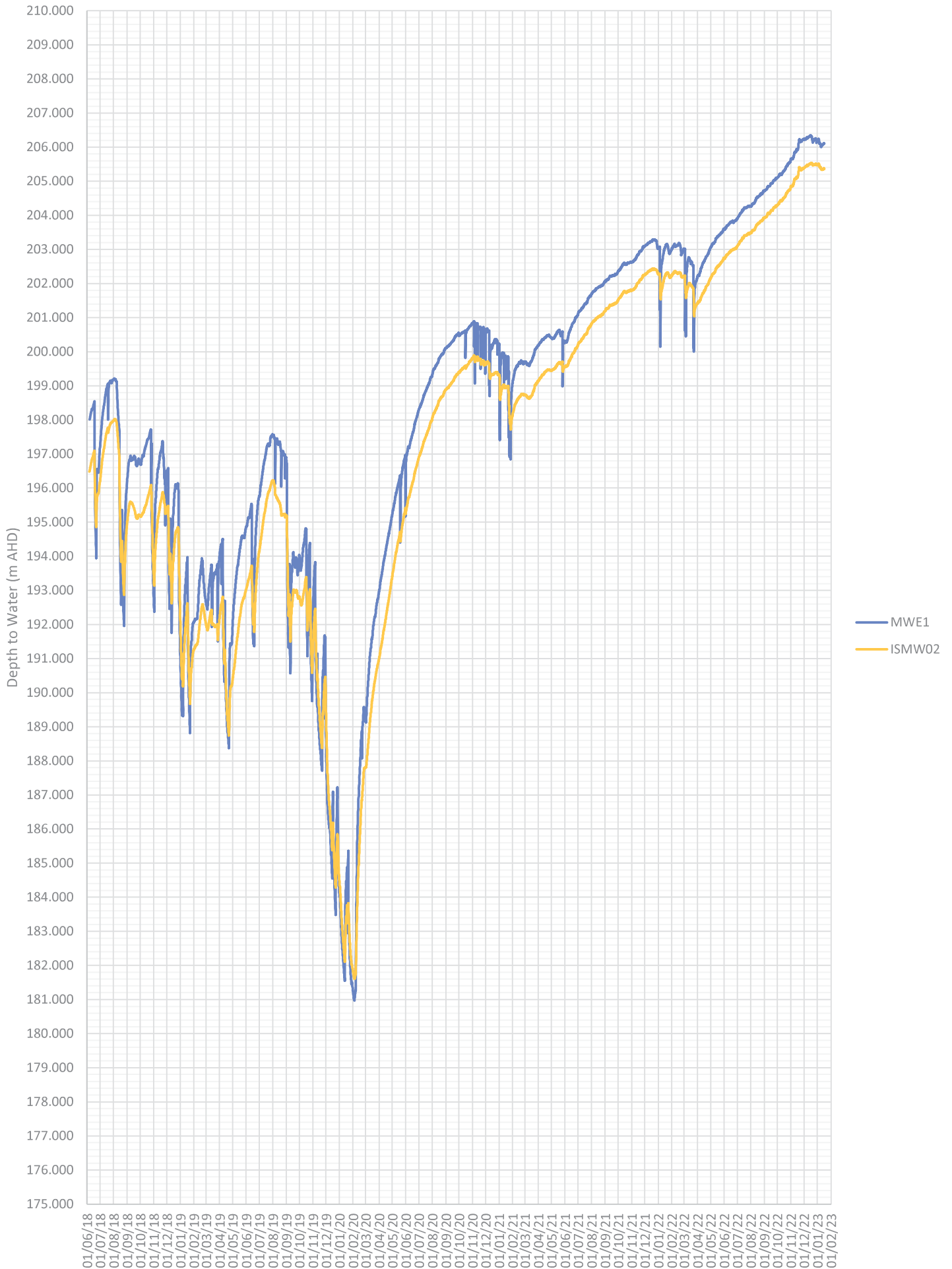


Chart D3
Depth to Water (m AHD) vs Time - West Borefield Monitoring Bores



5B - GROUNDWATER MONITORING – WATER CHEMISTRY

Table A-10 Groundwater Water Monitoring – Minesite Bores - Analytical Results 2022

