Heron Resources Limited

Woodlawn Zinc – Copper Project

Woodlawn Mine
SML20
Annual Review

1 July 2020 to 30 June 2021

WOODLAWN MINE

TITLE BLOCK

Table 1. Annual Review Title Block

Name of Operation	Woodlawn Mine Project
Name of Operator	Tarago Operations Pty Ltd (Administrator Appointed)
Development consent / project approval #	MP07_0143MOD2
Name of holder of development consent / project approval	TriAusMin Limited
Mining Lease	SML 20
Name of Holder of Mining Lease	Tarago Operations Pty Ltd
Water Licence Number	40WA411642 held by Veolia
	WAL42034 Held by Tarago Operations
MOP start date	11 Nov 2014
MOP end date	30 Nov 2021
Revised C&M MOP	Submitted 1 July 2020
Annual Review start date	1 July 2020
Annual Review end date	30 June 2021
I, Tim Dobson, certify that this audit report is a true and accurate record of the compliance status of the Woodlawn Mine Project for the period 1 July 2020 to 30 June 2021 and that I am authorised to make this statement on behalf of Tarago Operations Pty Ltd.	
Name of authorised reporting officer	Tim Dobson
Title of authorised reporting officer	Chief Executive Officer
Signature of authorised reporting officer	
Date	31 August 2021

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FIGURES

TABLES

LIST OF PLANS

1 COMPLIANCE

1.1 Statement of Compliance with Project Approval

Table 2**Error! Reference source not found.** summarises the compliance status of the Woodlawn Mine. No breaches were identified during the reporting period. Four matters from the 2019/2020 reporting period remain outstanding and will be included in a modification of the consent prior to operational restart at Woodlawn.

There was one environmental incident relating to the pollution control dam overflowing resulting in a release of stormwater water offsite during a heavy rainfall event in August 2020. This matter is discussed in section 6.4.5 .

Table 2. Project approval compliance summary

Were all conditions of the relevant approvals complied with?	Yes/No
MP07-0143MOD2	No
WAL42034	Yes
SML20	Yes
EL7257	Yes
EPL 20821	No

Condition	Description	Non-compliance Risk Level	Comment	Where addressed
Project Approval Condition	Carrying out building work for the process plant office without a construction certificate	Administrative non-compliance	No risk of environmental harm	Section 10
Project Approval Condition	Occupation or use of the new concentrate building prior to obtaining an occupation certificate	Administrative non compliance	No risk of environmental harm	Section 10
Project Approval Condition	Breach in relation to the location of the waste rock storage area	Administrative non-compliance	No risk of environmental harm	Section 10
Project Approval Condition 3 of Sch 4	Passive treatment system for Waste Rock Dump drainage	Administrative Non-Compliance	No risk of environmental harm.	Section 10
Project Approval Condition 2 of Sch 2	Overflow of water from Pollution Control Dam	Low Risk Non-compliant	Potential for low environmental consequence	Section 6.4.5

Key:

Risk Level	Colour Code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-compliant	Non-compliance with: ▪ potential for serious environmental consequences, but is unlikely to occur; or ▪ potential for moderate environmental consequences, but is likely to occur
Low	Non-compliant	Non-compliance with: ▪ potential for moderate environmental consequences, but is unlikely to occur; or ▪ potential for low environmental consequences, but is likely to occur
Administrative	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

In accordance with Condition 4 of Schedule 5 of Project Approval 07_0143 MOD2, Heron confirms that there have been no other potential non-compliances during the reporting period. Heron also confirms that there are no known non-compliances with the mining titles and water licence.

1.2 Independent Audit

The first Independent Audit has been undertaken in accordance with the requirements of the Project Approval Schedule 6 Condition 9 however at the time of this annual report the consultant's report is yet to be received.

2 INTRODUCTION

This Annual Report has been prepared in accordance with Condition 4 Schedule 6 of the Woodlawn Project Approval and also satisfies the Annual Environmental Management Report (AEMR) requirements for SML20. The report covers the operations at Woodlawn Mine for the period 1 July 2020 to 30 June 2021 and reports against the approved Mining Operations Plan (MOP) and Project Approval 07_0143 MOD2. The report provides details of the environmental management and performance of the operations as follows:

- Environmental management procedures for the operation;
- Monitoring activities and results;
- Current compliance with statutory provisions;
- Operational activities during the reporting period; and
- Program of works and activities for the coming reporting period.

2.1 Background

Tarago Operations Pty Ltd (Tarago Operations), a wholly owned subsidiary of Heron Resources Limited (Heron) holds Special Mining Lease 20 (SML20) and operates the Woodlawn Mine producing zinc, copper and lead concentrates for the export market. Following receipt of the Project Approval on 4th July 2013, Heron commenced the project in the 2014-15 reporting period. The approval was modified in March 2016 to allow for relocation of the mine entry to the western side of the Bioreactor. A second modification was approved in July 2017 which included minor layout changes to the processing plant site as a result of detailed design.

As reported in the 2019/2020 Annual Report, Heron Resources Limited (Heron) suspended operations at Woodlawn on 25 March 2020 due to the continued underperformance of operations, rapidly declining metals markets and the impacts of the COVID19 pandemic, and entered a period of Care and Maintenance (C&M). The decision to suspend operations was also made to safeguard the financial position of Heron.

Following suspension of operations and the transition to C&M, all staff and contractors were demobilised with the exception of a small number of personnel whom remained on site to carry out maintenance of the plant and underground assets, and to ensure ongoing environmental and compliance requirements of the operation.

After operations were suspended, Heron commenced a strategic process to identify a financing solution to enable a return to operations at Woodlawn. The process explored various options for the Woodlawn Mine including refinancing, joint ventures and partial or complete divestment. Woodlawn remained in C&M throughout the reporting period while the strategic process was progressed.

Subsequent to this reporting period, Heron has entered Voluntary Administration (VA) with FTI Consulting appointed as Administrators on 16 July 2021 and remains in VA at the time of writing. Under VA, care & maintenance activities at Woodlawn are continuing unhindered, and the administrators are running a similar process to attract new financing and potentially ownership for the Woodlawn Mine.

In addition to Heron's Woodlawn Mine, the SML20 site is occupied by two other operators: Veolia Environmental Services (Veolia) and Iberdrola Australia (formerly Infigen Energy). Veolia has operated a Bioreactor within the original mine open cut void since 2004. The Bioreactor receives putrescible waste primarily from Sydney and captures landfill gas for the generation of electricity. Iberdrola Australia operates the Woodlawn Windfarm which comprises 23 wind turbines. Not all the wind turbines in the Woodlawn Windfarm precinct are located within SML20.

Plan 1 shows the location of the operation while Plan 2 shows the overall site layout and operating boundaries between Tarago Operations and Veolia. All plans are provided in Appendix A. There are various overlaps in responsibilities on site, including the respective Project Approvals and EPL boundaries. Within these boundaries there are also access agreements, shared services and water transfers. Plan 2 shows the respective EPL boundaries while Plan 5 shows the water transfers across the site.

At full capacity, the Woodlawn Mine is designed to extract and process up to 1.5 Mt of tailings or 1.0 Mt of underground ore per year to produce a maximum of 150,000 tonnes (t) of copper, lead and zinc concentrates per year, for up to 21 years. During the initial operation phase the concentrate was transported by road to a rail yard in Goulburn (approximately 50km from the mine site). From there, concentrate was transported via rail to Port Kembla and/or Port Botany for export to international customers.

An overview of the processing plant site is provided in **Error! Reference source not found.** below.

Figure 1. Overview of the completed processing plant - January 2020

2.2 Mine Contacts

Primary contacts for the Woodlawn Mine during the C&M period are provided in **Error! Reference source not found.** below

Table 3. Key mine personnel

Position	Personnel	Company	Responsibility	Contact Details
Chief Executive Officer	Tim Dobson	Heron	Overall responsibility for operation of the Woodlawn Project	02 9119 8111
Site Manager	Tim Brettell	Heron	Statutory Mining Engineering Manager. Management of site operations.	02 4816 6349
Sustainability Lead	Dr Zoe Read	Heron	On site environmental management	02 4816 6318
Exploration	Alexandra Bonner	Orthosa Pty Ltd	Management of exploration activities, Resource evaluation and reporting	0422 169 365

2.3 Consultation with Stakeholders

Communication with government regulators and community consultation has continued during C&M. Tarago Operations is committed to continuing this consultation work with key government and community stakeholders. During C&M the consultation process may include the following stakeholders:

- ❒ Woodlawn Bioreactor (Veolia);
- ❒ Woodlawn Windfarm (Iberdrola Australia);
- ❒ Department of Planning, Industry and Environment (DPIE);
- ❒ Department of Planning , Industry and Environment (DRE);
- ❒ Department of Planning, Industry and Environment – Resources Regulator
- ❒ NSW Office of Environment and Heritage (OEH);
- ❒ Environment Protection Authority (EPA);
- ❒ Dams Safety NSW;
- ❒ NSW State Emergency Service;
- ❒ Goulburn Mulwaree Council;
- ❒ Queanbeyan-Palerang Regional Council;
- ❒ Water NSW;
- ❒ Department of Primary Industries - Water (DPI-Water);
- ❒ Natural Resources Access Regulator (NRAR);
- ❒ NSW Roads and Maritime Services (RMS); and
- ❒ Various community groups and open forums.

A Community Consultative Committee operates for the Woodlawn Mine which consists of an Independent Chair, representative from Goulburn Mulwaree Council and four community members. Invited observers to the meetings can include representatives from Veolia and other community organisations. The committee meets up to four times per year. Details of the committee are provided in Chapter 9. All approval documents and management plans are publicly available on Heron web page at:

https://www.heronresources.com.au/woodlawn-environment-health-and-safety

3 APPROVALS

3.1 Consents Leases and Licenses

Table 4 below summarises the licences and consents relating to the Woodlawn Mine. There are other consents and approvals relating to the other operations on site however the following represent those relevant to the mining operation.

Table 4. Consents and Leases

Authority	Title	Critical date:
Department of Planning, Industry and Environment	Special (Crown and Private Lands) Lease 20 (known as SML20)	November 2029
Department of Planning, Industry and Environment	Mining Operations Plan	2 July 2022 (revision for C&M and with the RR for approval)
Environment Protection Authority	Environment Protection Licence 20821	Issued May 2017 and reviewed every 3 years.
Department of Primary Industries - Water	WAL28983 WAL42034 Works Approval for new bore (Notice of Determination A7441)	15/1/2025 held by Veolia under agreement with Heron 17/8/18 held by Heron 12/04/16 ongoing
Dams Safety NSW	Surveillance Reports for Five Prescribed Dams Annual Dams Safety Standards Report	Annual intermediate and five yearly major surveillance reports 31 March 2022
Department of Planning, Industry and Environment	Heron Resources proposed Woodlawn Mine Project (MP 07 0143)	4 July 2013 for a period of 21 years
Department of Planning, Industry and Environment	Relocation of Mine Portal and Overland Haul modification (MP07-0143MOD1)	22 April 2016 for the period of the original consent
Department of Planning, Industry and Environment	Site Layout Update MP07-0143 MOD2)	6 July 2017 for the period of the original consent
Department of Planning, Industry and Environment – Resources Regulator	Approval to Extract within Woodlawn Notification Area Approval to Conduct Hydraulic Mining in Woodlawn South Tailings Dam	April 2017 April 2017

Heron has previously negotiated a Water Access Licence to secure additional water allocation within the Goulburn Fractured Rock Groundwater Source. Despite Woodlawn holding a Water Access Licence within the Lachlan Fold Belt Groundwater Source, it was determined by the DPIE-Water and NRAR that a portion of the dewatering activities occurred in the adjacent groundwater source and therefore technically an allocation from both sources was required. No mine dewatering has been undertaken during the reporting period.

3.2 Future Approvals

Heron has prepared a third modification (MOD 3) to its Project Approval for lodgement. The modification includes clarification of the timing of the passive treatment system required for seepage from the Rehabilitated

Waste Rock Dump, relocation of the new Waste Rock Emplacement and corresponding reduction in its footprint along with minor updating of the approval. Heron has been advised by DPIE that as the approval was issued under the old Part 3A, it will need to be converted to a State Significant Development Approval. This may necessitate other administrative changes to the wording of the consent. Submission of the modification has been deferred until a definitive outcome for operations at Woodlawn has been determined.

4 OPERATIONS SUMMARY

Operations during the reporting period have included:

- ❒ Decommissioning and demobilisation from site of the Water Treatment Plant (WTP);
- ❒ Activities related to the care and maintenance of the underground mine;
- ❒ Activities related to the care and maintenance of all surface infrastructure;
- ❒ Water transfers between storage facilities to manage surface water inflows; and
- ❒ Commencement of a tailings rehabilitation trial on tailings dam north (TDN)

4.1 Resource Utilisation

There have been no underground or surface hydraulic tailings mining activities undertaken at Woodlawn during the reporting period.

4.1.1 Exploration at Woodlawn

There was no exploration activity undertaken at Woodlawn during the reporting period.

4.1.2 Reserve / Resource Status

The current Mineral Resource and Ore Reserve Statement was published in October 2019. It details the Resource and Reserve estimates for the period ending June 2019. Although further drilling has been completed and mining has been undertaken, depleting both the Mineral Resource and the Ore Reserve, the October 2019 Statement remains the current Mineral Resource and Ore Reserve estimate reported in accordance with the JORC 2012 Code.

4.2 Environmental Activities

4.2.1 Mine dewatering

There has been no mine dewatering from the old mine workings during the reporting period. Routine test results of previously extracted mine water stored in ED2 shows the water quality has not varied materially despite being exposed to the atmosphere. The water has been subject to evaporation and dilution from rain water falling on the dam surface. Analysis results have shown that the mine water contains minor concentrations of ammonia, organic carbon and BOD, but not at concentrations requiring treatment (See Section 7.3). Dewatering is expected to resume early in any restart program.

4.2.2 Rehabilitation

The only rehabilitation activity carried out at Woodlawn during C&M has been the commencement of a tailings dam rehabilitation trial on TDN.

Ongoing maintenance of rehabilitated areas and rehabilitation of remaining exposed areas is planned to resume after operations recommence.

Further information on the tailings rehabilitation trial on Tailings Dam North is presented in Section 8.5. The rehabilitation trial is required by the Mining Operations Plan and Rehabilitation and Vegetation Management Plan. These trials were outlined in the Environmental Assessment and are designed to confirm the required methodology to successfully rehabilitate the tailings dams once reprocessing has been completed.

As the currently proposed rehabilitation method involves the use of "Woodlawn Organic Output" (WOO), a product produced by Veolia at its Woodlawn waste management facility, the physical trials on TDN were delayed as a result of an industry wide EPA ban on the use of mixed waste organic outputs (MWOO). However, following successful application to the EPA by Veolia to use the WOO the trials commenced in April 2021. Two EPA approved Waste Exemptions covering alkaline residues from pulp manufacture and the use of the Woodlawn Organic Output apply to the project. The tailings dam rehabilitation trial using the WOO will be resourced during the C&M period at Woodlawn from EPA grant funding obtained during the reporting period by Veolia, and by Veolia.

4.3 Mining

There has been no mining activity undertaken at Woodlawn during this reporting period.

4.3.1 Personnel

A small team has remained on site during the reporting period to carry out C&M activities and environmental compliance. During the reporting period, the project had one lost time injury, 18 days lost from work and 167 days on restricted duties.

4.3.2 Product Stockpiles

Approximately 1,600 tonnes of lead-bearing concentrates that remained on site at the end of the previous reporting period were screened and sold in May 2021.

The small run-of-mine ore stockpile remaining on the ROM pad at the end of the previous reporting period has not changed during this reporting period.

Materials to be used in the tailings dam rehabilitation trial previously stockpiled on site have been utilised for the TDN rehabilitation trial. The materials include alkaline product and WOO; both of these products have EPA RRO and RRE approvals.

4.3.3 PAF and NAF Stockpiles

Potential Acid Forming (PAF) materials and Non-Acid Forming (NAF) materials are identified in accordance with the Waste Rock Management Plan. In general, PAF material is mineralised and is the target of mining while NAF material represents the unmineralised rock which is incidentally mined in order to access the ore lenses. There are however some rock strata which are not mining targets but which contain high concentrations of iron which have the potential to release acid drainage when oxidised.

During the reporting period, PAF material continued to be stored in the designated Waste Rock Emplacement. Veolia have relocated and utilised some of the material in their bioreactor operations. In accordance with the Waste Rock Management Plan, PAF material must be separated and either delivered to the ROM pad if economically viable to recover the metals or in a designated Waste Rock Emplacement located adjacent to TDN.

Due to the nature of the ore body, it is not practical to segregate NAF material from PAF. Consequently, NAF is no longer separated or stockpiled on Site.

4.4 Mineral Processing

No processing operations have been undertaken during the reporting period.

4.5 Waste Management

During C&M there are three categories of waste produced at the Woodlawn Mine:

- Recyclable or recoverable waste;
- Commercial & Industrial solid waste; and
- Sewage.

During the reporting period, and whilst in C&M, a comprehensive clean-up of the site was carried out to remove all waste including chemicals and hazardous materials left on site from the previous operations. All commercial, liquid and solid industrial waste was removed from site by licensed contractors. Stockpiled scrap steel reported in the previous annual report was removed from site by a contractor for recycling.

The sewage treatment system was maintained by the C&M team during the reporting period. Minor quantities of sludge are removed by licensed contractor as and when required. The pump-out tank system that was installed for the construction phase, remains in-situ as a back-up system. A licenced contractor is engaged to remove untreated sewerage if required.

4.6 Hazardous Material Management

Hazardous materials that have not been able to be removed from site such as processing reagents for the plant are stored in suitable bunded areas and undercover where necessary. All reagent mixing and storage are within compliant bunded areas. A reagent manifest that references all relevant Safety Data Sheets is kept for all chemicals stored on site and all packaging complies with the Globally Harmonised System of Classification and Labelling of Chemicals.

While the plant remains in C&M, all efforts have been made to minimise the quantity of reagents stored on site (especially those classified as Hazardous and/or DG). Where possible the materials have been sold and, should it be necessary, professional reagent disposal companies may be utilised to remove remaining reagents in tanks or in opened storage vessels (e.g. IBC's).

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

5.1 DPIE General Compliance Audit

Actions from the DPIE audit undertaken in 2019 remain programmed for commencement following a return of operations at Woodlawn and include:

- Non compliance no. 1 for the relocation of the waste rock emplacement. This was further processed as a breach of the conditions of the licence, and remains subject to further action vide the MOD3 to the project approval to be submitted on resumption of operations.
- Observation of concern no. 1 – monitoring and assessment of vegetation, requiring ongoing landscape function analysis of rehabilitation areas across site
- Observation of concern no. 2 – Erosion and vegetation failure on the legacy rehabilitated waste rock dump.
- Observation of concern no. 3. Revised management of NAF and PAF material – this will be addressed with revision of the Waste Rock Management Plan (WRMP)
- Observation of concern no. 4 – Rehabilitation of Domain 4 (Hickory's Paddock). The area of particular concern during the audit currently has adequate vegetation cover. Continued rehabilitation of the area will resume when operations resume at Woodlawn
- Observation of concern no. 5 – Compliance and environmental incident reporting. Required modification of the internal reporting systems will be ongoing during C&M in preparation for resumption of operations.
- Suggestion for improvement no. 1. Development of a formal compliance management system. The recommendation being to implement an environmental monitoring system utilising the framework outlined in AS/NZS ISO 14001:2016. This work will continue during C&M in preparation for resumption of operations.
- Suggestion for improvement no. 2. Utilisation of MYOSH software to record and assign actions for environmental issues. This action is ongoing and will be assessed further prior to resumption of operations

5.2 DPIE response to 2020 Annual Review

No response has been received following submission of the 2019/2020 Annual Review.

6 ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

Monitoring data has been compared with historical data aimed at assessing trends and environmental performance at the site. The data has been compared with performance criteria contained in the original Environmental Assessment, Project Approval and Environment Protection Licence where relevant. Reference is also made to any relevant Trigger Action Response Plan values contained the various environmental management plans. The monitoring sites are shown on Plan 6.

6.1 Meteorological Summary

Meteorological information is recorded continuously by the onsite weather station which is approved for the purpose of monitoring vide EPL 20821 ID No 5. The station provides hourly site specific data for:

- ❒ wind speed and direction @ 10 m
- ❒ temperature @ 10 m and 2 m
- ❒ sigma theta @ 10 m
- ❒ rainfall
- ❒ solar radiation
- ❒ relative humidity (%)

Total rainfall recorded for the 2020/21 reporting period (1,117 mm) was well above the previous 2019/20 period (529 mm) and the previously experienced drought conditions are no longer evident. The 2019/20 total rainfall was also well above the long term annual average rainfall of 622.7 mm (Source BOM: Goulburn 1971-2020). The annual average rainfall recorded on site since 2004 is 666 mm. The total number of rain days recorded during the reporting period (131) was also higher than the previous period (94 days). Weather statistics for the reporting period are shown in Table 5:

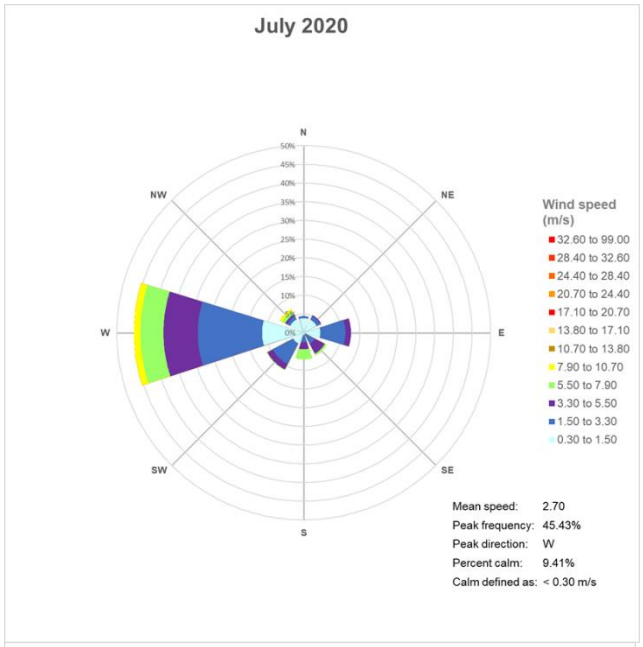
Table 5. Monthly weather statistics (2020-2021)

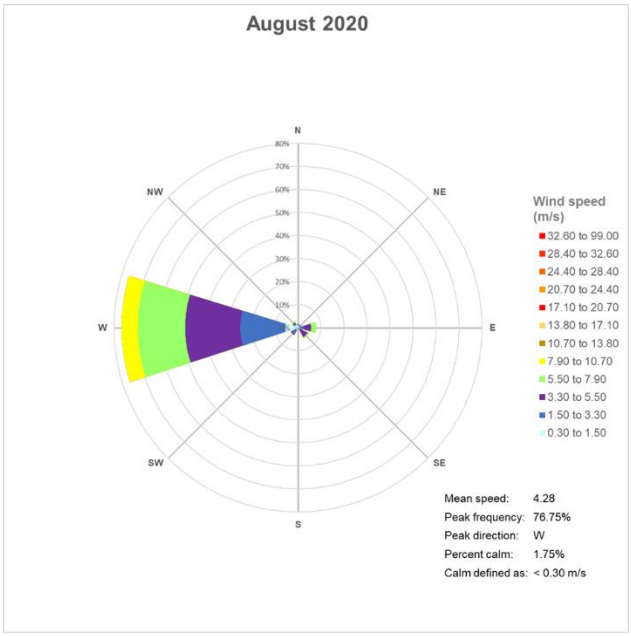
Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Tot
Rainfall (mm)												
35	208	35	117.5	95	63	84	72	238	3.5	82	84	1117
Number of Rain Days (≥1mm)												
10	14	9	15	5	14	10	15	12	3	12	12	131
Evapotranspiration (mm)												
35.4	46.5	75.1	88.2	128.8	123.9	139.2	92.8	92.4	41.4	40.1	27.8	931.6
Average wind speed (m/s)												
2.7	4.3	3.9	3.7	3.1	3.9	3.4	3.0	3.5	2.6	3.0	3.3	3.4

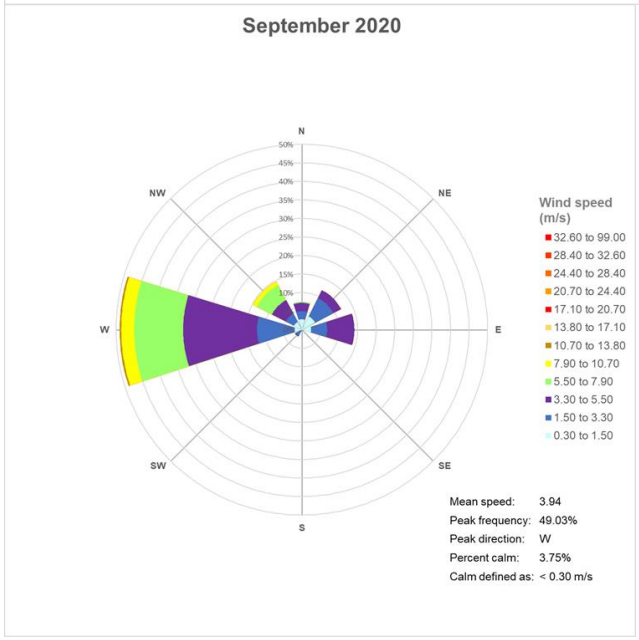
The highest monthly rainfall recorded during the 2020-2021 reporting period occurred in March 2021, with 238 mm. The lowest monthly rainfall was recorded in April 2021, with 3.5 mm. Overall the region experienced drought-breaking conditions throughout the reporting period, with a clearly observable rebound in vegetation.