Bore ID	Analytes	Units	LOR	GAM01	GAM01	GAM02	GAM02	GAM03	GAM03	GAM04	GAM04	GAM05	GAM05	GAM06	GAM06	GAM07	GAM07
Sampling Date				25/04/2022	19/12/2022	26/04/2022	19/12/2022	25/04/2022	19/12/2022	26/04/2022	19/12/2022	25/04/2022	19/12/2022	26/04/2022	19/12/2022	25/04/2022	19/12/2022
Major Cations (mg/L)	Calcium	mg/L	0.5	11	48	51	44	25	23	68	58	51	46	290	270	2	2
	Magnesium	mg/L	0.5	<0.5	6.7	52	50	190	190	82	75	98	92	420	420	54	57
	Sodium	mg/L	0.5	58	61	32	34	35	46	85	74	25	34	470	530	180	180
	Potassium	mg/L	0.5	2	3	2	2	2	2	3	3	1	1	12	12	5	5
Major Anions (mg/L)	Sulphate	mg/L	5	44	19	9	11	8	10	26	28	11	13	480	540	13	17
	Chloride	mg/L	1	32	14	43	47	42	44	130	120	70	76	1800	1900	210	240
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	61	240	420	480	1000	1000	530	560	530	590	730	750	290	330
	Carbonate Alkalinity (as CaCO3)	mg/L	10	9	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	39	47
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<6	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<6	<5
	Total Alkalinity (as CaCO3)	mg/L	20	70	240	420	480	1000	1000	530	560	530	590	730	750	330	380
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05	0.05	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Arsenic	mg/L	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Boron	mg/L	0.05	0.06	0.06	0.07	0.08	0.1	0.1	0.1	0.1	0.07	0.07	0.2	0.2	0.04	0.04
	Cadmium	mg/L	0.0002	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	<0.001	<0.001	0.019	0.019	0.02	0.021	0.012	0.012	0.068	0.075	0.006	0.007	<0.001	<0.001
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	<0.001	0.005	<0.001	<0.001	0.003	0.001	0.003	0.004	0.002	<0.001	0.009	0.006	<0.001	<0.001
	Iron	mg/L	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
	Manganese	mg/L	0.005	<0.005	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Mercury	mg/L	0.0001	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		0.00027		<0.0001	
	Nickel	mg/L	0.001	<0.001	0.003	0.001	<0.001	0.013	0.014	0.004	0.002	0.009	0.009	0.017	0.016	<0.001	0.002
	Silver	mg/L	0.005	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	
	Vanadium	mg/L	0.005	0.006	0.006	0.027	0.031	0.001	0.002	0.022	0.024	0.006	0.008	0.013	0.016	<0.001	<0.001
	Zinc	mg/L	0.005	0.009	0.005	0.005	<0.001	0.01	0.003	0.015	<0.001	0.01	<0.001	0.022	0.059	<0.001	<0.001
Nutrients (mg/L)	Nitrate (as N)	mg/L	0.02	1.3	9.1	0.47	0.43	0.6	0.61	4.3	3.9	1.8	1.7	0.19	0.16	0.056	0.067
	Nitrite (as N)	mg/L	0.02	0.008	0.19	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Ammonia (as N)	mg/L	0.01	<0.005	0.026	<0.005	<0.005	<0.005	0.007	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Total Kjeldahl Nitrogen (as N)*	mg/L	0.2	<0.1	1.8	<0.1	<0.1	<0.1	<0.1	0.9	0.3	0.2	<0.1	<0.1	<0.1	<0.1	0.1
	Total Nitrogen (as N)	mg/L	0.2	1.4		0.5		0.6		5.2		1.9		0.2		0	
	Phosphate total (as P)	mg/L	0.01	<0.05	0.07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Others	TDS	mg/L	10	200	380	500	520	980	1000	810	770	680	670	5200	5400	680	670
	Electrical Conductivity (Lab)	uS/cm	10	350	570	810	880	1400	1700	940	1300	750	1200	6700	6900	1400	1300
Field	Temperature	°C		20.2	20	20.5	20.7	21.2	22.2	19.8	20.3	21	22.5	20.9	22.1	21	20.9
	pH	pH units		8.52	7.49	7.2	7.28	7.1	7.22	6.79	6.95	7.03	7.11	6.5	6.72	8.7	8.83
	Electrical Conductivity	uS/cm		287	507	753	809	1467	1583	1147	1192	996	1091	5950	6499	1123	1252
	Dissolved Oxygen	Mg/L		0.3	0.14	4.8	4.94	2.68	2.91	4.63	4.78	4.3	5.16	2.88	2.09	0.55	0.63

Table A-10 Groundwater Water Monitoring – Minesite Bores - Analytical Results 2022 (cont.)