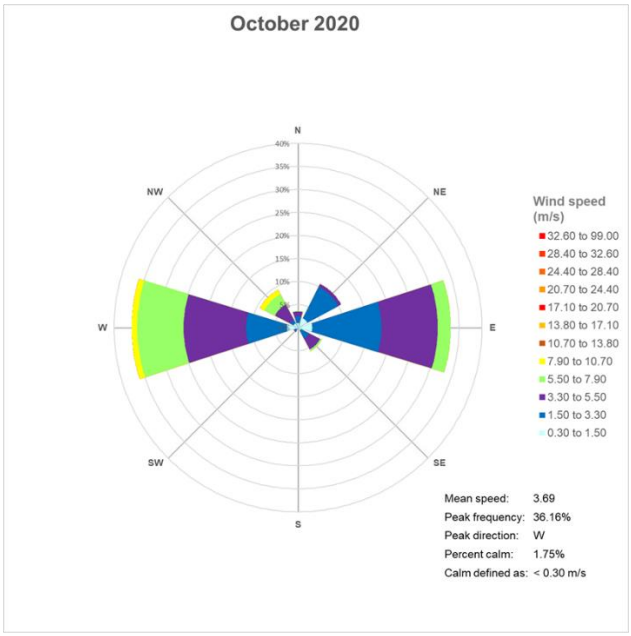
6.1.1 Wind roses for Reporting Period

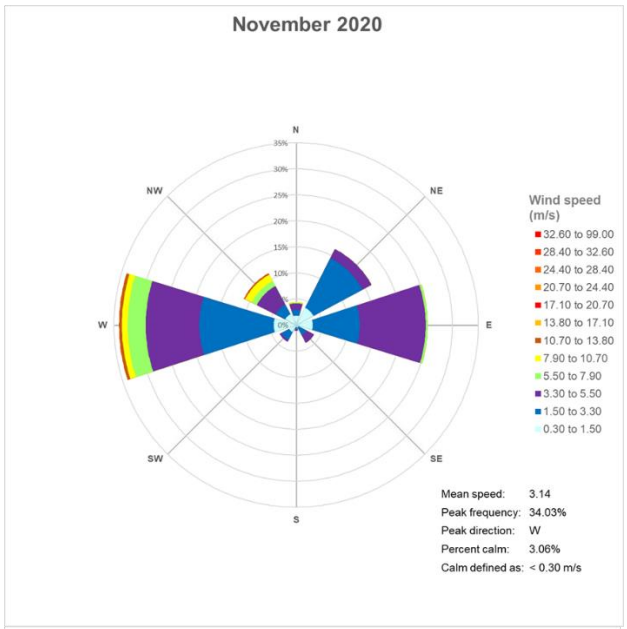
Wind roses for each month during the current reporting period are shown in Figure 2. The mean annual wind speed for the reporting period was 3.4 m/s which is lower than the previous reporting period. Winds are generally from a westerly direction although the warmer months have a strong easterly component. There was a similar pattern in the previous reporting period. Strong wind gusts can occur from the west however easterly winds can be relatively strong from time to time. There are some occurrences of southerly and northerly winds throughout the year. This data is useful in determining the component dust contribution to properties surround the Woodlawn Mine.

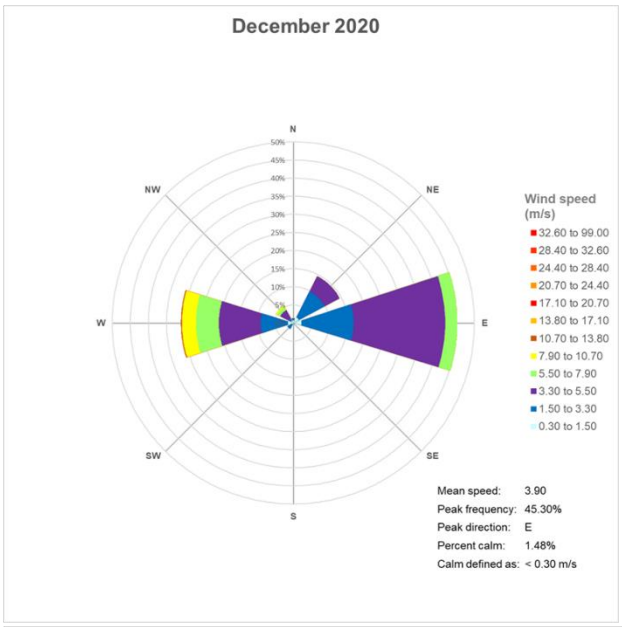

July 2020
N
NE
E
SE
S
SW
W
NW
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 2.70
Peak frequency: 45.43%
Peak direction: W
Percent calm: 9.41%
Calm defined as: < 0.30 m/s

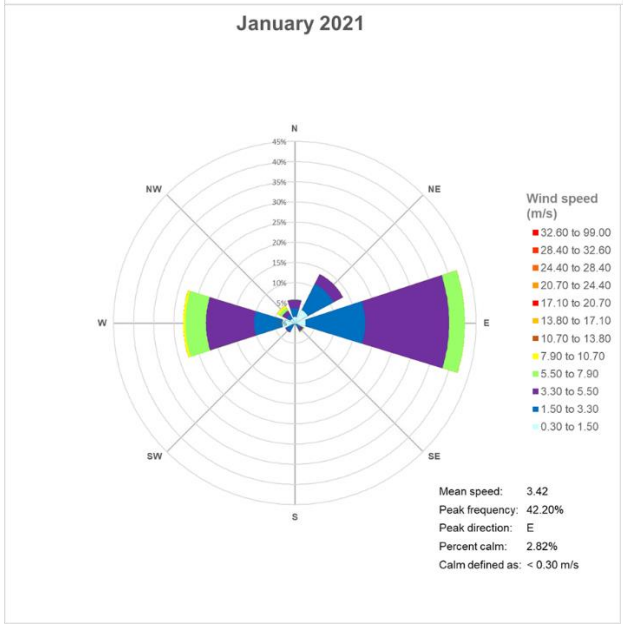

August 2020
N
NE
E
SE
S
SW
W
NW
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 4.28
Peak frequency: 76.75%
Peak direction: W
Percent calm: 1.75%
Calm defined as: < 0.30 m/s

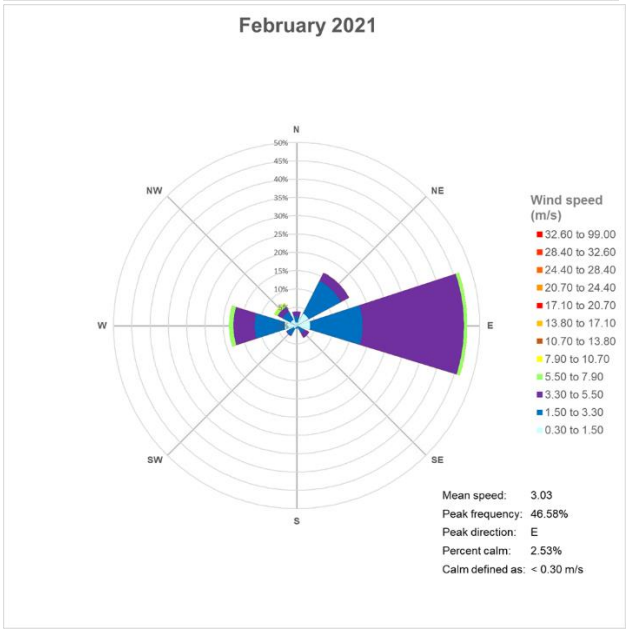

September 2020
N
NE
E
SE
S
SW
W
NW
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 3.94
Peak frequency: 49.03%
Peak direction: W
Percent calm: 3.75%
Calm defined as: < 0.30 m/s


October 2020
N
NE
E
SE
S
SW
W
NW
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 3.69
Peak frequency: 36.16%
Peak direction: W
Percent calm: 1.75%
Calm defined as: < 0.30 m/s


November 2020
N
NE
E
SE
S
SW
W
NW
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 3.14
Peak frequency: 34.03%
Peak direction: W
Percent calm: 3.06%
Calm defined as: < 0.30 m/s


December 2020
N
NE
E
SE
S
SW
W
NW
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 3.90
Peak frequency: 45.30%
Peak direction: E
Percent calm: 1.48%
Calm defined as: < 0.30 m/s


January 2021
N
NE
E
SE
S
SW
W
NW
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 3.42
Peak frequency: 42.20%
Peak direction: E
Percent calm: 2.82%
Calm defined as: < 0.30 m/s


February 2021
N
NE
E
SE
S
SW
W
NW
Wind speed (m/s)
32.60 to 99.00
28.40 to 32.60
24.40 to 28.40
20.70 to 24.40
17.10 to 20.70
13.80 to 17.10
10.70 to 13.80
7.90 to 10.70
5.50 to 7.90
3.30 to 5.50
1.50 to 3.30
0.30 to 1.50
Mean speed: 3.03
Peak frequency: 46.58%
Peak direction: E
Percent calm: 2.53%
Calm defined as: < 0.30 m/s

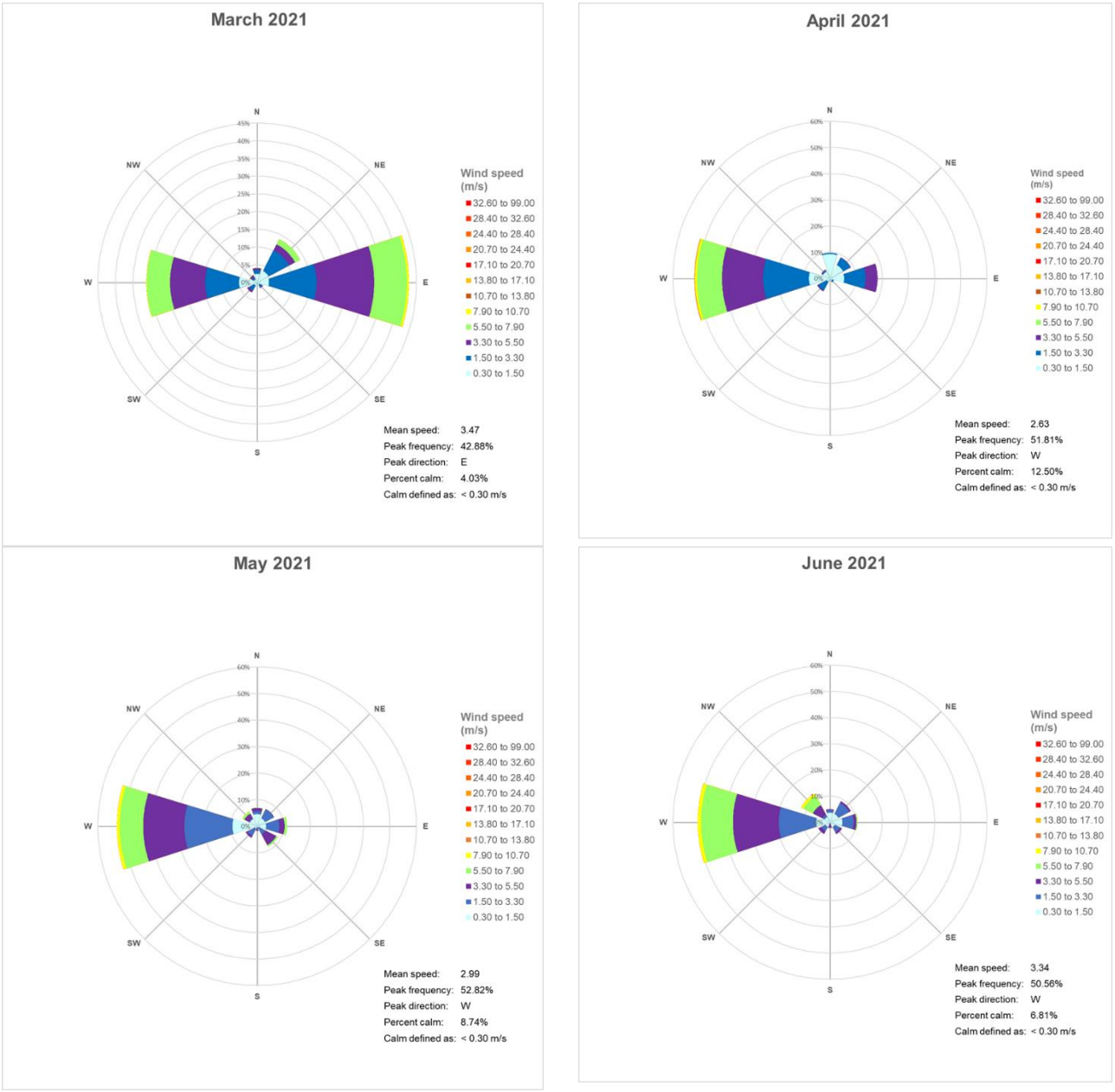


Figure 2. Wind roses

Data from the Woodlawn weather station is utilised to determine potential dust impacts at the downwind adjacent property (Pylara). Given the two dominant wind directions, due east and due west, it is possible to accurately determine the level of dust contribution received at Pylara from the combined Heron/Veolia activities on site. It is not however possible to accurately determine the contribution of each company's operations to the dust level at Pylara. Despite this, Heron is committed to proactively minimising its component of dust contribution.

6.2 Air Pollution

There was relatively little dust experienced across the region over the reporting period due to the high rainfall experienced and consequent vegetative ground cover produced. The good air quality experienced over the year is reflected in the very low PM_{10} and TSP dust concentrations recorded by the HVAS and the DDGs across site.

There was very little dust generated from site due to there being no earthworks or operational activity being undertaken during the reporting period as a result of Woodlawn being in C&M.

6.2.1 Air Pollution Management

Woodlawn was in C&M for the whole reporting period. During that time the principal dust control strategies depended wholly on the minimal activity on site and the favourable rainfall and vegetation cover.

6.2.2 Air Quality Criteria

The project approval assessment criteria for dust emissions is provided in Table 6, Table 7 and Table 8. An exceedance of any of these criteria constitutes an air quality incident.

Table 6. Long-term criteria for particulate matter

Pollutant	Averaging period	[d] Criterion
Total suspended particulate (TSP) matter	Annual	[a] 90 µg/m^3
Particulate matter <10 µm (PM_{10})	Annual	[a] 30 µg/m^3

Table 7. Short-term criteria for particulate matter

Pollutant	Averaging period	[d] Criterion
Particulate matter <10 µm (PM_{10})	24 hour	[a] 50 µg/m^3

Table 8. Long-term criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
[c] Deposited dust	Annual	[b] 2 g/m^2/month	[a] 4 g/m^2/month

Notes to Tables
[a] Total impact (i.e. incremental increase in concentrations due to the Project plus background concentrations due to all other sources);
[b] Incremental impact (i.e. incremental increase in concentrations due to the Project on its own);
[c] Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and
[d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Director-General.

6.2.3 Dust Deposition Monitoring

Dust monitoring has been undertaken at Woodlawn for several years. There are currently four dust deposition gauges associated with the mining operation as shown on Plan 6:

- DG22 – located to the eastern side of the open pit void (relocated by Veolia to avoid contamination from Veolia haul road)
- DG34 – located on the western side of the open pit void
- DG28 – located at Pylara; and
- DG33 – located on the south east side of the site adjacent to the Rehabilitated Waste Dump.

Sampling and analysis of dust deposition was carried out in accordance with Australian Standard AS2724.1 (Ambient Air - Particulate Matter). Monitoring was conducted monthly and results are recorded as total solids analysed according to Australian Standard AS3580.10.1 (Methods for sampling and analysis of ambient air). The

monthly raw results are provided in Table 9. The assessment criterion for dust deposition is a rolling annual average, the results of which are presented in Table 10.

Table 9. Dust deposition monitoring results 2020/2021 (Total insoluble solids g/m2/month)

Date	DG 22 East of Void	DG 28 Pylara Homestead	DG 33 Waste Rock Dam	DG34 West of Void	Comment
July 2020	1	1	0.5	5.6	Predominantly westerly winds in July - location of DDG 34 relative to Woodlawn operations indicative of regional dust source
Aug 2020	1.1	1.1	1.8	0.9	Negligible impact on air quality
Sept 2020	2	2.3	1.7	1.2	Negligible impact on air quality.
Oct 2020	2.8	2.6	2.9	1.1	Negligible impact on air quality
Nov 2020	1.6	3.7	2	1.7	Negligible impact on air quality
Dec 2020	2	3.4	1.4	3.4	Negligible impact on air quality
Jan 2021	2	2.6	1.3	5.7	Predominantly easterly winds in January - proximity of DDG 34 relative to Woodlawn operations indicative of off site dust origin
Feb 2021	1.7	2.5	2.6	2.3	Negligible impact on air quality
Mar 2021	1.5	1.6	2.3	1.4	Negligible impact on air quality
Apr 2021	0.2	0.6	0.3	0.6	Negligible impact on air quality
May 2021	2.2	1.0	0.5	1.8	Negligible impact on air quality
June 2021	1.2	0.4	0.4	0.9	Negligible impact on air quality

Table 10. Dust deposition gauge - rolling annual average (total insoluble solids g/m²/month)

Date	DG 22 East of Void	DG 28 Pylara Homestead	DG 33 Waste Rock Dam	DG34 West of Void
July 2020	4.0	3.8	2.0	4.7
Aug 2020	4.0	3.9	2.1	4.7
Sept 2020	4.1	3.9	2.2	4.7
Oct 2020	4.1	3.9	2.2	4.5
Nov 2020	4.1	3.6	2.2	4.3
Dec 2020	4.1	3.1	2.1	4.2
Jan 2021	3.8	2.9	2.0	3.0
Feb 2021	3.6	2.8	2.0	3.0
Mar 2021	2.6	2.2	1.7	2.4
Apr 2021	2.0	1.9	1.5	2.1
May 2021	2.0	1.8	1.4	2.0
June 2021	1.9	1.7	1.3	2.0

** Note: Each value represents an average of the previous 12 months raw data*

The long term dust criteria is set as an annual average, and the 12 month rolling average dust deposition rate is utilised for monitoring against criteria. The results shown in Table 10 indicate the easing of drought and transition to wet regional conditions favoured a decrease in atmospheric dust and improved air quality. The elevated readings shown in the table are a consequence of the lag in the annual rolling average from of the numerous, frequent regional dust storms experienced in early 2020. It is unlikely that the combined operations of Heron and Veolia had a significant impact on the high readings.

The dust criteria relate to the contribution of dust received at the assessment location rather than absolute dust levels. It is recognised that ambient dust levels can be high which may be unrelated to the generation of dust at the licensed premises. In this instance, the closest assessment location for Heron operations is Pylara which is an operating farming enterprise. In determining compliance with the dust criteria, an assessment is required of the contribution of dust generated on site as received at Pylara.

The relationship between the dust deposition gauges is shown Figure 3. The results for DG24 (decommissioned end of Jan 2018) have been retained in the chart to provide a historical context for results read by DG34 that was installed to replace DG24 in Feb 2018. The data shows that on most individual months, dust levels at Pylara (DG28) correlate generally with DG34. Where there is a correlation, the potential impact from the mining operation and bioreactor combined is considered to be very low with an estimated contribution of <1 g/m^2/month. Due to the above average rainfall received and the associated good ground cover, regional atmospheric dust has not been an issue throughout the reporting period. Further, due to there being no operations carried out at Woodlawn Mine there has been no operationally generated dust.

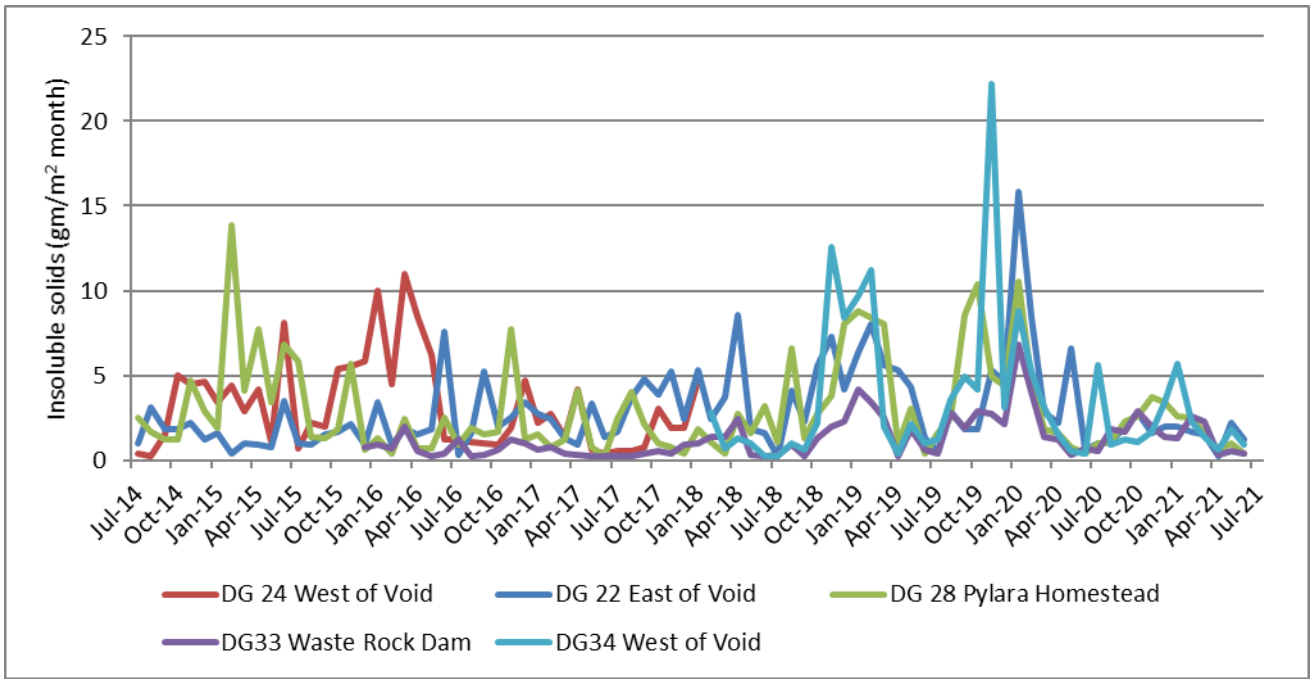


Figure 3. Raw monthly dust deposition results (g/m^2/month)

The 12 month rolling average levels are also used to determine trends, as shown in Figure 4. The recent trend indicates that the worst of the three year dry period and extreme drought conditions have rapidly eased.