Bore ID	Analytes	Units	LOR	GAM08	GAM08	GAM09	GAM09	GAM10	GAM10	GAM11	GAM11	GAM12	GAM12	GAM14A	GAM14A	GAM14B	GAM14B
Sampling Date				26/04/2022	19/12/2022	25/04/2022	19/12/2022	26/04/2022	20/12/2022	26/04/2022	20/12/2022	25/04/2022	20/12/2022	26/04/2022	20/12/2022	26/04/2022	19/12/2022
Major Cations (mg/L)	Calcium	mg/L	0.5	88	8.5	1	1	180	180	280	330	54	56	58	57	63	60
	Magnesium	mg/L	0.5	190	13	120	110	330	350	490	510	7.8	6.7	30	29	86	88
	Sodium	mg/L	0.5	1600	290	79	68	630	850	2300	2000	230	230	230	220	180	180
	Potassium	mg/L	0.5	21	4	3	3	16	16	25	25	6	6.1	4	4	6.1	6
Major Anions (mg/L)	Sulphate	mg/L	5	1500	170	30	34	510	620	1600	1700	300	350	120	140	66	73
	Chloride	mg/L	1	1500	170	80	86	1700	2000	4300	4500	180	200	330	360	310	350
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	800	340	600	670	850	880	790	830	100	89	190	210	440	490
	Carbonate Alkalinity (as CaCO3)	mg/L	10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Total Alkalinity (as CaCO3)	mg/L	20	800	340	600	670	850	880	790	830	100	89	190	210	440	490
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05	<0.01	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Arsenic	mg/L	0.001	0.002	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.006	0.004	0.002	0.002	0.001	0.001
	Boron	mg/L	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.27	0.25	0.42	0.46	0.2	0.21
	Cadmium	mg/L	0.0002	0.0009	0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0004	0.0004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	<0.001	<0.001	0.06	0.056	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Cobalt	mg/L	0.001	0.003	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.59	0.056	<0.001	<0.001	0.001	<0.001	0.015	0.008	0.002	0.004	<0.001	<0.001	0.009	0.009
	Iron	mg/L	0.05	<0.01	0.05	<0.01	<0.01	0.03	0.09	<0.01	<0.01	0.15	0.05	0.07	<0.01	<0.01	<0.01
	Lead	mg/L	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005	0.12	0.05	<0.005	0.01	0.006	0.053	0.005	<0.005	0.091	0.059	0.17	0.17	0.88	0.99
	Mercury	mg/L	0.0001	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
	Nickel	mg/L	0.001	0.026	0.015	0.003	0.008	0.017	0.019	0.013	0.008	0.002	0.004	0.001	0.005	0.005	0.004
	Silver	mg/L	0.005	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	
	Vanadium	mg/L	0.005	0.015	0.019	<0.001	<0.001	<0.001	0.002	<0.001	0.001	0.002	0.005	<0.001	<0.001	0.017	0.021
	Zinc	mg/L	0.005	0.021	0.033	0.004	0.005	0.024	0.033	0.053	0.059	0.003	0.006	0.002	0.012	0.007	<0.001
Nutrients (mg/L)	Nitrate (as N)	mg/L	0.02	6.5	0.63	0.089	0.082	0.23	0.09	2.6	2.4	0.12	0.17	<0.005	<0.005	7.1	7.6
	Nitrite (as N)	mg/L	0.02	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.33	0.054
	Ammonia (as N)	mg/L	0.01	0.012	0.01	<0.005	0.017	<0.005	0.021	<0.005	0.006	0.2	0.17	0.1	0.099	<0.005	<0.005
	Total Kjeldahl Nitrogen (as N)*	mg/L	0.2	1.8	0.7	<0.1	<0.1	<0.1	<0.1	0.5	0.2	0.3	0.2	0.2	0.1	1.5	1
	Total Nitrogen (as N)	mg/L	0.2	8.2		0		0.1		3.1		0.4		0.2		9	
	Phosphate total (as P)	mg/L	0.01	<0.05	0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.2	0.05	0.06	<0.05
Others	TDS	mg/L	10	5300	1100	680	680	4600	4700	9800	10000	980	920	930	980	1200	1200
	Electrical Conductivity (Lab)	uS/cm	10	7600	1400	1200	1300	6800	7500	14000	15000	1400	1400	1600	1700	1800	2000
Field	Temperature	°C		21.2	21.8	21.1	20.7	20.9	21.1	20.6	21.2	20.7	20.9	19.9	19.9	19.7	20.6
	pH	pH units		6.75	7.48	7.56	7.59	6.54	6.66	6.43	6.61	7.65	7.79	7.48	7.57	7.43	7.55
	Electrical Conductivity	uS/cm		7325	1447	1096	1148	6028	6790	12856	13780	1232	1297	1397	1467	1594	1767
	Dissolved Oxygen	Mg/L		2.05	7.46	2.19	3.46	3.76	3.4	3.54	2.6	0.16	1.58	0.43	0.72	0.57	0.23

Table A-10 Groundwater Water Monitoring – Minesite Bores - Analytical Results 2022 (cont.)