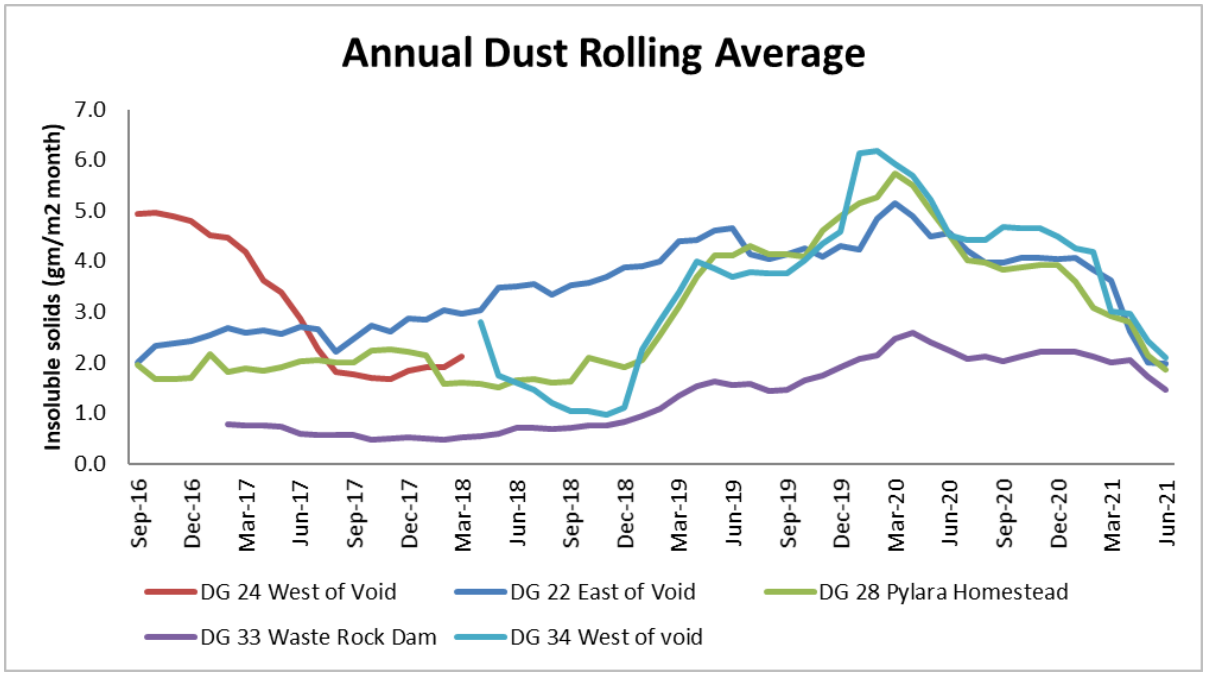


Figure 4. Annual DDG rolling average (g/m²/month)

6.2.4 Atmospheric Dust Monitoring (HVAS)

A High Volume Air Sampler was installed by Heron in October 2017. High volume air sampler (HVAS) results for PM10 are provided in Figure 5. TSP results for the current reporting period are shown in Figure 6. Compared with the previous reporting period the above average rainfall experienced during this reporting period has led to a considerable reduction in high dust days, and there have been no exceedances recorded.

Long term impact assessment criteria for PM_{10} is 30 µg/m^3 and for TSP is 90 µg/m^3.

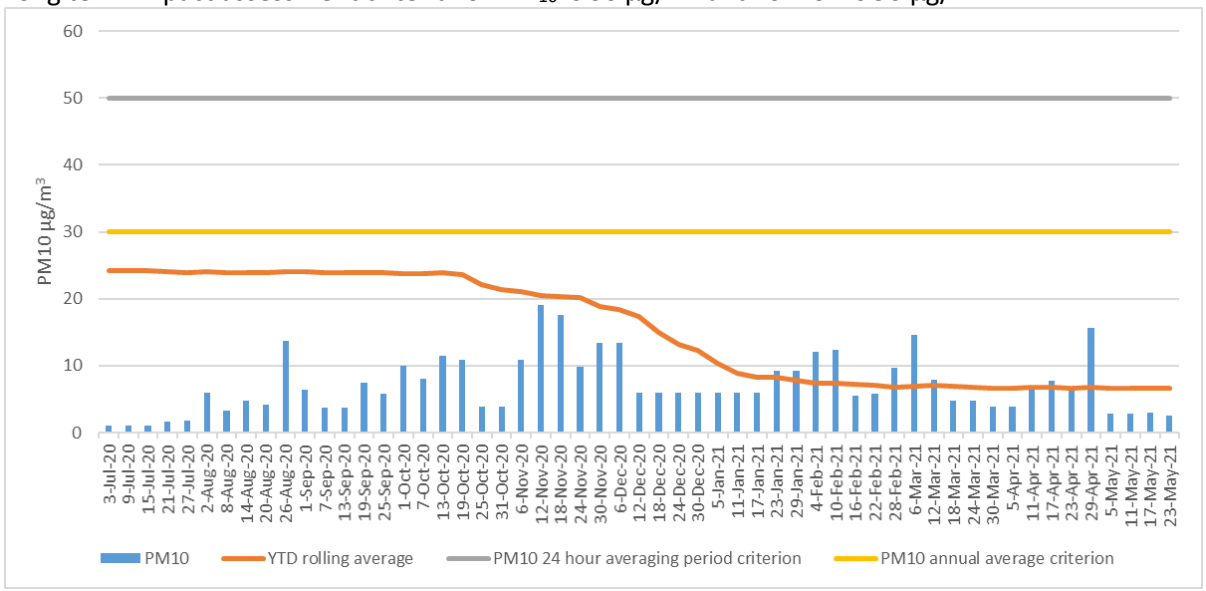


Figure 5. PM10 monitoring results (raw data and rolling average)

The PM10 results recorded at the Pylara HVAS station correlated with results recorded by the NSW Department of Planning, Industry and Environment Air Quality Monitoring Network; principally from the Goulburn station which can be monitored regularly to provide advice to employees of air quality forecasts and PPE requirements.

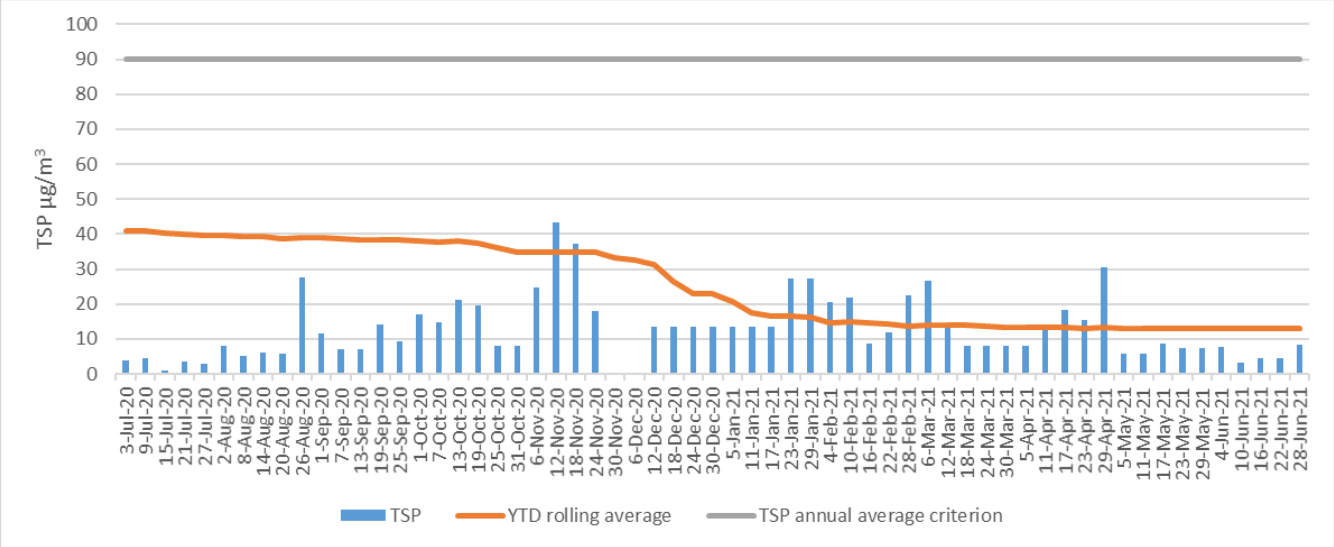


Figure 6. Total suspended particle raw data and rolling average

6.2.5 Reportable Incidents

There have been no reportable air quality incidents during the reporting period.

6.2.6 Effectiveness of Environmental Controls

The controls for dust mitigation employed during operations have been minimal due to limited resources. However, given the extremely high rainfall experienced on site during the reporting period, commensurate high vegetation cover together with minimal site activity dust emissions from site have been minimal

6.2.7 Further Improvements

A program of dust mitigation through revegetation will resume when operations resume and resource constraints caused by C&M are lifted.

6.3 Erosion and Sediment Control

Prior to entering C&M clean water diversion channels had been constructed around disturbed areas and silt control fencing installed below all disturbed areas and in drainage lines. The erosion control measures were designed to safely convey water away from disturbed areas, reduce runoff velocity, increase batter and bench stability and reduce solids loading prior to entering the pollution control structures. Surface stability was improved where possible by the use of temporary and permanent revegetation measures. Erosion control structures will require upgrading or repair when operations resume. In the meantime, seasonal conditions during the past 18 months have eased promoting natural regeneration of groundcover to mitigate substantial erosion.

On resumption of operations further erosion control measures will be installed in accordance with the principles specified in the "Managing Urban Stormwater: Soils and Construction – 4th Edition", Landcom 2004 (Blue Book).

6.3.1 Reportable Incidents

There have been no reportable incidents in relation to erosion and sedimentation control during the reporting period.

6.3.2 Effectiveness of Environmental Controls

Above average rainfall during the reporting period including several intense storm events have caused runoff to enter the PCD but sediment levels remained small. The PCD did not require cleaning during the reporting period indicating that overall the in situ erosion and sedimentation controls performed adequately.

6.4 Surface Water

The Woodlawn surface water management system allows collection and transfer of water from various locations within SML20 to the evaporation dams as shown on Plans 2, 5 and 6. In order to maintain the site as nil discharge, the water management system is extremely flexible allowing water to be transferred between multiple sources and storages and includes various levels of treatment to maximise reuse. The main water storages in the system include:

- Raw Water Dam (RWD) which receives water from the Willeroo Borefield;
- Evaporation Dam 1 (ED1) is operated by Veolia and now only receives water primarily from Veolia's activities and the legacy waste rock dam; ED1 is being gradually dewatered by Veolia in accordance with their project approval conditions, although above average rainfall during the reporting period has led to an increase in water levels within ED1 during this reporting period. Water quality data for ED1 is not included in this report as the dam is monitored and operated by Veolia;
- Evaporation Dam 2 (ED2) presently only receives water pumped from Heron's new underground mine decline. The origin of the water in the decline is a combination of stormwater inflow and seepage through old exploratory drill holes from ED3S. It is envisaged that ED2 will revert to being used for water storage and evaporation of water pumped from the old underground workings following resumption of mining operations.
- Evaporation Dam 3 (ED3) is operated by Veolia and primarily receives water from Veolia's operation. Until May 2021, ED3S also received ground water pumped from the decline. Water from the decline is now pumped to ED2. Water currently stored in ED3 is relatively clean and is a potential supply source for future processing plant operations;
- Old Plant Collection Dam (PCD) which is part of Veolia's the surface pollution control system;
- Rehabilitated Waste Rock Dam (RWRD) water is transferred to ED1;
- Tailings Dam North (TDN);
- Tailings Dam South (TDS) & Return Water (TDSRW). During C&M, stormwater management activities have resulted in TDS receiving substantial quantities of water pumped from TDN and TSF4. The need to pump water to TDS is a result of the above average rainfall received on site;
- Tailings Dam West (TDW);
- Tailings Storage Facility 4 (TSF4); and
- Process Plant Pollution Control Dam (PPPCD) which receives surface water from the process plant catchment area and is recycled as a raw water source. The PPPCD has not been utilised during C&M.

During Woodlawn's operational period, water contained in the open cut and underground workings was transferred to the various evaporation dams. This aspect of the mine's operation has not varied but has required

additional licensing requirements to recommence dewatering. The approval to dewater the mine came in three stages to enable monitoring and assessment to be completed prior to proceeding to the next stage. A variation in the EPL was approved in May 2018 for the final Stage 3 Ongoing Dewatering of the old underground workings which commenced in December 2018 and will continue for the life of mine. The water previously pumped from the old workings is currently stored within six HDPE lined cells in ED2 where it is evaporated.

ED3 and component dams remains with Veolia as part of the Bioreactor water management system. Heron may however, reuse water from the Bioreactor system as a means of reducing make up water supplied from the Willeroo Borefield.

ED1 is operated by Veolia with Veolia holding an EPL over the dam while Heron hold a planning approval covering its ongoing use for mining purposes.

A second Water Access Licence (WAL) is available to Heron from the Goulburn Fractured Rock Groundwater Source. This WAL is in addition to Heron's existing WAL and license allocation within the Lachlan Fold Belt groundwater source. The additional licence was required because the mine workings straddled two groundwater sources as defined by DPI-Water. Despite the mine being geologically located with the Lachlan fold belt, an administrative definition of groundwater sources being defined by surface catchment divides required Woodlawn to secure an addition WAL. This issue is further discussed in Section 7.1.

The following section details surface water management within SML20 and provides results from monitoring undertaken during the reporting period.

6.4.1 2012 EA Assessment and Predictions

No specific assessment criteria were provided in the EA in relation to surface water or groundwater discharges as the site is and will continue to be a nil discharge site. During the 2020/21 reporting period apart from the discharge event reported in paragraph 6.4.5 no other water has been discharged from site. The EA however, made the following commitments in relation to surface water management in Table 11 below.

Table 11. Environmental Assessment - Surface Water Management Commitments

Commitment in EA	Compliance
To maintain sufficient freeboard on the plant pollution control pond to avoid discharging water	Achieved during the reporting period.
Maintain sufficient freeboard in ED2 to avoid discharges	Each cell is managed with to maintain in excess of .6m freeboard during the reporting period. Cell 5, with a capacity of ~ 400ML was commissioned in April 2020. It retains plenty of free storage capacity for the C&M period.
Maintain sufficient freeboard on the waste rock leachate dam to avoid discharges	The dam had an excess of 1 metre freeboard during the reporting period. The freeboard is maintained by a pumping system
Operate a site water recycling system that maximises the treatment and recycling of contaminated water onsite	The water treatment plant was decommissioned and removed during the reporting period. It is not envisaged a new water treatment plant will be required on resumption of operations.
Install and maintain adequate erosion and sedimentation controls on site	The controls were installed during the construction program and are currently subject to maintenance
Rehabilitate disturbed areas following completion of construction program	Rehabilitation work will recommence when operations resume
Continue surface water and groundwater monitoring program	Results of the monitoring program, for the previous reporting period is provided in this Annual Review

6.4.2 Surface Water Monitoring – Creeks

There are eleven surface water monitoring sites as shown on Plan 6. The sites consist of three ephemeral creeks and nine dam locations.

SML requirements for surface water monitoring include pH and conductivity monitoring of surface water. Other general water quality parameters are also measured to determine overall health of the receiving waters. The sites are monitored quarterly with an attempt to complete the monitoring when the creeks are flowing. Good rain during the reporting period allowed sampling to be undertaken of the monitoring points, although saturated soil and surface water conditions made accessing sites problematic from time to time. A summary of surface creek water results for SML20 is presented in Table 12.

Table 12. 2020-2021 SML 20 surface water quality - creeks

Site	Number of Samples	pH			Conductivity (µS/cm)		
		Minimum	Average	Maximum	Minimum	Average	Maximum
100	3	7.22	8.21	9.24	495.4	765.87	1185.3
105	6	6.29	7.39	8.66	251.5	1222.08	2798.5
109	5	7.15	7.77	8.52	396.5	1974.44	4532.7
115	4	7.64	8.11	8.66	930	2535	3840

The number of samples collected is directly related to the number of flow events encountered during the reporting period. Samples are taken when sufficient flow is available at the time of sampling. Site 100 is located on the western perimeter of SML20 and measures water quality downstream of the Waste Rock Dam. Site 105 is located on Crisps Creek at the downstream edge of SML20. Site 109 is located on the edge of SML20 downstream of the South Tailings Dam. Site 115 measures water quality downstream of ED2 in Allianoyonyiga Creek. These sites were located to measure water quality within the natural environment surrounding the mine site. As the mine is located at the top of the catchment, on the catchment divide, the creeks have very limited catchment and only flow after heavy or prolonged rainfall. From time to time drought has resulted in very few rainfall events that provided sufficient water to stimulate surface flows, however this reporting period rainfall has been above average and samples have been obtained.

The results generally show little, if any influence on water quality as a result of the mining operation. Instead the key driver for fluctuations tends to be variations in seasonal conditions. Nevertheless, any changes outside the historical trends are investigated as required. The following graphs show historic levels of pH, conductivity, key metals and sulphate indicators at Site 100, Site 105 and Site 109. Gaps in data represent periods when the ephemeral sites had no surface flow.

As seen in Figure 7 and Figure 8 below, the surface water at Site 100 which is downstream of the Waste Rock Dam has remained neutral at around pH 7 with low salts and metal content. Sulphate concentrations are well below safe stock drinking levels (ANZECC guideline = 1,000 mg/L) and Human Recreation Guideline of 400 mg/L. Metal concentrations with the exception of Zinc are generally at trace levels and indicate that no detectable leakage has occurred from the south western portion of the site, and in particular from the Waste Rock Dam and Rehabilitated Waste Rock Dump. The spike in zinc observed in March 2020 is considered to be an anomaly and associated with the drought conditions at the time. The zinc concentration has since retreated to long term average level.

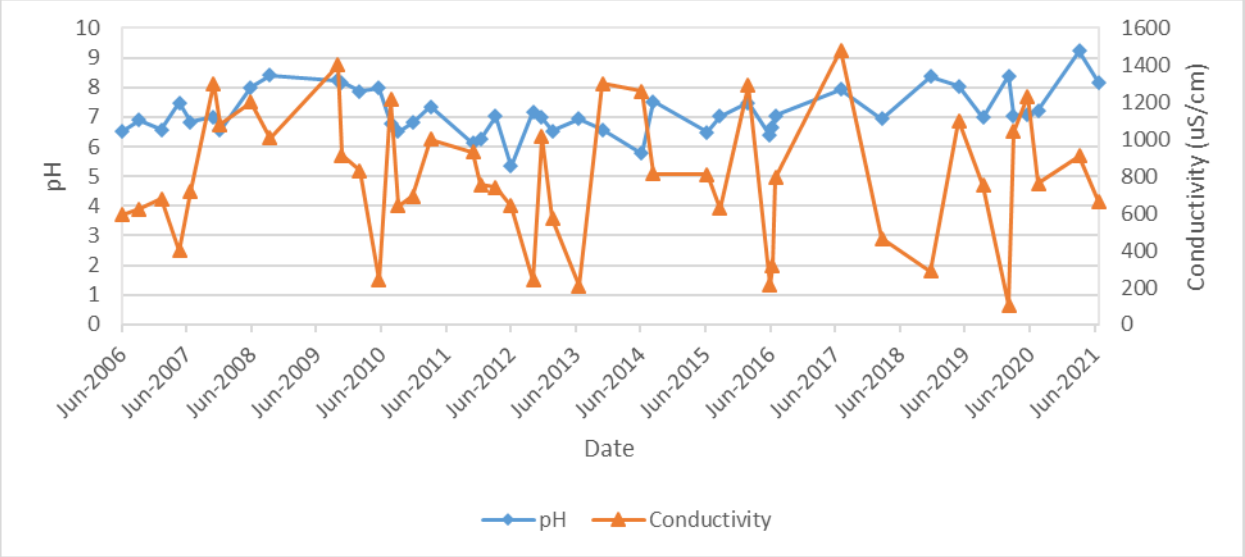


Figure 7. Water quality pH and conductivity - Site 100

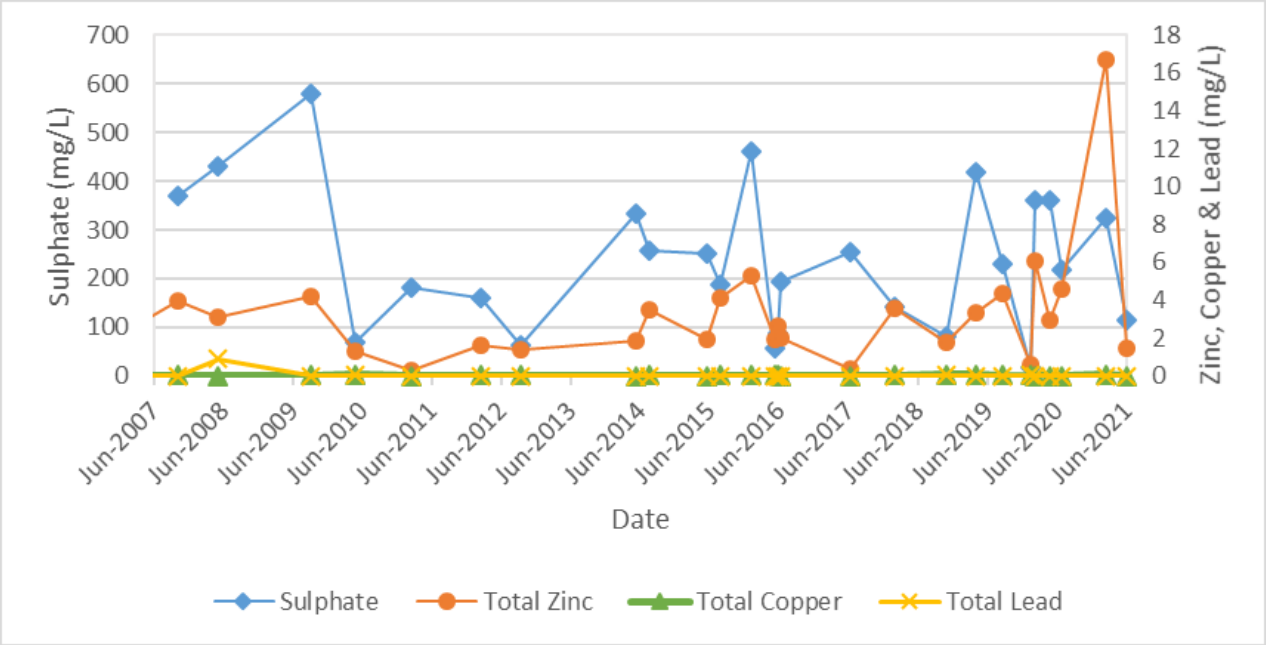


Figure 8. Water quality - sulphate and metals - Site 100

Results for Site 105 are shown in Figure 9 and Figure 10 below. Site 105 is located on the eastern side of the mining lease on Crisps Creek. Crisps Creek is ephemeral and therefore sampling only occurs when the creek is flowing after rain events. Water quality fluctuates in response to rainfall and can contain higher salt content particularly during low flow or following extended dry conditions. During the reporting period Crisps Creek has consistently had water flow due to the above average rainfall experienced across the region.