Bore ID	Analytes	Units	LOR	GAM14C	GAM14C	GAM15	GAM15	GAM16	GAM16	GAM100	GAM100	GAM101	GAM101	Berillée	Victoria Park
Date				25/04/2022	19/12/2022	26/04/2022	20/12/2022	26/04/2022	20/12/2022	26/04/2022	20/12/2022	26/04/2022	19/12/2022	25/04/2022	25/04/2022
Major Cations (mg/L)	Calcium	mg/L	0.5	46	49	100	97	120	190	12	11	40	36	100	37
	Magnesium	mg/L	0.5	120	130	160	160	450	460	73	69	100	100	190	45
	Sodium	mg/L	0.5	160	160	480	540	510	500	1600	1300	1700	1400	230	110
	Potassium	mg/L	0.5	5	5.1	8.4	8.2	18	17	31	27	21	20	8.3	4
Major Anions (mg/L)	Sulphate	mg/L	5	32	45	560	620	180	220	460	510	610	680	85	26
	Chloride	mg/L	1	250	350	490	530	2000	2200	1300	1400	1500	1700	650	80
	Bicarbonate Alkalinity (as CaCO ₃)	mg/L	20	620	690	900	950	590	650	1700	1600	1400	1700	470	400
	Carbonate Alkalinity (as CaCO ₃)	mg/L	10	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Hydroxide Alkalinity (as CaCO ₃)	mg/L	20	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Total Alkalinity (as CaCO ₃)	mg/L	20	620	690	900	950	590	650	1700	1600	1400	1700	470	400
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Arsenic	mg/L	0.001	0.002	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.002	<0.001	0.001
	Boron	mg/L	0.05	0.2	0.21	0.1	0.2	0.2	0.21	0.1	0.1	0.1	0.1	0.2	0.1
	Cadmium	mg/L	0.0002	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Chromium	mg/L	0.001	0.002	0.003	<0.001	<0.001	0.002	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	0.002
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.006	0.006	<0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.005	0.01	<0.001	<0.001	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002
	Iron	mg/L	0.05	0.01	<0.01	0.29	0.13	<0.01	<0.01	0.19	0.2	0.03	0.02	<0.01	<0.01
	Lead	mg/L	0.001	<0.001	0.007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005	<0.005	<0.005	0.11	0.12	<0.005	0.008	0.45	0.46	0.19	0.18	<0.005	<0.005
	Mercury	mg/L	0.0001	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	<0.0001
	Nickel	mg/L	0.001	0.015	0.005	0.005	0.006	0.012	0.015	0.012	0.012	0.006	0.01	<0.001	<0.001
	Silver	mg/L	0.005	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	<0.001
	Vanadium	mg/L	0.005	0.016	0.024	<0.001	<0.001	0.004	0.005	<0.001	0.001	0.008	0.013	0.036	0.034
	Zinc	mg/L	0.005	0.009	0.035	0.018	0.008	0.021	0.015	0.012	0.036	0.005	<0.001	0.005	0.003
Nutrients (mg/L)	Nitrate (as N)	mg/L	0.02	4.2	7.8	<0.005	<0.005	0.29	0.23	<0.005	0.008	0.005	0.009	0.74	1.7
	Nitrite (as N)	mg/L	0.02	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Ammonia (as N)	mg/L	0.01	<0.005	0.006	<0.005	0.025	<0.005	0.013	<0.005	0.042	<0.005	0.011	<0.005	<0.005
	Total Kjeldahl Nitrogen (as N)*	mg/L	0.2	0.9	1.7	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.2
	Total Nitrogen (as N)	mg/L	0.2	5.1		0		0.3		0.1		0		0.8	1.9
	Phosphate total (as P)	mg/L	0.01	<0.05	<0.05	<0.05	<0.05	0.07	0.4	0.1	0.07	0.3	0.2	<0.05	<0.05
Others	TDS	mg/L	10	1100	1300	2200	2500	4800	4400	4200	5400	4400	4600	2000	580
	Electrical Conductivity (Lab)	uS/cm	10	1200	2100	2400	3900	5900	7300	6700	7400	4900	8000	2600	940
Field	Temperature	°C		20.6	20.5	21.1	22.1	20.4	24.9	19.9	21.9	20.4	22.2	21.9	20.3
	pH	pH units		6.89	7.08	6.53	6.69	6.41	6.57	6.85	7.02	6.91	7.1	7.2	7.24
	Electrical Conductivity	uS/cm		1622	1907	3345	3605	5929	7155	60.29	6741	6697	7396	2544	774
	Dissolved Oxygen	Mg/L		2.23	7.36	3.04	1.2	4.65	4.73	2.58	1.14	2.37	1	3.51	5.55