As indicated in the long term results provided in Figure 9 and Figure 10, the water quality in Crisps Creek is generally very good, with spikes in EC typically associated with dry cycles. When flowing, conductivity levels are between 1,000 and 3,500 µS/cm while sulphate and metals concentrations are very low. The creek is consistently neutral to slightly alkaline with an average pH of 7.4 during the reporting period. Sulphate and conductivity spiked in May 2020 but the results are still relatively low and no greater than previous spikes. The probable cause being the drought conditions at the time. Subsequent rainfall has seen the conductivity retreat to a low concentration.

Figure 10 below show sulphate and metal concentrations of Crisps Creek. Although the graph appears to show elevated sulphate and zinc in June 2014 and again in 2020, the actual values are low. The remaining data are at trace levels. The peak of 600 mg/L sulphate occurred during very low flow but is still below ANZECC stock drinking guidelines.

When flowing, Crisps Creek has very good water quality with all parameters meeting the very conservative ANZECC 2000 guidelines for 95% ecosystem protection. This is somewhat surprising given that the creek flows through active agricultural land. As Crisps Creek runs parallel to Collector Road, any contamination leaving the site, either surface of subsurface, would be detected at the Site 105. The results confirm that there are no measurable impacts from the Woodlawn Mine site.

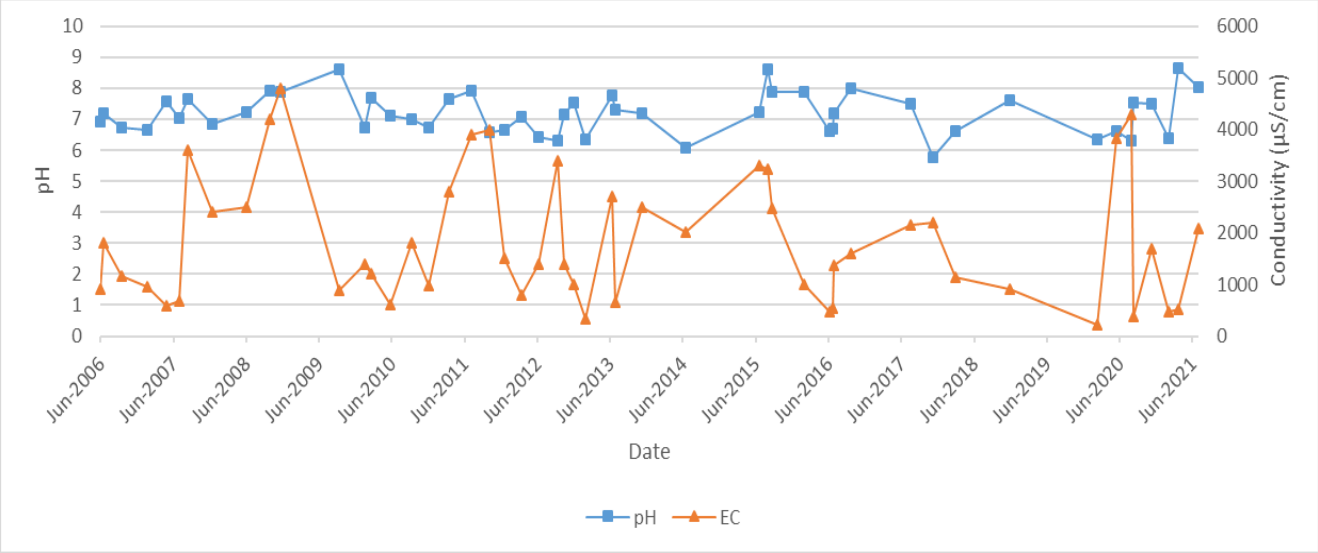


Figure 9. Water quality - pH and conductivity - Site 105

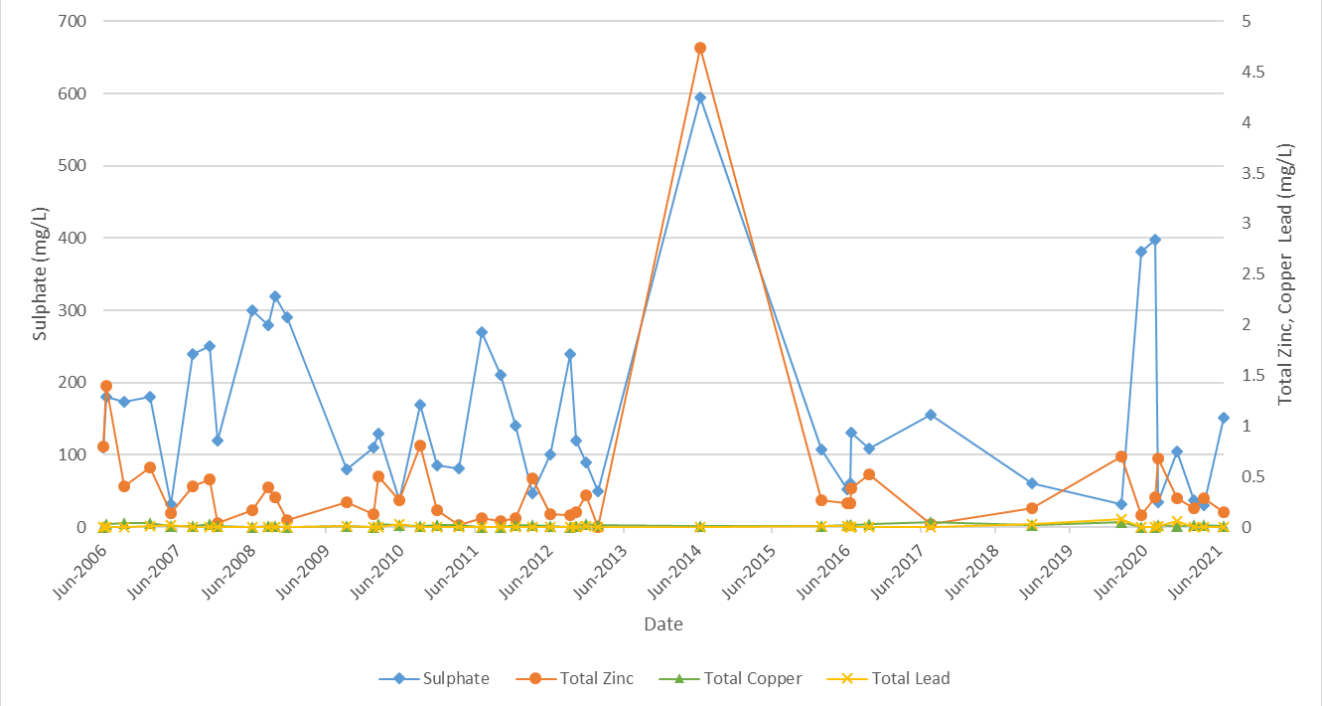


Figure 10. Water quality - Sulphate and metals - Site 105

Site 109 is located downstream of Tailings Dam South (TDS) and is located in an ephemeral channel at the southern edge of SML20. The results are provided in Figure 11 and Figure 12 below. The results show the water quality at site 109 is relatively good and does not indicate that any offsite seepage is occurring from TDS. The pH tends to be neutral approximately pH 7 and conductivity fluctuation occur consistent with seasonal conditions with higher EC observed during dry cycles.

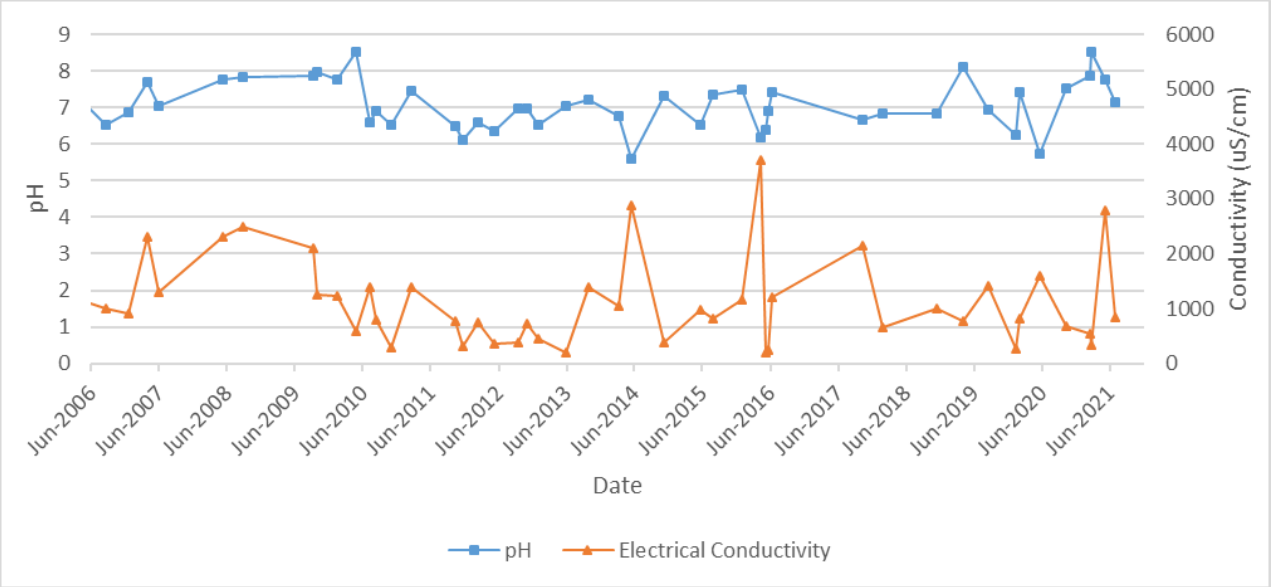


Figure 11. Water quality - pH and conductivity -Site 109

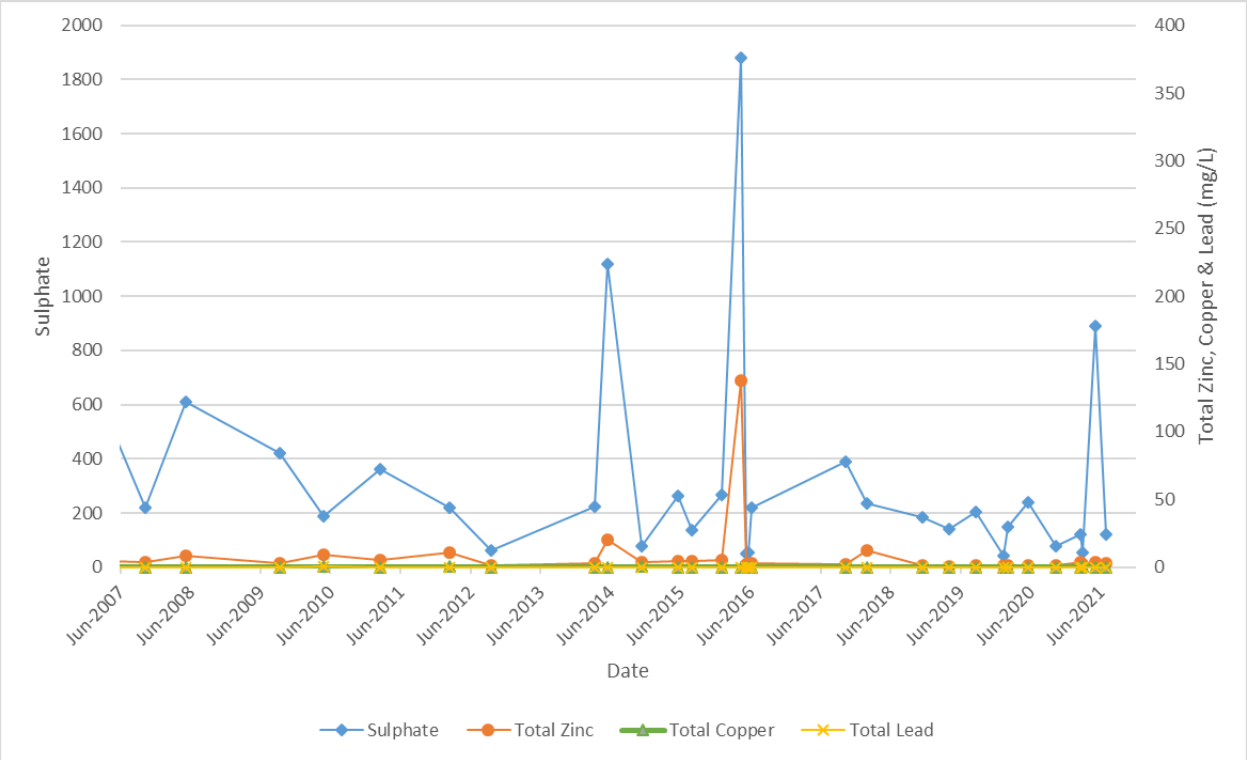


Figure 12. Water quality - Sulphate and metals - Site 109

In summary, although Woodlawn is nil discharge site, surrounding ephemeral surface water channels can be heavily influenced by local geology and soils which reflect the chemistry of the underlying sulphide ore body.

An important issue in determining if the mine has had any influence over natural background levels is to ascertain if there are any long term trends in water quality.

Since 2007 there are no emerging trends although there have been isolated spikes in water quality. These spikes often reflect low flow conditions, particularly when samples are taken from ponded water following minor rainfall events.

6.4.3 Surface Water Monitoring – Dams

Water quality within the tailings and evaporation dams on site is used as a reference to determine the potential impacts on receiving waters should discharge from the site occur. Although the site is designed as nil discharge, there is the potential for some dams to overflow under extreme rainfall events. Monitoring surface water quality also provides an indication of general water quality trends on site as well as the potential for impacts on groundwater systems.

Heron no longer utilises ED1 for water storage as Veolia have the obligation under their Project Consent to dewater the acidic water from the dam. Heron retains the right under its approvals to access ED1 in future. Should Heron require to use ED1 in future an arrangement will be made with Veolia to construct appropriately lined coffer dams within the bounds of the existing ED1 footprint. All management and monitoring for ED1 is currently undertaken by Veolia.

Table 13 provides the water quality results for the reporting period. Long term trends are shown on the following graphs. As forecast in earlier Annual Reports, the water source in ED2 has changed from the original acid water which has been evaporated or removed from ED2. ED2 is now used to store water that has been extracted from the old underground workings. In view of the change in water quality, the EPL monitoring requirements in ED2 have also changed whereby the water is sampled monthly. The dam has been subdivided into six separate cells and lined with HDPE lining to accept water from the old underground mine. The new monitoring point is designated as the cell receiving mine water at the time of sampling. There have been no dewatering operations during the reporting period consequently sampling from the discharge point into ED2 has not occurred.

Table 13. 2019-2020 SML20 Surface Water Quality - Dams

Site	*Number of Samples*	*pH*			*Conductivity (µS/cm)*		
		Minimum	*Average*	*Maximum*	*Minimum*	*Average*	*Maximum*
ED2 mine dewatering	0	n/a	n/a	n/a	n/a	n/a	n/a
TDS	3	2.75	2.79	2.84	7660	7836.7	8030
TDN	3	2.48	2.6	2.74	9070	9793.3	11200
TSF4	4	3.05	3.6	4.53	2830	5085	7740
RWRD	3	2.97	3.08	3.14	13500	22267	34000
WM200	6	7.25	7.95	8.2	872	1016.	1250
Heron PCD WM300	4	4.05	4.54	5.27	1220	1478	2070

ED2 has been used to store and evaporate water pumped from the old underground workings since May 2017. A total of 642,000m^3 has been pumped from the old workings into ED2. The EPA has allowed extraction of the old mine water to be conducted in three stages. Stages 1 and 2 have been completed. Stage 3 commenced on 20 November 2018. Analysis of the water quality has been undertaken throughout the three stages of dewatering. The results of water sampled from the discharge point from the mine dewatering pipe through Stage 3 is shown in Figure 13. Whilst in C&M pumping of the mine water has ceased. The EPA have been advised that water sampling of mine water will be discontinued until dewatering resumes.

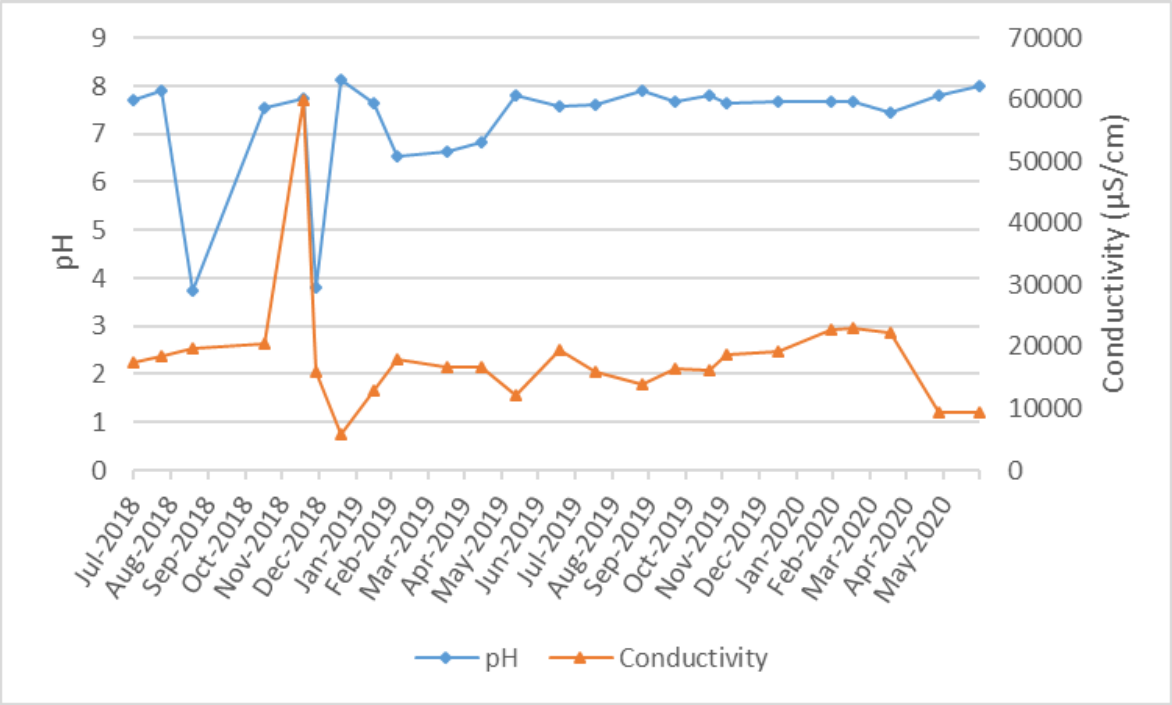


Figure 13. ED2 mine dewatering water quality

Tailings Dam South (TDS) is known to be leaking and Heron committed to sealing the leak as part of the tailings retreatment project. The leakage enters a small dam at the base of the TDS wall and water is pumped back into the dam. During June 2016 a sulphate and zinc spike was identified but on inspection, the seepage collection dam level was low and there was no indication that it had discharged. Levels returned to normal during the last three reporting periods. Site 109, which is located downstream of the TDS return dam is regularly inspected and when in drought is often found to be dry indicating that the leakage is fully contained and returned to the dam.

Water contained in TDS was lowered significantly prior to the commencement of tailings extraction for retreatment. The volume of water leaking from the wall reduced to a minimum throughout the reporting period. Tailings reclaim from south tailings dam has been suspended during C&M. During the reporting period under C&M all stormwater flowing into TDN and TSF4 has been pumped to TDS which now contains a substantial volume of water. The water quality, notably the conductivity has reached comparatively low levels reflecting the nature of the water being pumped into TDS (Figure 14). Any work to repair the historical leak will not be able to occur until completion of tailings reclaim operations. The resumption of such operations have been deferred until resumption of operations.

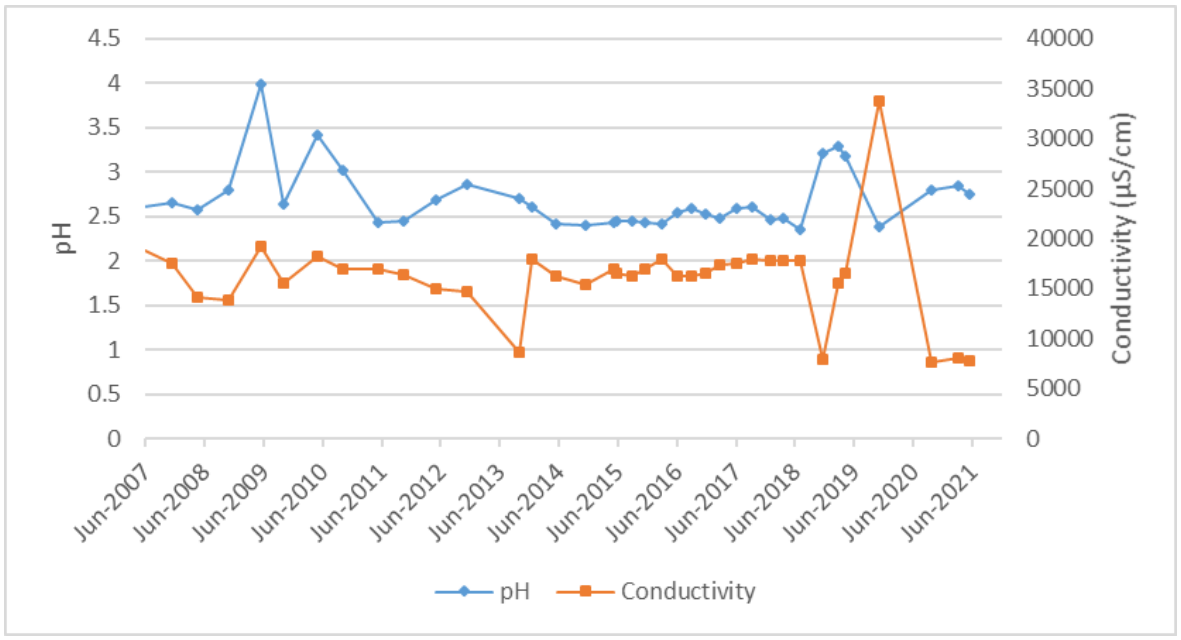


Figure 14. TDS pH and Electrical Conductivity results

Figure 15 shows the water quality within the return water dam below TDS. Water quality fluctuates more significantly due to rainfall as there is the influence of a small natural catchment between the wall of the tailings dam and the catch dam. This water is simply pumped back into TDS.

The data shows no trends emerging over several years and the water quality during the reporting period was within trends seen in previous results although probably the lower conductivity and higher pH recorded during the reporting period reflects the above average rainfall experienced in the region.

The earlier dewatering and recent rewatering of TDS has also had no measurable effect on water quality in the return water dam.

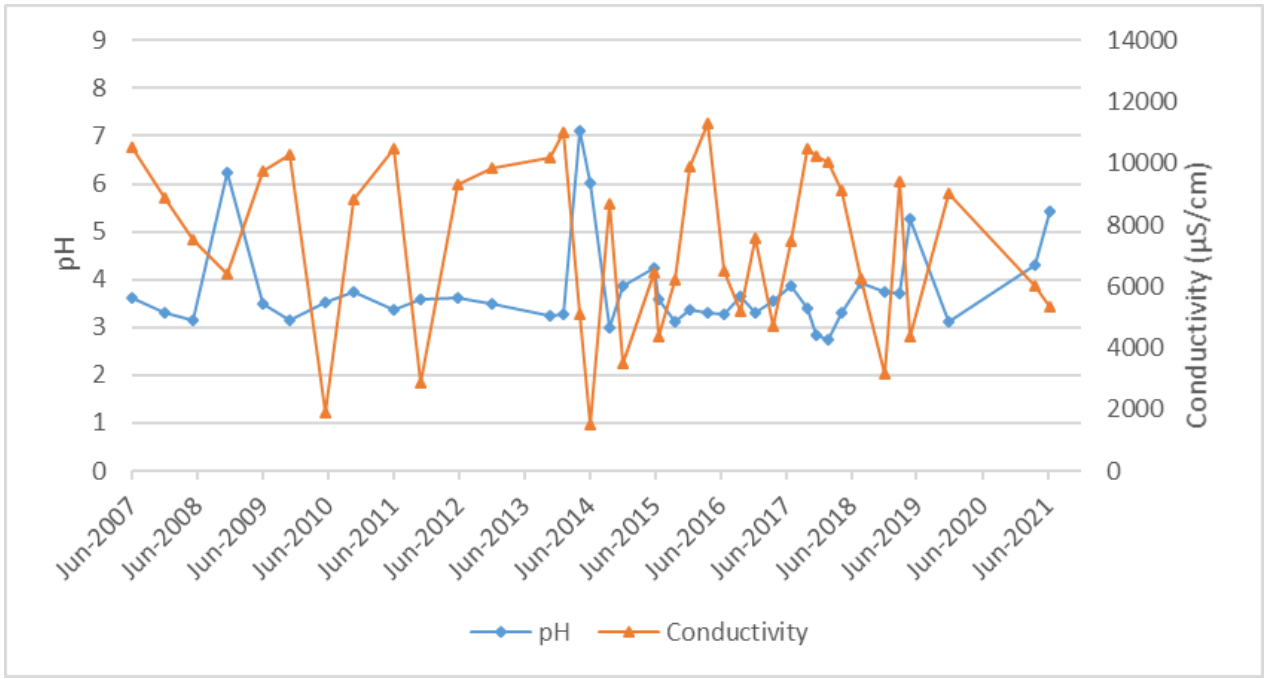


Figure 15. Tailings Dam South Return Water Dam

Figure 16 shows pH and conductivity levels of the TDN which shows pH and salinity have responded to the increase in rainwater across site during the reporting period compared with recent years. The conductivity level reduced and pH rose slightly during the reporting period reflecting stormwater inflows following above average rainfall experienced on site.

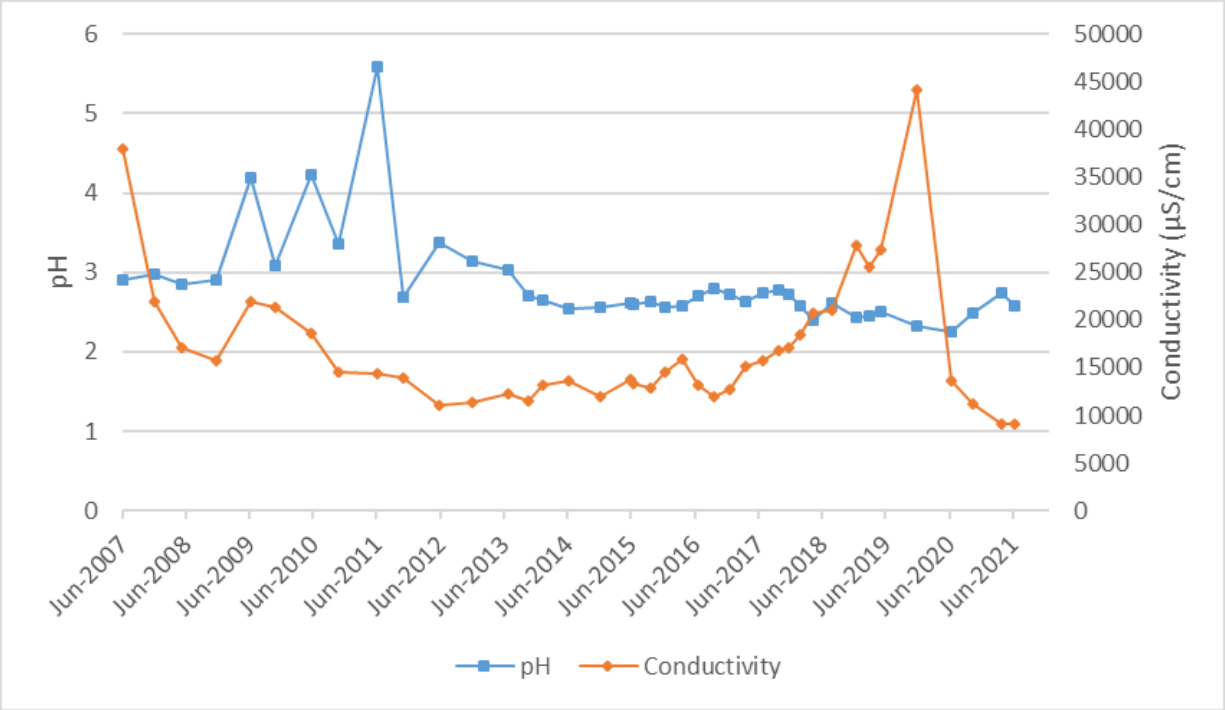


Figure 16. Tailings Dam North - pH and conductivity

The waste rock dump represents the out of pit overburden emplacement for the open cut mine and consists of waste rock which has been shaped and rehabilitated. Although vegetation cover is mature and healthy, the emplacement produces a small amount of subsurface leachate which is captured in small catchment dam referred to as the waste rock dam (WRD) located on the south western corner of the SML. Leachate contained in the dam is able to be pumped into evaporation dams so the WRD does not discharge off site.

Long term water quality data is provided in Figure 17 and shows a fluctuation in the WRD water quality most likely associated with the high rainfall experienced on site during the reporting period. The rainfall resulted in a dilution event manifest as a decrease in electrical conductivity and increase in pH. Additionally, there are a number of drainage embankments which cut across the southern part of the emplacement which allow some surface water to enter the leachate dam. This fresh water inflow also contributes to the fluctuation of the salt content of the rehabilitated waste rock dam.

Condition 3 of Schedule 4 of the Project Approval requires the development of a long term passive treatment system for the WRD. At present the water is pumped into ED1 and recycled as required. However, a passive treatment system is required to be installed to treat any overflows from the pond, in the event that the pumping and transfer system will not be available after mine closure. The Project Approval MOD3 will incorporate a proposal for early establishment of a trial passive treatment system. Installation of the passive treatment system is unlikely to occur during C&M.

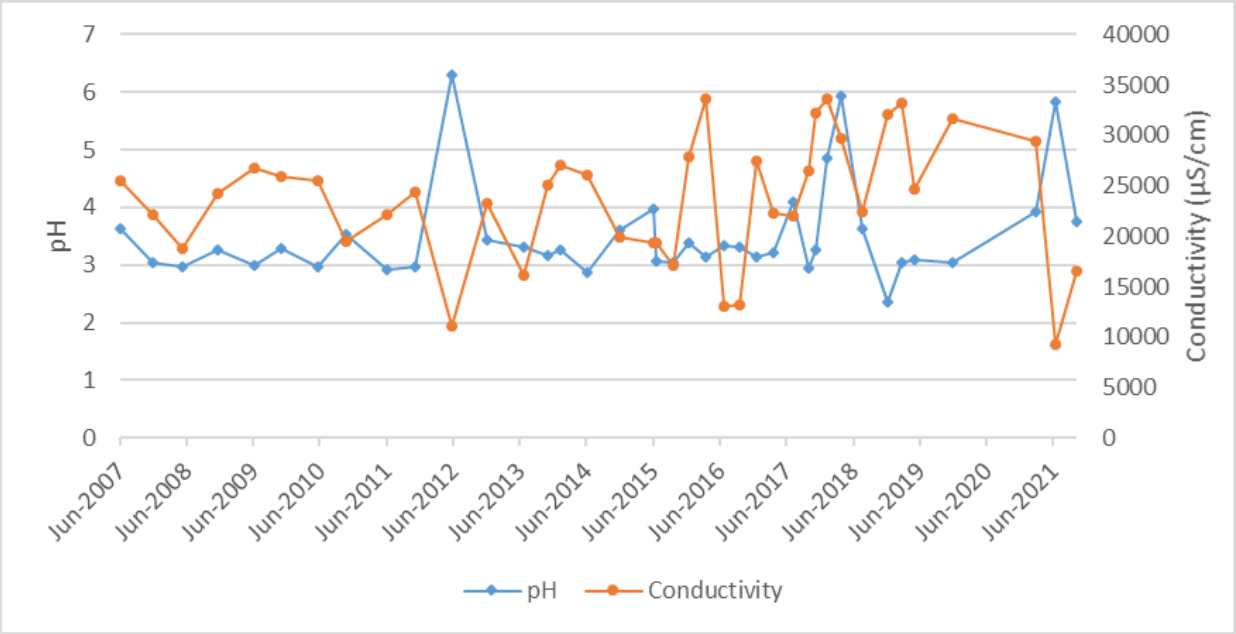


Figure 17. Rehabilitated Waste Rock Dam - pH and conductivity

Results for WM200, the site Raw Water Dam (RWD), are shown in Figure 18. The RWD (also referred to as Woodlawn Dam) contains water pumped from the Willeroo borefield and runoff from the western ridge of Rehabilitated Waste Rock Emplacement. This water is natural and can be used as an indication of background levels in the area. The pH is generally close to neutral although does fluctuate ±1pH unit while the conductivity long term average is around 1000 µS/cm. The conductivity has been around 500 µS/cm reflecting a dilution of salts in the borefield and from surface flows during the recent wet cycle

Water from the RWD is transferred to a storage tank for raw water reuse at the site. Veolia and Heron share the water allocation available under the water access licence but both maximise the recycling of water around the site. Water recycling is a key feature of the Woodlawn Mine and includes water contained in all on site dams including excess water from the Bioreactor operation.

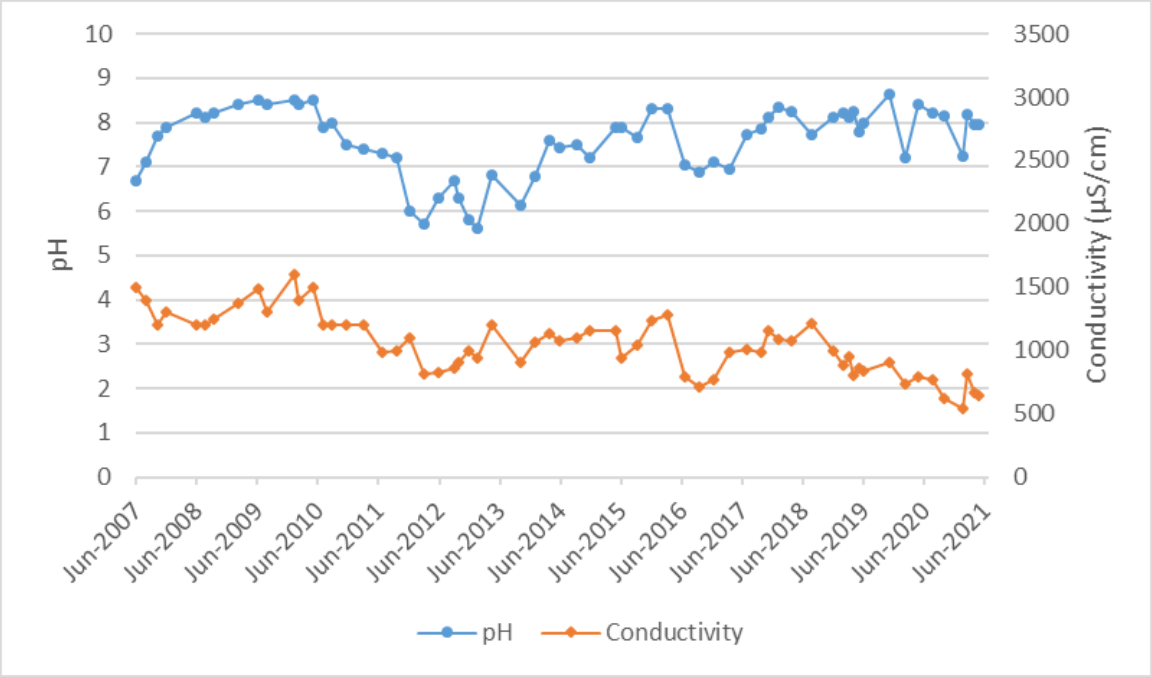


Figure 18. WM200 Raw Water Dam - pH and conductivity

6.4.4 New Heron Dams

A summary of the water monitoring results for the process plant pollution control dam (PPPCD) (WM300) is provided in Figure 19. During the reporting period the water level in the Heron PCD was actively managed to prevent overflow. Nevertheless, a storm event over the weekend 7-9 August 2020 resulted in overflow of the PPPCD on the 9th August 2020. The spillover was reported to the EPA and the Resources Regulator. Since the event, the water level in the PPPCD is closely monitored and the pumping system from the PCD to TSF4 has been improved to prevent a recurrence. Because, during C&M the PPPCD only received stormwater the water quality is very good Figure 19.

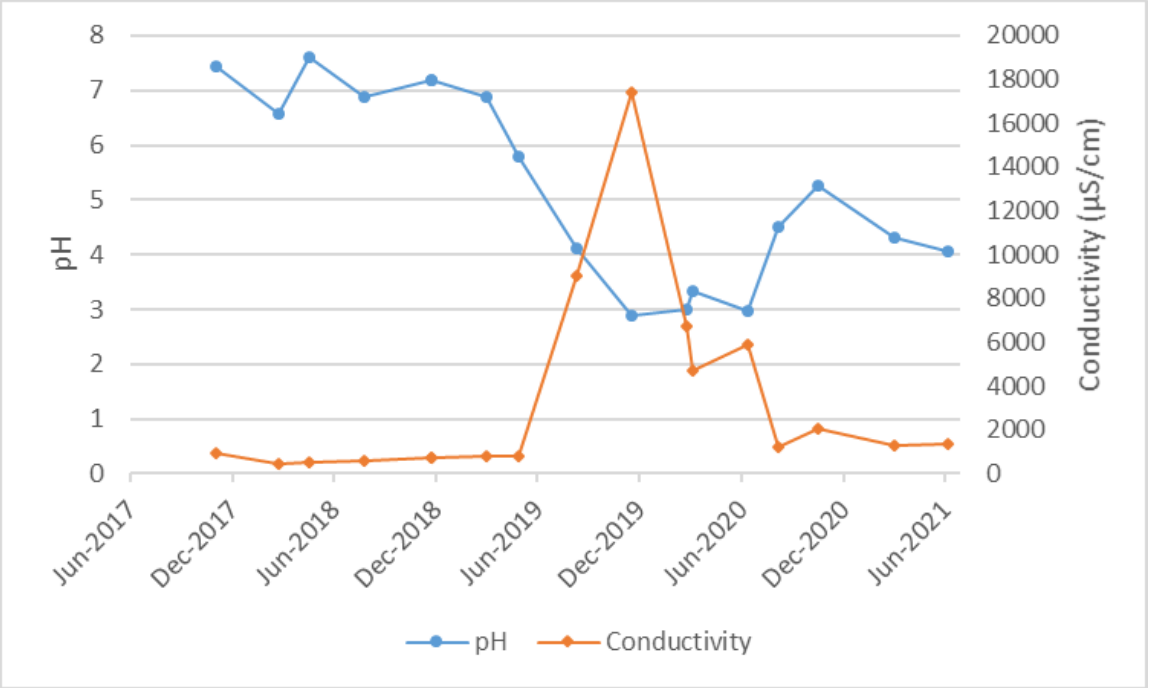


Figure 19. WM300 - Pollution Control Dam - pH and conductivity

A summary of the water monitoring results for Tailings Storage Facility 4 (TSF4) is provided in Figure 20. Stage 1 of TSF4 was constructed during the Woodlawn Mine Project construction phase and commissioned in 2019. It contains approximately 280,000m^3 of tailings and has capacity to hold up to 500,000m^3. During the reporting period the water level in TSF4 was actively managed to ensure water from the decant pond was kept away from the embankment. Nevertheless, due to the large stormwater catchment and extraordinarily high rainfall experienced on Site during the reporting period a high volume of storm water reported into TSF4. During C&M the water from TSF4 is being pumped into TDS for storage and evaporation.

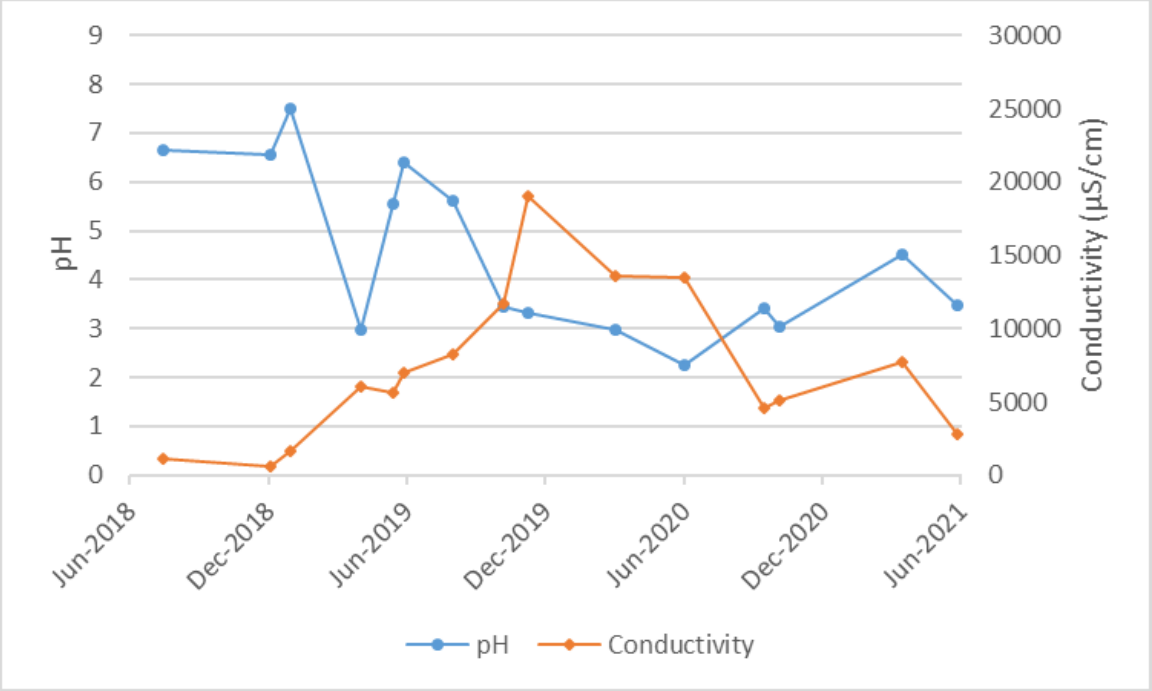


Figure 20. TSF4 - pH and conductivity

6.4.5 Reportable Incidents

There was one reportable incidents associated with surface water discharge during the reporting period. On the weekend of 7th to 9th August 2020, with the peak overnight 8th/9th August, Woodlawn experienced 164mm of rainfall during a regionally significant rain event. Water from the PPPCD overtopped during the early hours of the 9th August. Downstream water samples were obtained for analysis and a report submitted to the EPA. The water quality in the PCD had improved during the preceding period due to there being no contaminated water added following suspension of operations at Woodlawn and subsequent successive rainfall events diluting the residual water in the PCD and excess water being pumped to TSF4. There have been no apparent adverse environmental outcomes following the overflow event. C&M procedures were subsequently reviewed and improved to prevent a recurrence of this type of event.

6.4.6 Effectiveness of Environmental Controls

The surface water management system has performed as designed during the reporting period and all surface water storages have had sufficient freeboard maintained to avoid discharges offsite during storm events. No further improvements have been identified as being necessary in the coming reporting period, however a review of the water storage requirements will be necessary prior to resumption of operations to manage the high volume of water stored on site following the above average rainfall during the reporting period.

The water quality monitoring program will continue and if any trends emerge in surface water quality, control measures will be designed and implemented.

6.5 Groundwater Management

Groundwater is managed in accordance with the Woodlawn Water Management Plan. Groundwater quality monitoring analysis is completed for pH and conductivity under SML20 requirements. Analysis is also undertaken for zinc, copper, lead and sulphate annually for the tailings piezometers and monitoring bores to assist in the analysis of groundwater quality. A summary of groundwater results for this reporting period are provided in following sections.

6.5.1 Assessment Criteria

Monitoring of piezometric installations provides an indication of the hydraulic pressures associated with onsite dams. These readings, in conjunction with groundwater quality data, contribute to assessing the integrity and stability of the large storage dams and the potential for offsite impacts to be occurring. It is important to note that the environment prevailing at Woodlawn is heavily influenced by the sulphide ore body which has been the subject of mining for many years. The natural environment is therefore normally high in base metals and given the marine nature of the surround sedimentary strata, can also be naturally saline.

The groundwater quality monitoring program is designed to monitor groundwater in the vicinity of the mine for a wide range of analytical parameters indicative of mining operations. Comparison of background groundwater quality with surface water monitoring results (from tailings dams) and downstream groundwater quality can provide an indication of the management and containment of contaminated land and runoff. All groundwater monitoring locations are shown in Plan 6.

DPIE requested that Heron develop a set of Site Specific Trigger Values based on ANZECC Guidelines to assist in assessing groundwater systems and to determine if there is any influence caused by the use of paste fill within the underground workings. Although the ANZECC Guidelines are not designed for groundwater systems, they do provide a methodology to develop site specific water quality trigger values using a large long term ambient water quality database. At Woodlawn, this database extends over a 20 year period. The development of trigger values would be useful in determining compliance with Condition 3(d) of Schedule 3 of the Project Approval, that is, the material used to backfill underground voids is to be physically and chemically stable and non-polluting. The data comes from a series of groundwater monitoring bores spread across the site, as shown in Plan 6.

There are several limitations to the detection of impacts from the use of paste underground. There are four distinct host rock types within the site, sedimentary rock, metamorphic, sulphide volcanic and ore lens, and the groundwater quality naturally varies according to the host rock of the monitoring bore. Variability also occurs within the same bore over time due to climatic conditions linked with saturation levels of the surrounding strata. There are also no upstream sample points available for use as comparisons to the groundwater data.

Despite these limitations, ANZECC based Site Specific Trigger Values have been determined based on the 80th percentile water quality obtained from 24 consecutive samples from monitoring bores located within the four separate host rock types. The results are shown in Table 14 and Table 15.