Table A-11 Groundwater Water Monitoring – Borefield Bores - Analytical Results 2022

Bore ID	Analytes	Units	LOR	ISMW01	ISMW01	ISMW02	ISMW02	ISPB01	MWE1	MWE1	MWW1	MWW1
Sampling Date				28/04/2022	16/01/2023	28/04/2022	16/01/2023	28/04/2022	28/04/2022	16/01/2023	28/04/2022	16/01/2023
Major Cations (mg/L)	Calcium	mg/L	0.5	18	12	25	31	19	24	31	34	37
	Magnesium	mg/L	0.5	18	11	21	24	19	22	26	26	26
	Sodium	mg/L	0.5	200	55	210	220	200	170	200	98	98
	Potassium	mg/L	0.5	3	3	3	4	3	3	3	2	2
Major Anions (mg/L)	Sulphate	mg/L	5	65	22	70	70	66	63	72	72	67
	Chloride	mg/L	1	230	68	270	270	230	220	250	160	160
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	190	100	190	190	200	170	180	150	150
	Carbonate Alkalinity (as CaCO3)	mg/L	10	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<5	<5	<5	<5	<5	<5	<5	<5	<5
	Total Alkalinity (as CaCO3)	mg/L	20	190	100	190	190	200	170	180	150	150
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Arsenic	mg/L	0.001	<0.001	0.007	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.003
	Boron	mg/L	0.05	0.06	0.03	0.06	0.07	0.06	0.04	0.06	<0.02	<0.02
	Cadmium	mg/L	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001
	Chromium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.005	0.006
	Copper	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Iron	mg/L	0.05	0.74	0.37	0.46	0.61	0.68	0.25	0.29	4.8	5.9
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005	0.04	0.02	0.042	0.05	0.041	0.02	0.03	0.61	0.69
	Mercury	mg/L	0.0001	<0.0001		<0.0001		<0.0001	<0.0001		<0.0001	
	Nickel	mg/L	0.001	0.006	0.003	0.004	0.005	<0.001	0.004	0.005	0.007	0.01
	Silver	mg/L	0.005	<0.001		<0.001		<0.001	<0.001		<0.001	
	Vanadium	mg/L	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Zinc	mg/L	0.005	0.012	0.005	0.008	0.013	<0.001	0.007	0.016	0.021	0.047
Nutrients (mg/L)	Nitrate (as N)	mg/L	0.02	<0.005	<0.005	<0.005	0.11	0.006	<0.005	<0.005	<0.005	<0.005
	Nitrite (as N)	mg/L	0.02	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Ammonia (as N)	mg/L	0.01	0.029	0.035	0.036	0.038	0.025	0.032	0.044	0.079	0.073
	Total Kjeldahl Nitrogen (as N)*	mg/L	0.2	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Total Nitrogen (as N)	mg/L	0.2	0		0		0	0		0	
	Phosphate total (as P)	mg/L	0.01	0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.08	<0.05	1.5
Others	TDS	mg/L	10	640	270	730	730	630	610	710	600	540
	Electrical Conductivity (Lab)	uS/cm	10	1200	470	1400	1400	1200	1100	1300	930	950
Field	Temperature	°C		20	20.5	20.8	22.8	21.8	19.9	22	20.5	21.2
	pH	pH units		6.65	7.25	6.56	6.95	6.73	6.31	6.73	6	6.61
	Electrical Conductivity	uS/cm		1020	422	1162	1281	1072	969	1230	804	864
	Dissolved Oxygen	Mg/L		0.89	0.11	0.9	0.34	1.33	1.18	0.45	1.73	0.61