Table 14. 80th percentile trigger values derived for chloride, EC, dissolved major cations, pH and sulphate

Host Rock Type	Bore	Chloride	Conductivity	Calcium	Magnesium	Potassium	Sodium	pH	Sulphate
Ore Body	MB16	270	36000	480.5	7465	5.65	244.0	3.3	63350
Sulphide Volcanics	MB19	1115	6870	740.0	591.0	1.85	284.5	6.9	3225
Metamorphic	MB7	3065	9660	335.5	676.5	11.65	632.5	7.3	207
Sedimentary	MB4	410	1680	7.5	88.4	1.70	173.0	5.5	210

Table 15. 80th percentile groundwater site specific trigger values for dissolved metals (mg/L)

Host Rock Type	Bore	Aluminium	Arsenic	Cadmium	Copper	Lead	Manganese	Zinc	Iron
Ore Body	MB16	2145	0.2	29.4	206.5	0.5345	550	8450	51.95
Sulphide Volcanics	MB19	0.07	0.005	0.044	0.01	0.0029	6.61	11.39	0.475
Metamorphic	MB7	0.04	0.02	0.008	0.07	0.0007	1.16	1.137	0.145
Sedimentary	MB4	0.26	0.005	0.0017	0.06	0.0068	0.04	0.849	0.820

There are other bores which provide data on sedimentary hosted groundwater such as MB3 discussed in Section 6.5.3. However as this bore is located approximately 2 km to the north of the mine workings it is not a useful bore to determine potential impacts from the underground mining a paste filling activity

A key consideration is Acid Mine Drainage (AMD) which is generally indicated by an acidic pH (less than 5) and is caused by the exposure of minerals to oxygen which, when saturated with water, causes chemical reactions that release hydrogen ions into solution. Zinc and sulphate are also used as an environmental indicator for AMD as they are prevalent in process waters associated with mining activities at Woodlawn. Copper and lead results are provided to indicate the presence of other minerals which may be naturally occurring or associated with previous mining operations.

6.5.2 Ground Water Management TARPs

In addition, DPIE-Water required Heron to establish a Trigger Action Response Plan designed to identify changes in water quality which could indicate potential impacts offsite. These are generally set as a deterioration trend of 20% in the value of pH and conductivity of a 12 or 24 month period. Less than a 20% variation requires no action, greater than a 20% variation over 12 months requires further investigation while an increasing trend pattern of 20% over two consecutive 12 month periods would result in reporting to authorities and active engagement to identify causes and implement remedial measures if found appropriate. The TARPs are not set for all sites but rather specify external points to the mine site which may indicate off site impacts.

Although fluctuations greater than 20% regularly occur, there were no adverse trends in pH and conductivity. Favourable trends, that is, pH returning to neutral from acidic or reductions in conductivity are not included. The TARPs do not cover fluctuations in metal concentrations as this is usually reflected by pH and conductivity as being the main indicators. There were however some trends in zinc concentrations for MB17 and sulphate for MB16 which are commented on in the results. As these are internal monitoring sites, they have not triggered any additional measures however they will be closely reviewed in the coming reporting period.

6.5.3 Background Groundwater Quality

It is important to recognise that natural groundwater over the site has been heavily influenced by the local geology. The volcanogenic massive sulphide deposit forms part of a wider regional north-west plunging syncline which not only hosts metal rich ore lenses but also a range of metamorphosed sedimentary rocks of both marine and volcanic origin.

Marine deposits are naturally high in salt content. The ore body is naturally high in sulphides and the target ore lenses represent concentrations of metals including zinc, copper, lead, gold and silver. Together, it is referred to as the Woodlawn Volcanics.

The ore body is generally very hard and would normally be defined as an aquiclude, which is a geological formation that can neither store nor transmit water. However, the deposit is fractured which allows water to slowly penetrate and permeate through the strata. The rate of flow is small but the process creates a widely variable natural groundwater quality which is directly influenced by the immediately surrounding geology.

This creates difficulties in determining the impact of the operation on the natural environment. Groundwater naturally passes through these volcanics and picks up elevated sulphate and metal concentrations. These levels appear "contaminated" but are natural and should be considered part of the background water quality.
Monitoring Bore MB3 provides an indication of background groundwater quality that is not influenced by naturally occurring volcanics but is also well away from the mine site. The site is located in the valley to the north of the Woodlawn Mine site near the Woodlawn Farm Homestead and is hosted in sedimentary strata.

Results for MB3 (Figure 21) indicate that long-term pH ranges from 6.0 – 8.0 and conductivity from 1,640 – 3,000 µS/cm. The spike in conductivity in August 2018 is most likely a sampling or analytical anomaly as results have since returned to normal long-term levels. There was a slight drop in conductivity in Apr 2021, which is most likely due to the saturated ground conditions and infiltration of rainwater causing dilution of salts.

MB3 site is located well away from the underground workings and therefore not included in the nominated ANZECC assessment bores discussed in Section 6.5.1. This is considered a near surface groundwater table with the potential to form natural springs but is influenced by longer term rainfall patterns.

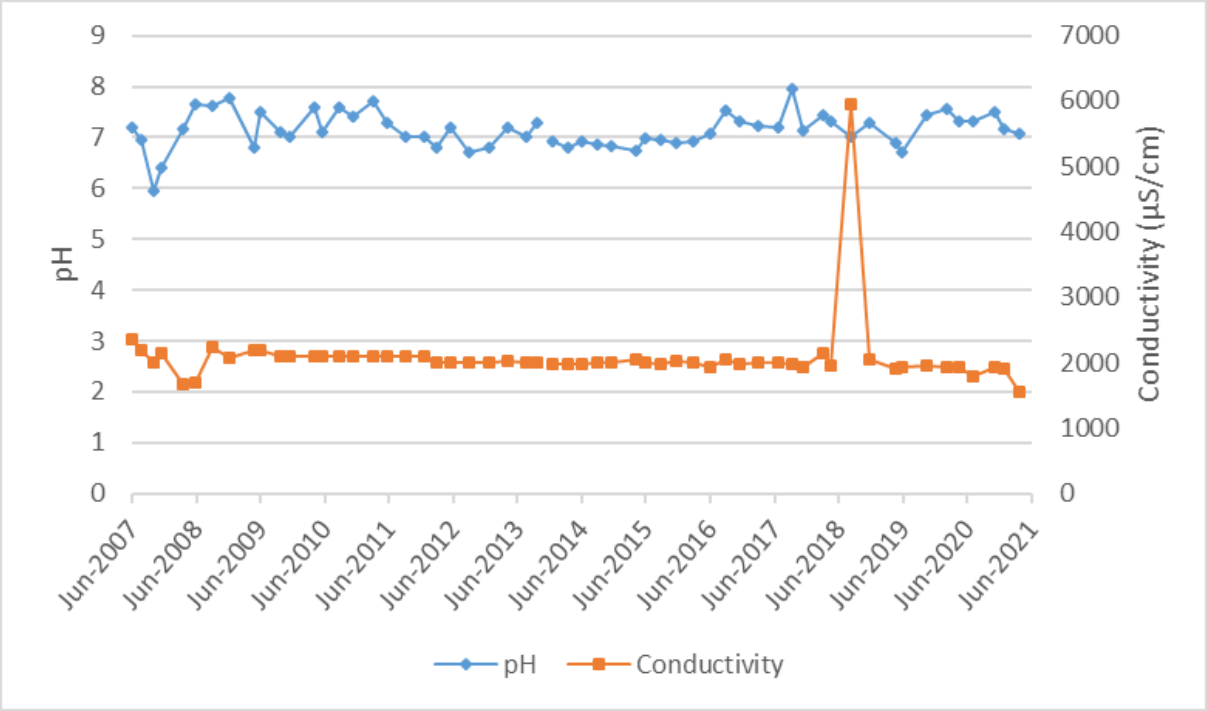


Figure 21. MB3 Conductivity and pH - Indicative of background groundwater quality

Results for key metals at MB3 are shown in Figure 22. There has been several high readings of Sulphate which is interesting given the location of the bore and lack of other geological influences at this site. Despite the fluctuations, the actual level was still quite low and within normal natural background ranges. The average long term zinc concentration is present at trace levels (average 0.1 mg/L), with a constant relatively flat trend throughout the reporting period. Copper (long term average 0.002 mg/L) and lead (long term average 0.0003 mg/L) were only detected at trace levels. Although the graph shows fluctuations, it is important to note the scale of the graph. The absolute level of sulphate and metals is quite low. However, there have been significant peaks in past periods which indicate that background water quality can be influenced by the movement of water through natural sulphide ore bodies within the region.

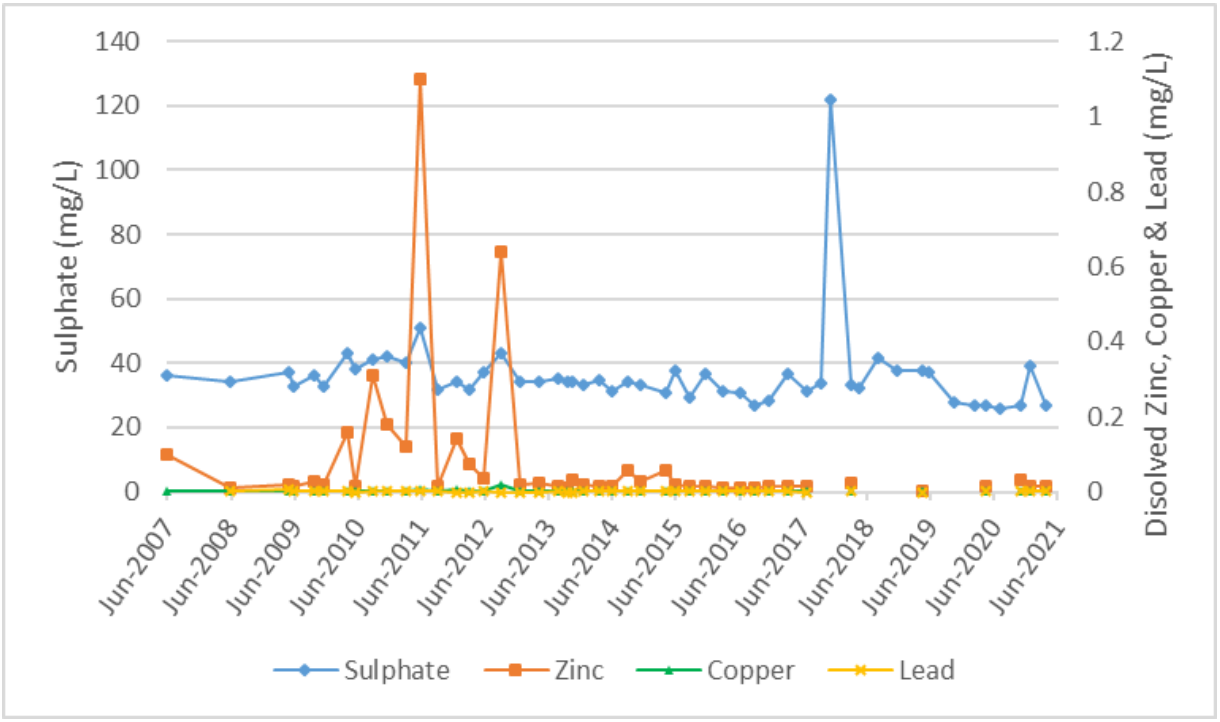


Figure 22. MB3 Water Quality - Background groundwater quality - sedimentary

MB7 is considered to represent non-volcanic influence background groundwater; that is, the groundwater at this location is representative of metamorphic and marine based host rock. Figure 23 and Figure 24 shows that conductivity is high but sulphates and metals are low. Long term average results for MB7 are pH 6.9, conductivity 8,417 µS/cm, sulphate 177 mg/L, zinc 0.99 mg/L, copper 0.06 mg/L and lead 0.002 mg/L. Conversely, when groundwater is influenced by the sulphide ore body but not the metal rich lenses, such as with MB10, sulphate levels increase to 3,700 mg/L, conductivity remains high but zinc, copper and lead concentrations remain low.

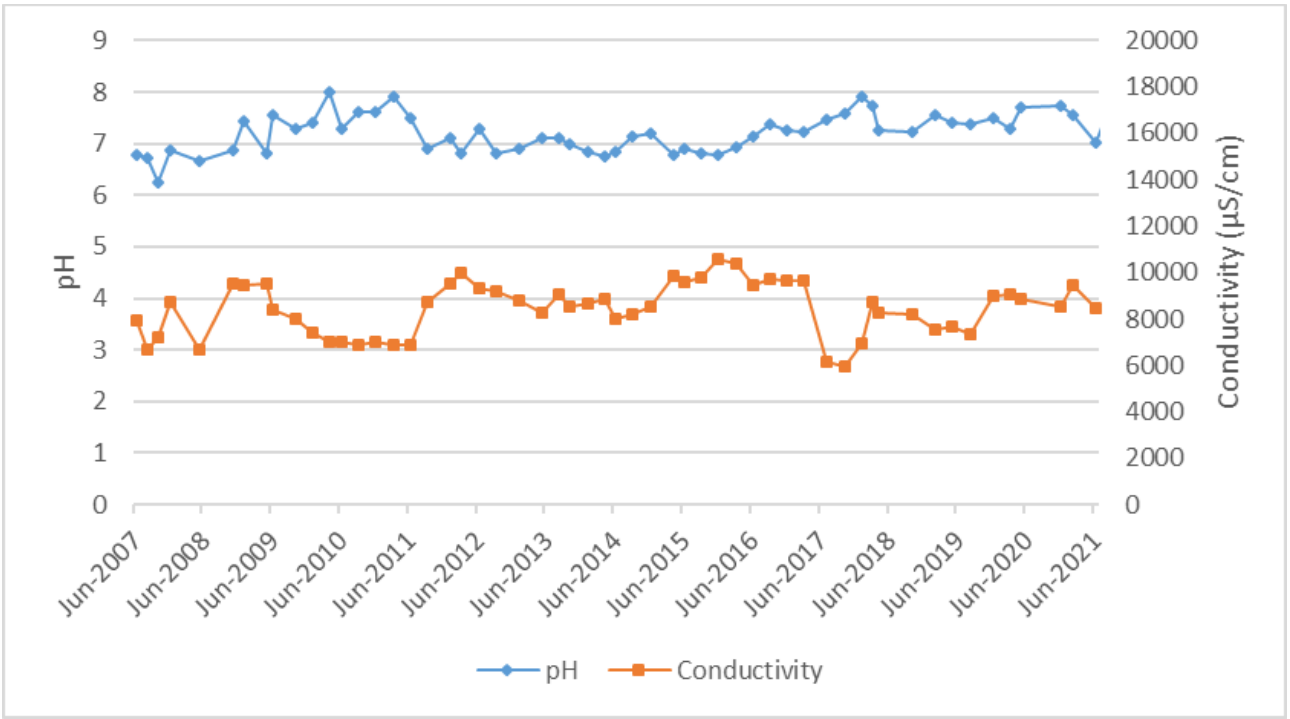


Figure 23. MB7 Water Quality - Background groundwater quality – metamorphic

The sulphate levels of between 150 mg/L and 300 mg/L within the metamorphic strata of MB7 (Figure 24) are considered low. Sulphate levels progressively increase towards the volcanic strata with natural levels in excess of 10,000 mg/L. Metal concentration however varies depending on the location of ore lenses which occur within the sulphide ore body. Sulphate levels have dropped during the reporting period which could be an indication that rainwater is infiltrating the strata and diluting the sulphate concentration.

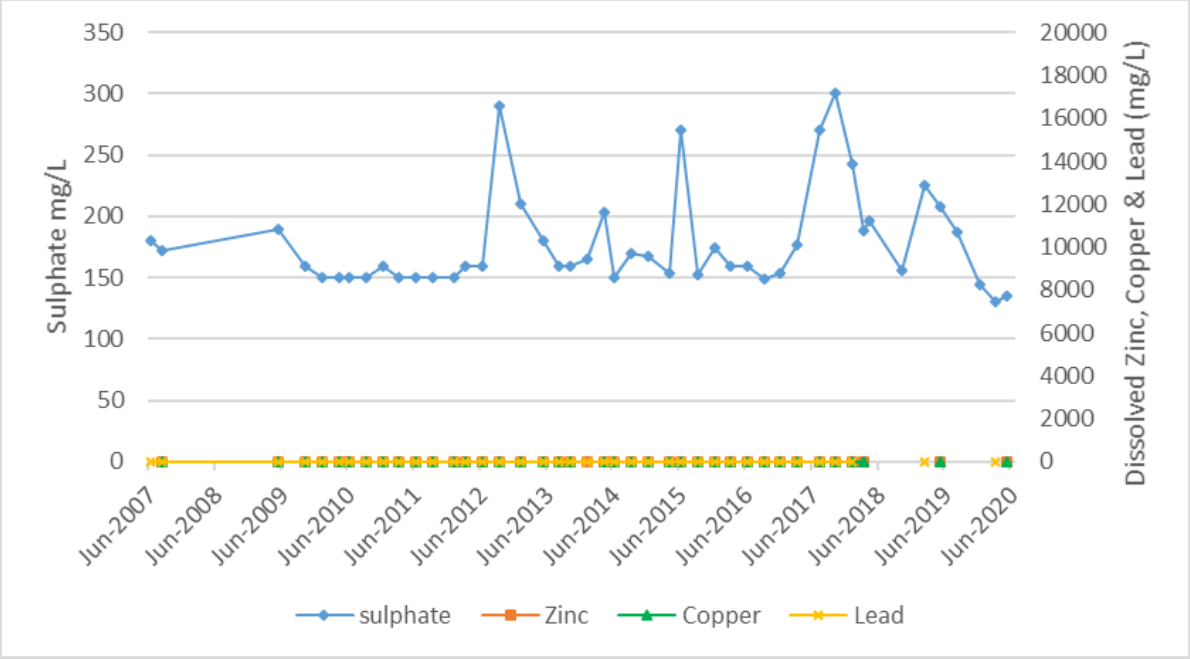


Figure 24. MB7 Water quality - background groundwater quality - metamorphic

6.5.4 Evaporation Dam 2

Monitoring Bores MB11 and MB12 are located at the base of the ED2 embankment and the results monitor seepage from ED2. MB11 is a shallow bore with a depth of 5.85m and MB12 is deeper with a depth of 14.48m. Water quality recorded in these bores remains similar to the mine water stored in ED2 prior to its dewatering and installation of HDPE lining of the facility during 2019/20 (Figure 25 and Figure 26).

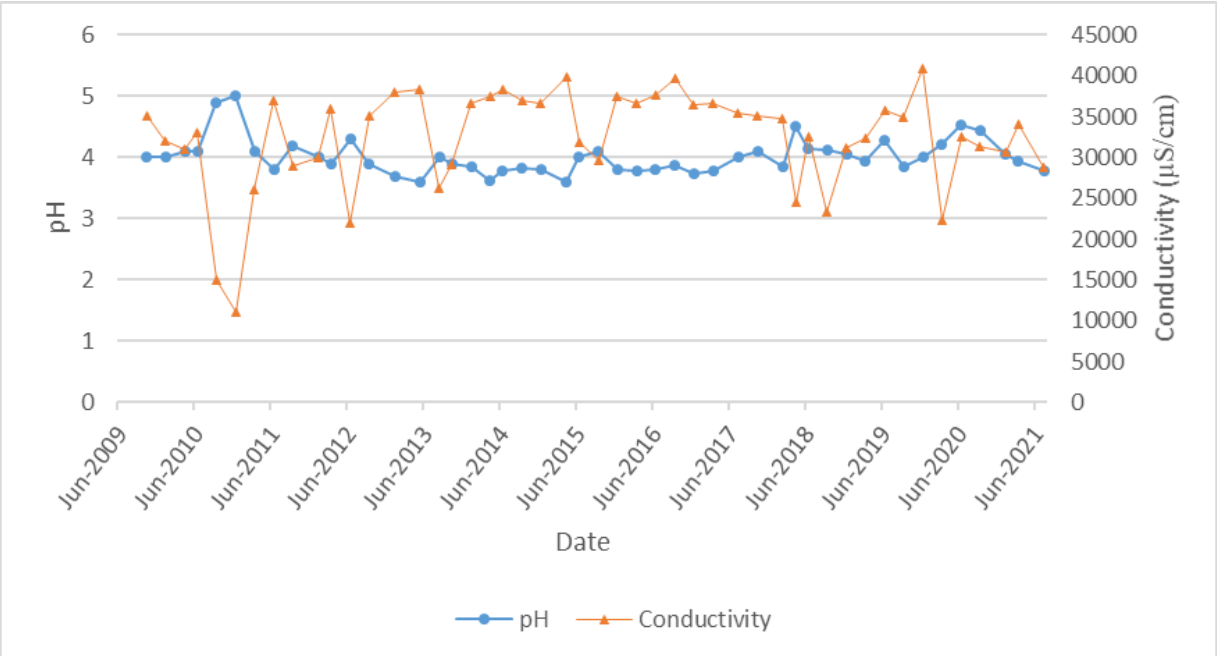


Figure 25. MB11. Water quality for pH and conductivity

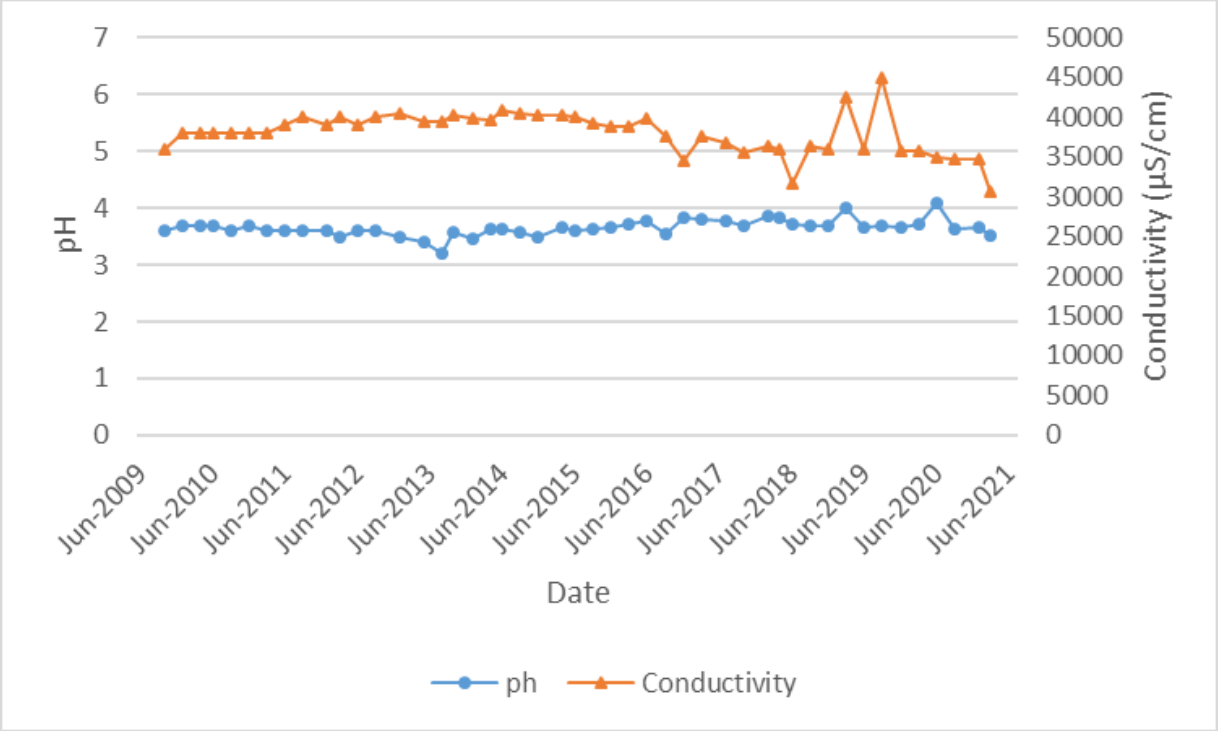


Figure 26. MB12. Water quality for pH and conductivity

Monitoring has commenced at 3 new bores installed by Veolia to monitor changes in groundwater quality as an indicator of potential seepage from ED2. The bores are labelled MB23, MB24 and MB25. Long term data is not available from these bores yet but results obtained in June 2021 are shown in Table 16:

Table 16. New ED2 bores - water quality results

	pH	EC (µS/cm)	Sulfate (mg/L)	Total Zn (mg/L)	Total Cu (mg/L)	Total Pb (mg/L)
MB23	6.99	1540	600	0.066	0.013	0.0031
MB24	6.82	5390	2670	0.886	0.003	0.003
MB25	7.49	6430	3250	0.000393	0.088	0.0435

Further downstream of ED2 at the head of Allianoyonyiga Ck is MB13 which measures any influence on groundwater quality at the western border of SML20. The results of this bore are provided in Figure 27 and Figure 28.

Bore MB13 has a similar water quality to natural background with slightly low pH and conductivity levels generally below 3,600 µS/cm (Figure 27). There are no trends in the data with the results obtained during the reporting period being similar to the previous years. The average conductivity concentration was 3,215 µS/cm, which is only slightly more than the historical average level of 3,152µS/cm (since 2007).

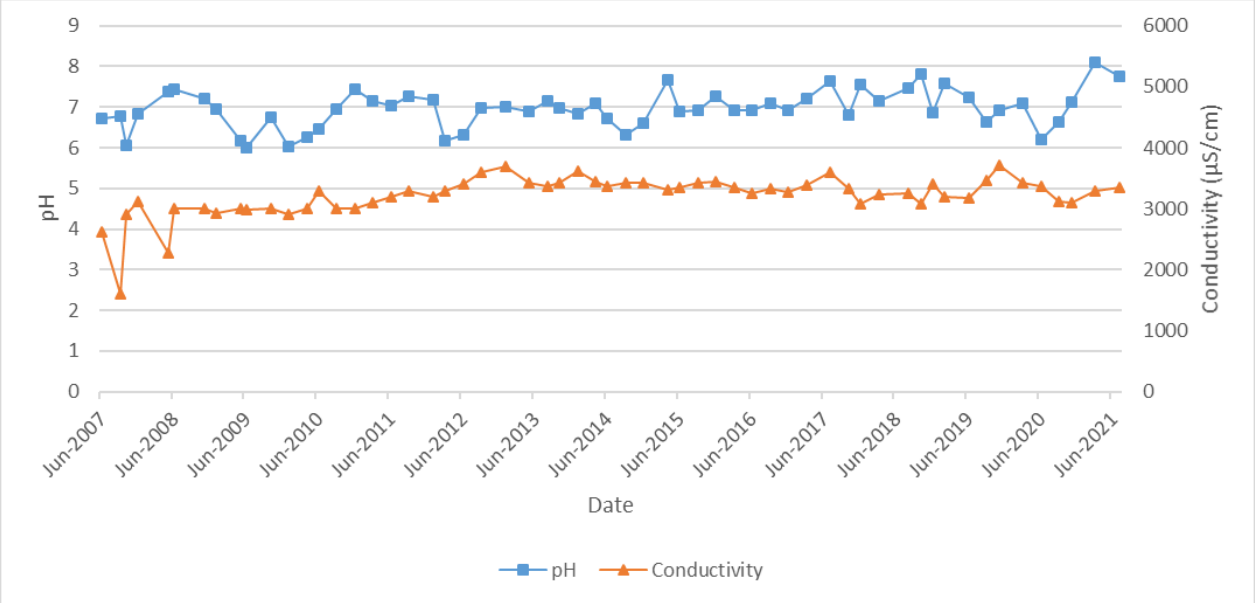


Figure 27. MB13 pH and Conductivity

The concentrations of sulphate and zinc have spiked twice in the past 10 years (in mid-2010 and early in 2013) (Figure 28) but in recent times generally are low and consistent with background levels. Sulphate levels trended upwards during the drought. However, levels have declined most notably during the current reporting period consistent with higher rainfall levels. Average zinc levels during the reporting period were measured at 0.03 mg/L, copper was 0.002 and lead was barely detectable. These results indicate that ED2 does not appear to be impacting downstream ground water quality.

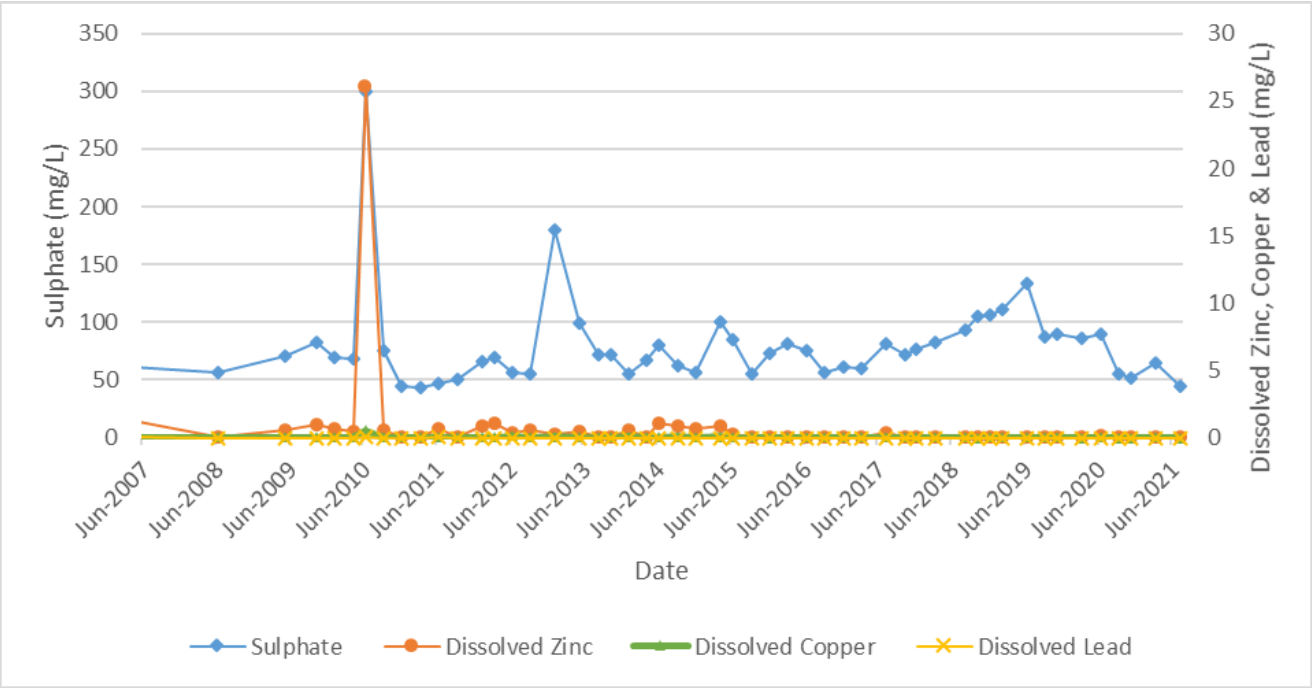


Figure 28. MB13 Sulphate and metals

6.5.5 Evaporation Dam 2 Leakage Assessment

In earlier reports Heron has provided detailed analysis of data in relation to the issue of leakage from ED1 and ED2. Although the data clearly indicates that the dams are not having a detrimental impact on surface and groundwater systems immediately surrounding the evaporation dams. ED2 has subsequently been lined with HDPE lining to meet EPA requirements for dewatering of water from the old underground workings. To facilitate water management ED2 has been segregated into 6 operational cells. Further discussion on the mine dewatering program is provided in Section 7.3.

6.5.6 Rehabilitated Waste Rock Dump

Seepage at the base of the Rehabilitated Waste Rock Dump is monitored by MB15, MB16 and MB17. MB5 monitors seepage on the southern face of the rehabilitated dump while the surface monitoring site WM100 is located at the downstream boundary of SML20. Seepage from the rehabilitated dump is collected in the Waste Rock Dam which is pumped to ED1.

The original purpose for these bores is unknown however given their proximity to the Rehabilitated Waste Rock Dump they are considered suitable to determine groundwater quality. Data from these monitoring bores is provided in the following graphs.

Monitoring Bore 15 is located just upstream of the Waste Rock Dam and essentially measures groundwater above the dam. Conductivity with an annual average of 7,840µS/cm is slightly elevated compared to normal background levels however pH has moved from historic levels of mild acidity to near neutral (Figure 29). The spike recorded in pH is uncertain but most likely associated with increased rainwater infiltration into the waste rock dam resulting in dilution of metals.

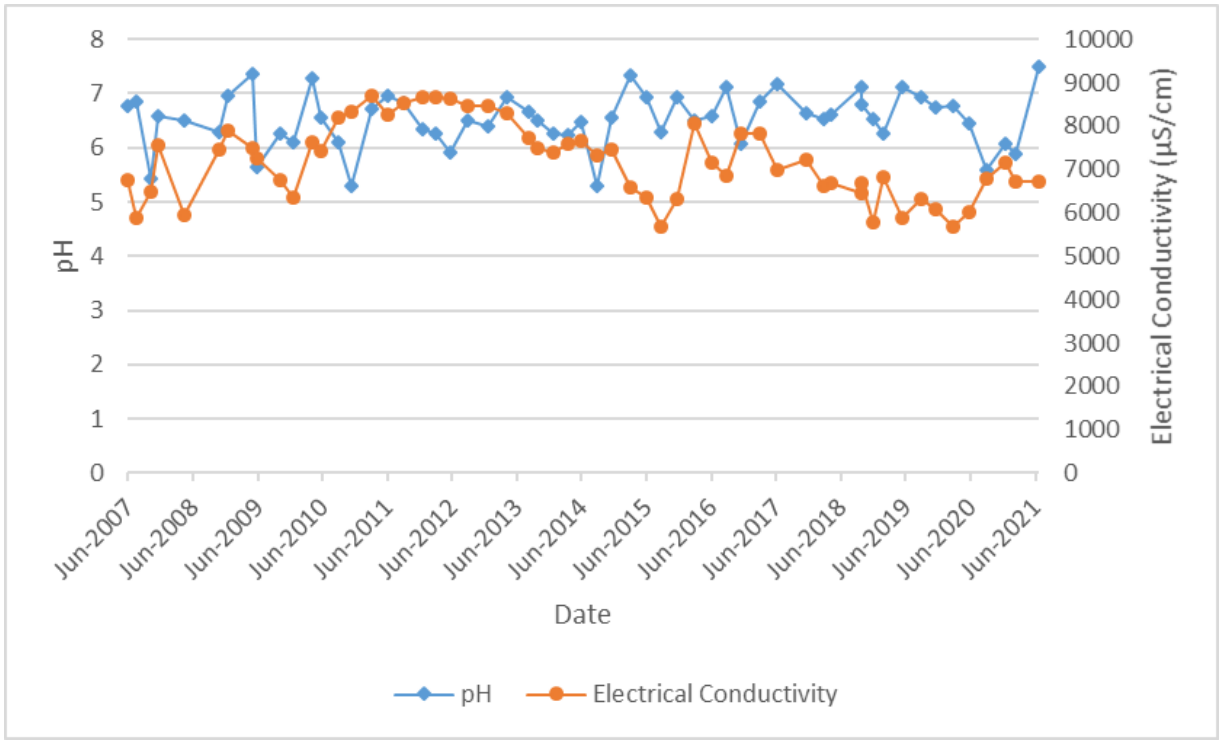


Figure 29. MB15 - pH and conductivity results

As seen in Figure 30 below, metals are generally low in MB15 with the exception of zinc which continues to fluctuate, with a pronounced spike recorded in January 2021 but subsequently retreated to long-term average levels. The reason for the spike is uncertain but may be associated with the mobility of zinc during wet cycles. Nevertheless the spike is at a relatively low concentration at 14.2 mg/L.

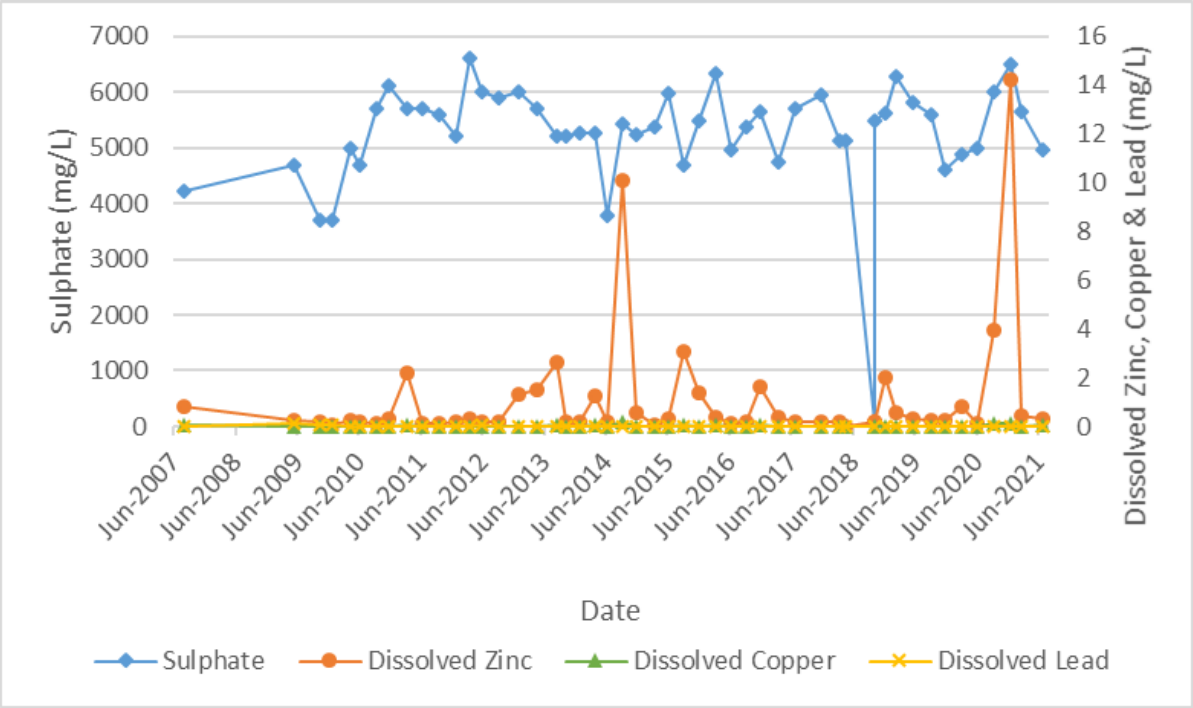


Figure 30. MB15 - Sulphate and metals water quality

MB16 appears to have intersected a mineralised zone when installed as the results do not correlate to the two adjacent bores. The drill database does not include any data on these bores, either drill date, lithology or assay data. It is however a shallow bore and may also be influenced by surface runoff.

Monitoring Bore 16 is a shallow well that may be influenced by surface runoff as well as shallow subsurface water flow entering the Waste Rock Dam. Over the past few years, water quality has been relatively consistent (Figure 31). Relative water levels, bore logs and groundwater chemistry suggest there is limited hydraulic connectivity between the deeper groundwater aquifer and the shallow aquifer.

MB 16 is an extremely saline bore and has significantly different water quality than either MB15 or MB17 (Figure 31). The reason for this can only be host rock with little if any connectivity of groundwater despite the bores being so close to each other (about 80 m apart).

There was a distinct rising trend in sulphate between June 2011 and June 2014 and a spike in February 2019 which now appears to have stabilised (Figure 32).

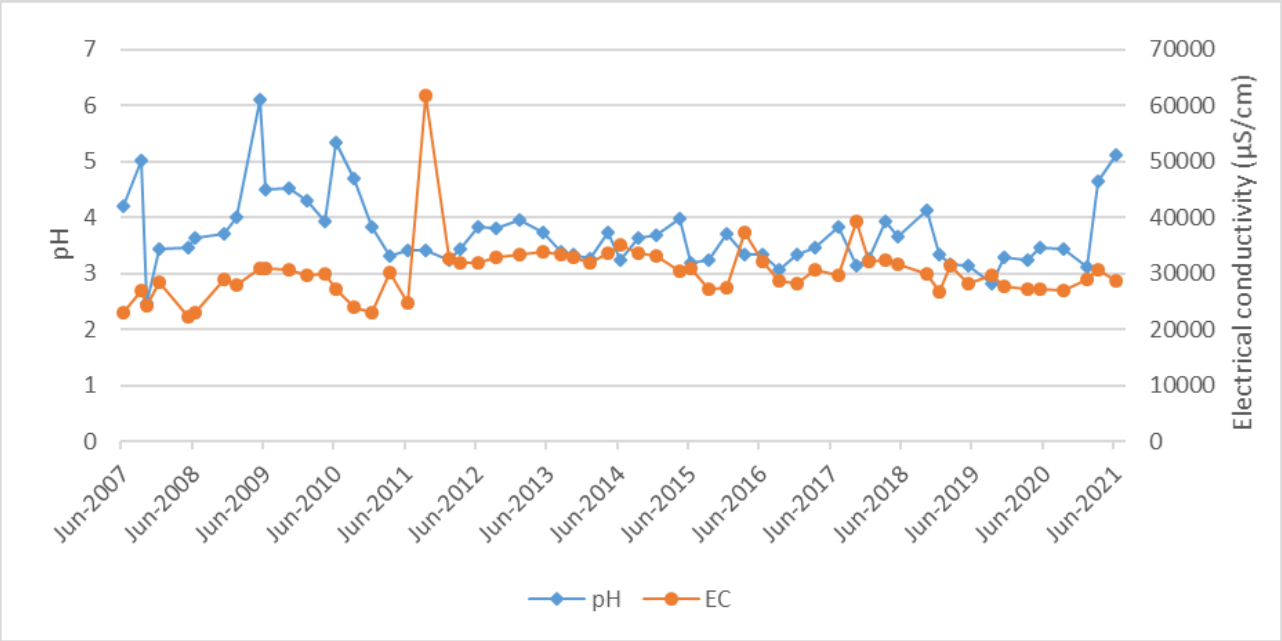


Figure 31. MB16 pH and conductivity results

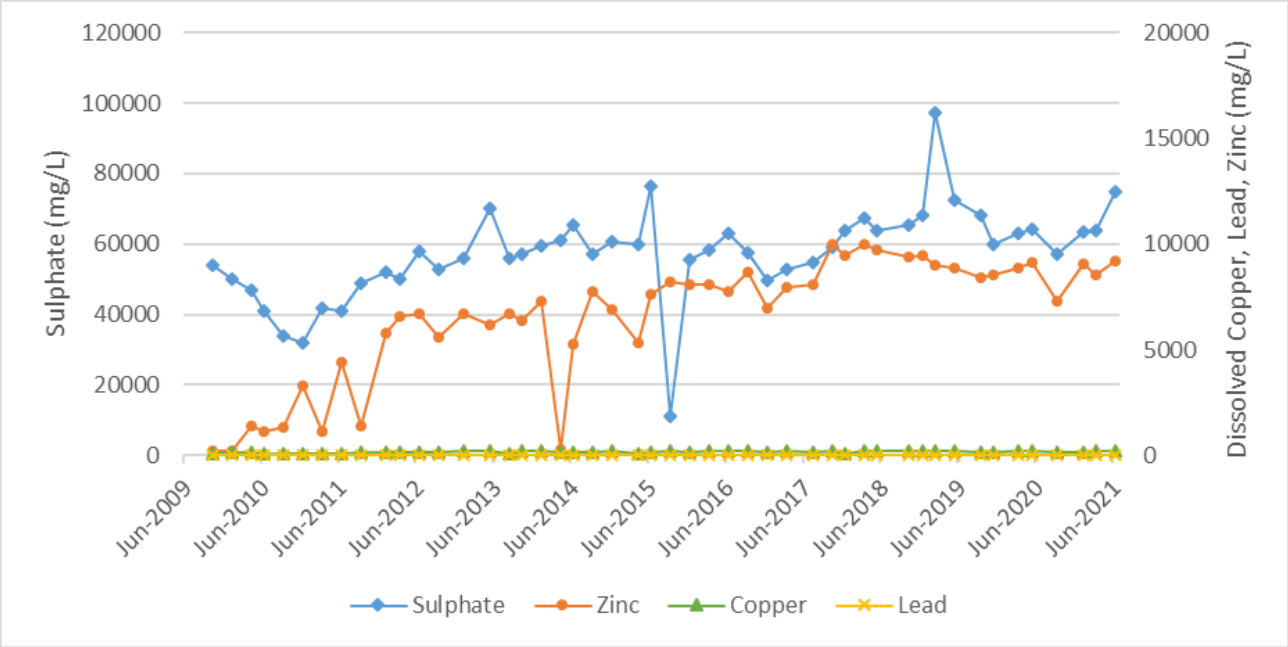


Figure 32. MB16 Sulphate and Metals results

Monitoring Bore 17 is located between MB 15 and MB 16 and is also relatively shallow with a standing water level of just over 3 m below ground, although a dip to 6.7m was recorded in March 2020 most likely associated with the drought. Water level returned to 4.0m in June 2020. Water quality measured during the reporting period was slightly acidic with an average pH of 5.95 but slightly elevated salt concentrations with an average of 12375µS/cm (Figure 33).

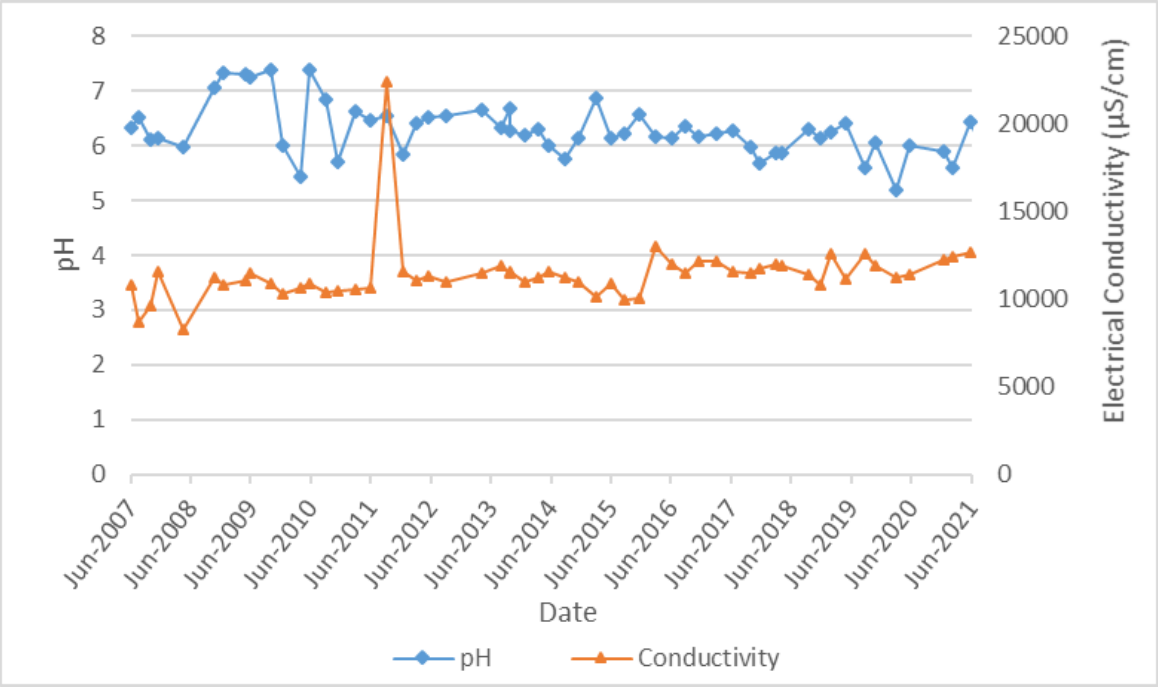


Figure 33. MB17 pH and conductivity results

Zinc concentration in MB17 has developed an upward trend over the past several years but is still at relatively low levels as with other metals (Figure 34). Sulphate levels however are relatively high so there is evidence of some influence of the sulphide volcanics and perhaps leachate from the waste rock emplacement.

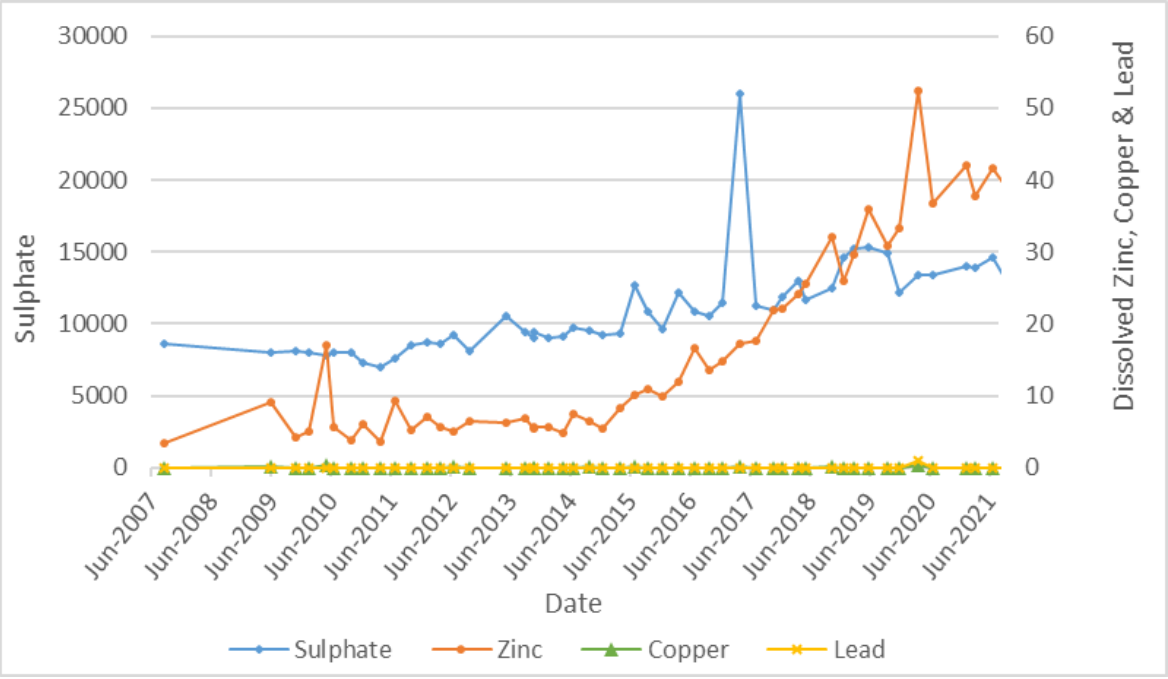


Figure 34. MB17 Sulphate and metals

MB5 is located on the southern side of the Rehabilitated Waste Dump and the monitoring results are provided in Figure 35 and Figure 36 below. The pH results show a spike in June 2021, although there have been several fluctuation over the past 15 years so this return to near neutral is likely caused by recent heavy rainfall events infiltrating into and diluting groundwater.

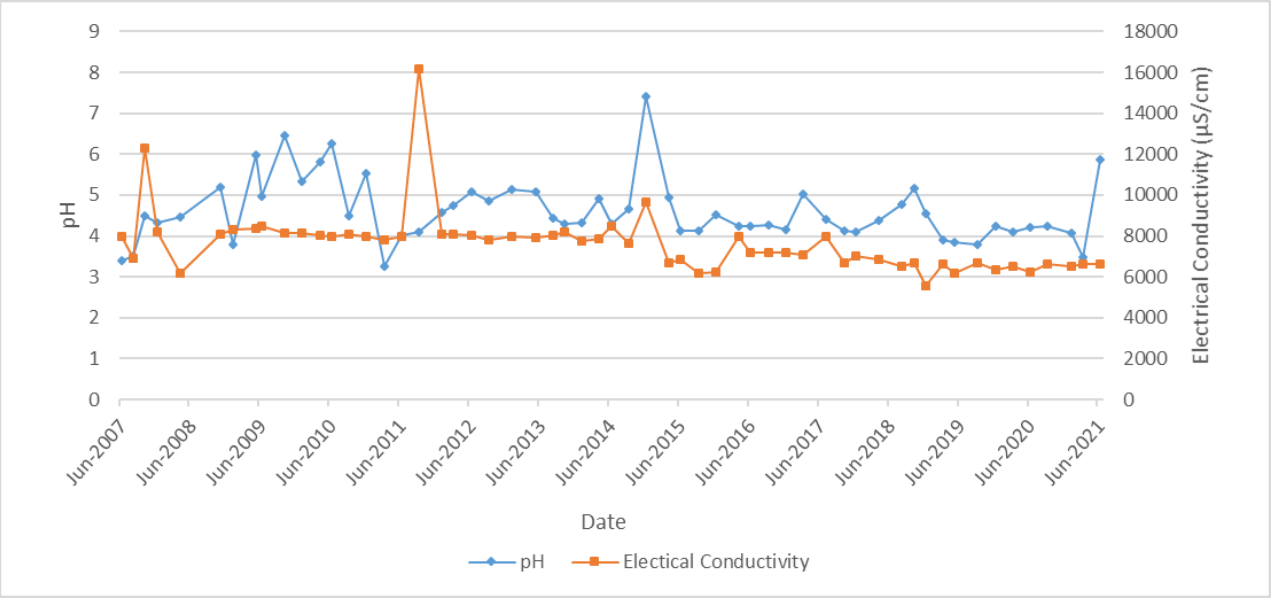


Figure 35. MB5 pH and conductivity

Figure 36 shows that MB5 has remained relatively high in sulphate but low in metal concentration. Copper and lead remain at trace levels while zinc is considered moderate. The data indicates that there could be an influence on local groundwater from the Rehabilitated Waste Rock Dump. This was recognised in the EA for the reopening of the mine and the commitment made to increase the number of monitoring points along the southern side of the dump. Two new monitoring bores were installed on the southern flank of the Rehabilitated Waste Rock Dump in February 2020. Results from these new bores are shown in Table 17and Table 18 .

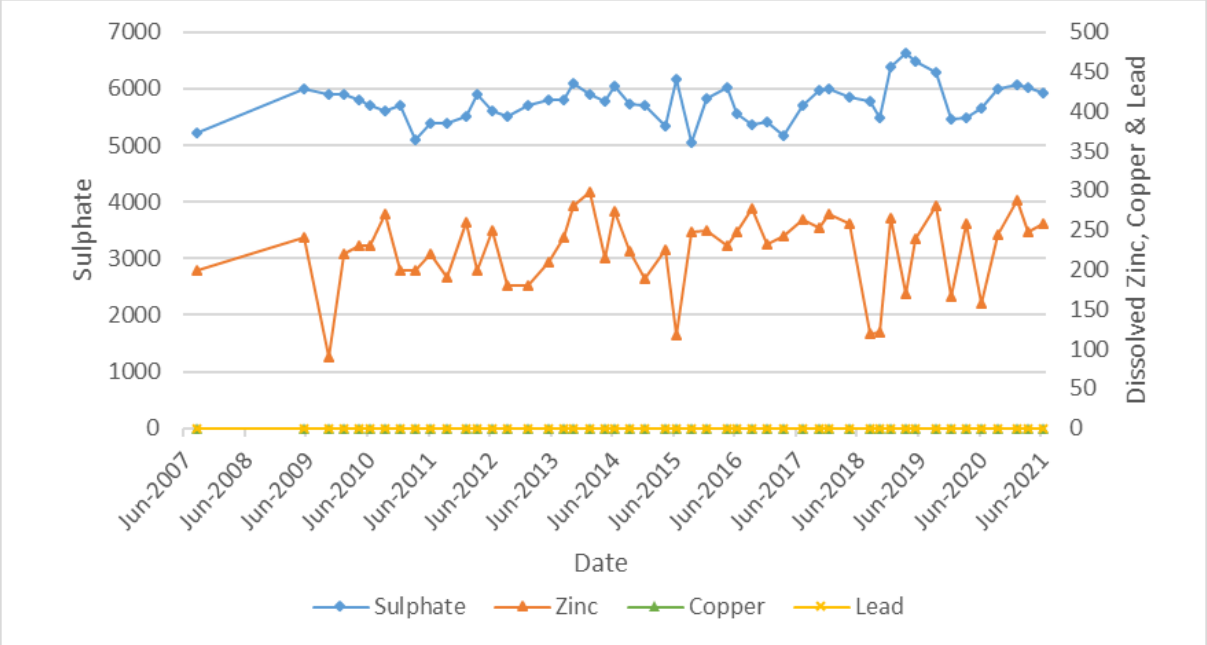


Figure 36. MB5 sulphate and metals results

The purpose of the two additional monitoring points (HMB6 and HMB7) is to determine if the results from MB5 are consistent along the toe of the Rehabilitated Waste Dump as the results have not shown any trends, either

increasing or decreasing for over a decade. The water quality is also quite different to the seepage collected in the Waste Rock Dam which is significantly more saline (25,000 µS/cm), higher sulphate levels (37,000 mg/L), but more importantly significantly higher metals (zinc at 4,500 mg/L; copper at 108 mg/L and lead at 0.23 mg/L). The results from MB5 appear to be more consistent with the natural sulphide ore body than leachate from the dump which is collected in the Waste Rock Dam.

The early results from HMB6 and HMB7 (Table 17 and Table 18) support the hypothesis because the key indicator attributes show pH is around neutral and conductivity has reached a peak of 4530µS/cm in HMB6 indicating there is little evidence that leachate from the WRD is contributing any contamination to groundwater quality to the south of the WRD.

Table 17. Water quality results for HMB6

HMB6	No of samples	Min	Average	Max
pH	4	7.1	7.4	7.8
EC (µS/cm)	4	3465	4081	4530
Sulphate (mg/L)	4	180	654	1590
Dissolved Cu (mg/L)	4	0.001	0.036	0.1
Dissolved Pb (mg/L)	4	0.0006	1.25	4.96
Dissolved Zn (mg/L)	4	0	0.59	1.89

Table 18. Water quality results for HMB7

HMB7	No of samples	Min	Average	Max
pH	4	7.4	7.5	7.8
EC (µS/cm)	4	2010	2355	3020
Sulphate (mg/L)	4	99	260	369
Dissolved Cu (mg/L)	4	0.003	0.022	0.02
Dissolved Pb (mg/L)	4	0.0004	0.07	0.23
Dissolved Zn (mg/L)	4	0	0.07	0.14

The relationship between sulphate, salt and metals reflect the underlying geology and has been used as a predictive tool to determine the location of metal rich ore lenses within the sulphide volcanic strata. It is also useful in determining the location of the sedimentary and metamorphic rock sequences as well as marine deposits within these sequences.

6.5.7 Tailings Dam North

Piezometers have been used to measure groundwater to the north of the northern embankment of Tailings Dam North (TDN) since 1984. To date, there has been no leakage detected. Heron has since constructed Tailings Storage Facility 4 (TSF4) in front of NTD essentially isolating NTD. Two of the 4 piezometers were removed to allow for the construction of TSF4. The two remaining piezometers are denoted as NPT2 and SP3C which are immediately adjacent to each other. Water quality results in NTP2 and SP3C are consistent with background groundwater quality in MB7 and do not indicate seepage in these areas. The results are consistent with historical monitoring results at these locations and do not correlate to water quality contained in the tailings dams.

Results for NTP2 are provided in Figure 37 and Figure 38. These results shown in the graphs do not indicate that there has been leakage from the Northern Tailings Dam as water quality is the same as normal background levels over the long term. Conductivity levels indicate lower salt concentrations than other background sites while pH is neutral.

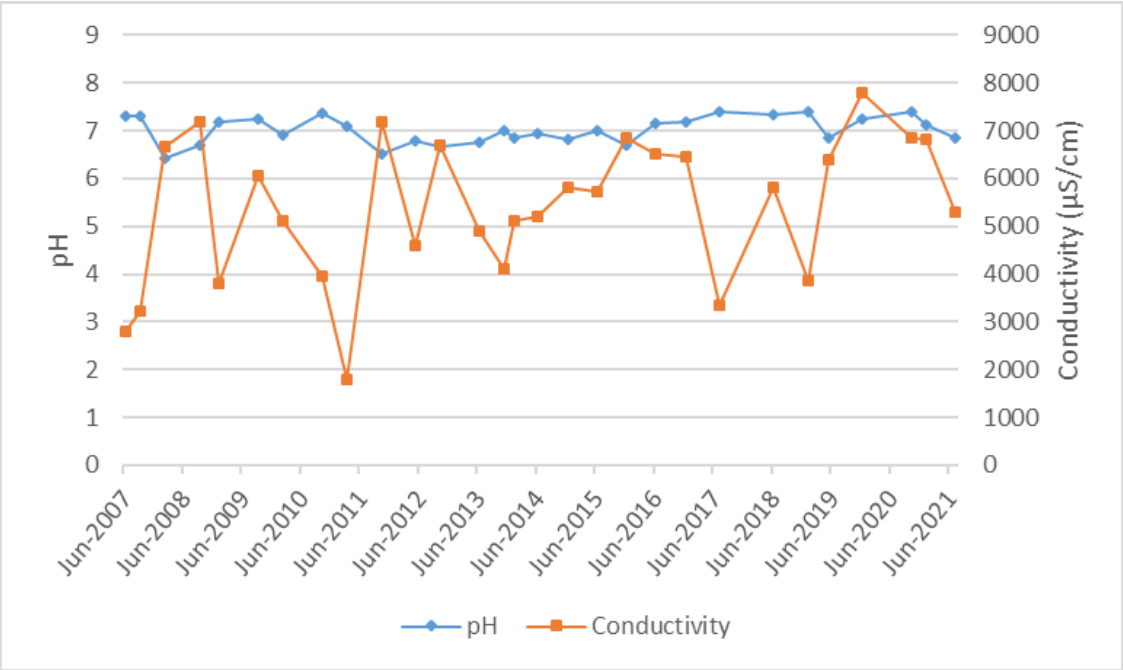


Figure 37. NTP2 pH and conductivity

There have been several spikes in sulphate concentrations on several occasions (Figure 38), although the actual concentration is relatively minor. Zinc too has tended to fluctuate slightly. The reason for the fluctuations in this reporting period is difficult to determine. Following earlier peaks, the concentrations have typically lowered back to original levels at around 50 mg/L so may be associated with wetting and drying cycles. Nevertheless water quality at NTP2 will continue to be monitored. Overall the water quality compares well to natural background and is substantially lower than the sulphate levels found in the TDN decant pond water of approximately 13,500 mg/L. Monitoring bore NTP2 is located closest to Tailings Dam North wall and would be considered to be the first that would detect seepage from the dam.

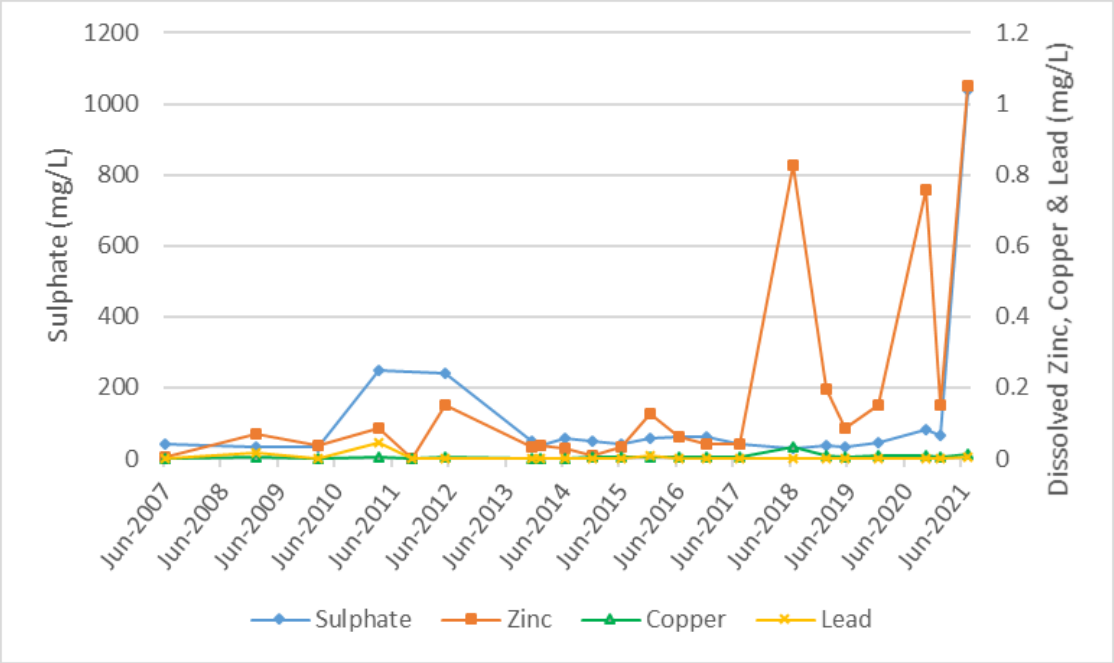


Figure 38. NTP2 Sulphate and metals

SP3C is approximately 100m further north from NTP2. Results show similar fluctuations in zinc concentrations to NTP2 but overall the concentration is within background levels (Figure 39 and Figure 40). Sulphate concentrations are typically lower than that seen in NTP2. The results indicate that there is minimal impact from TDN downstream of the embankment. SP3C is potentially in the tailings footprint of TSF4 should the stage 3 lift proceed, so the potential for environmental impact from TDN is negligible

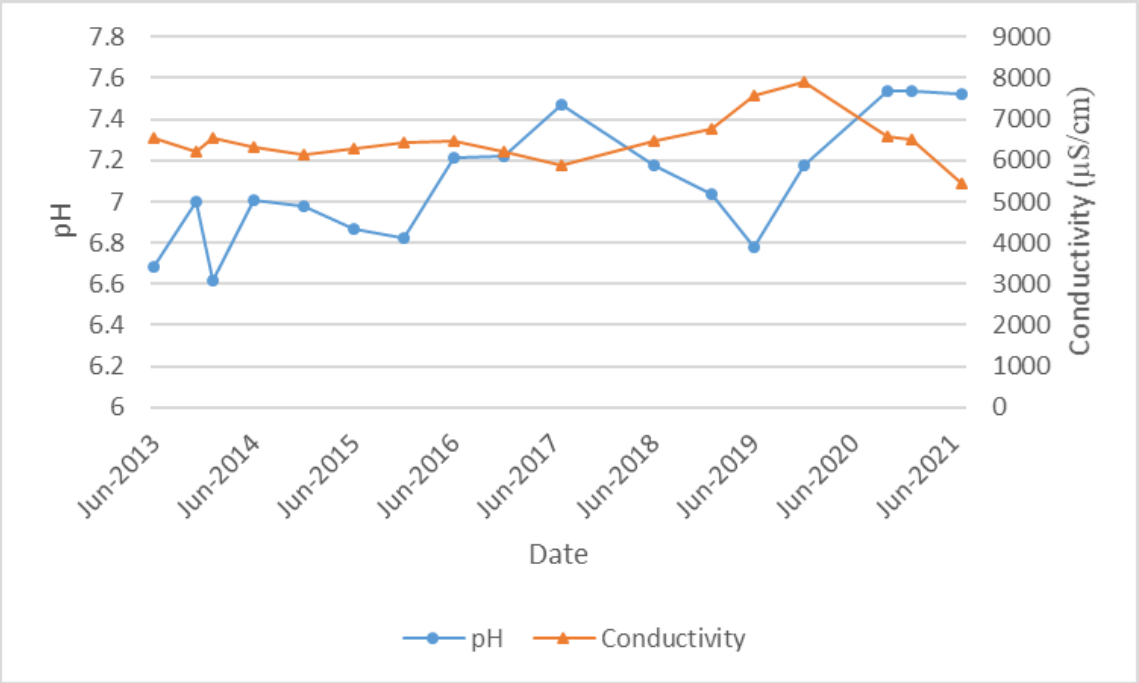


Figure 39. SP3C pH and Conductivity results

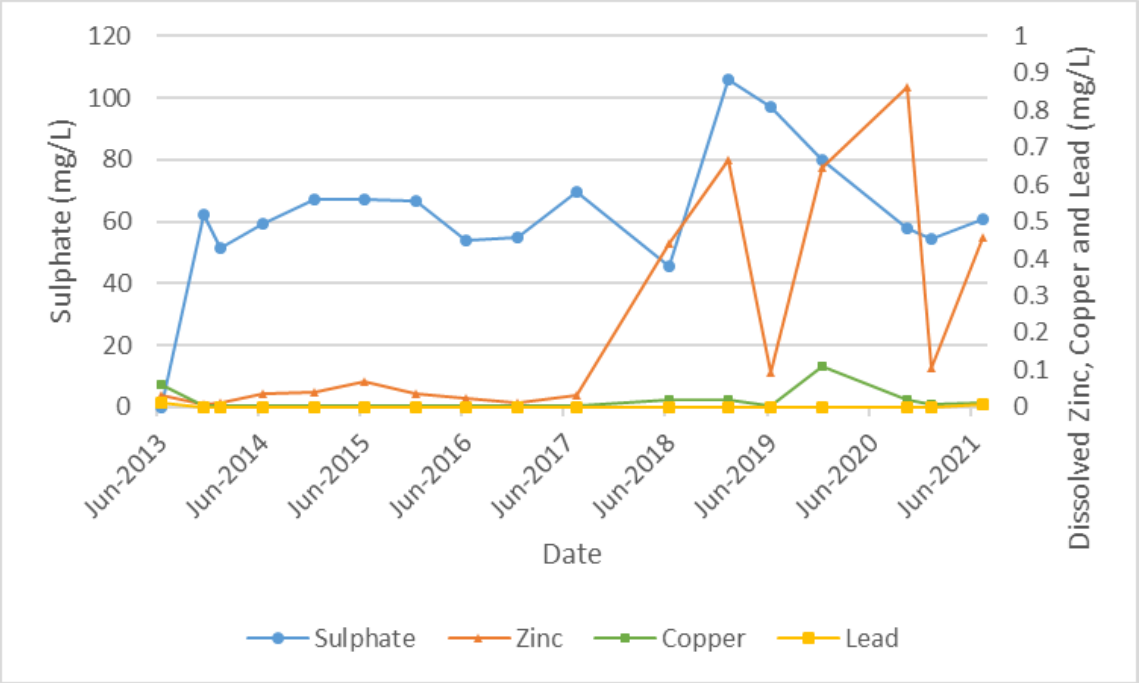


Figure 40. SP3C Sulphate and metals

ETP8 and SP11B are located downstream of the eastern embankment of TDN. Results for ETP8 (Figure 41 and Figure 42) show recent pH and conductivity levels were comparable with background levels. Sulphate fluctuates but the absolute concentration is well within background levels. The recent average zinc concentration has been 1.2 mg/L, which is less than the long term average level of 6.84 mg/L, since 2007. Copper and lead were measured with trace levels detected at both ETP8 and SP11B.

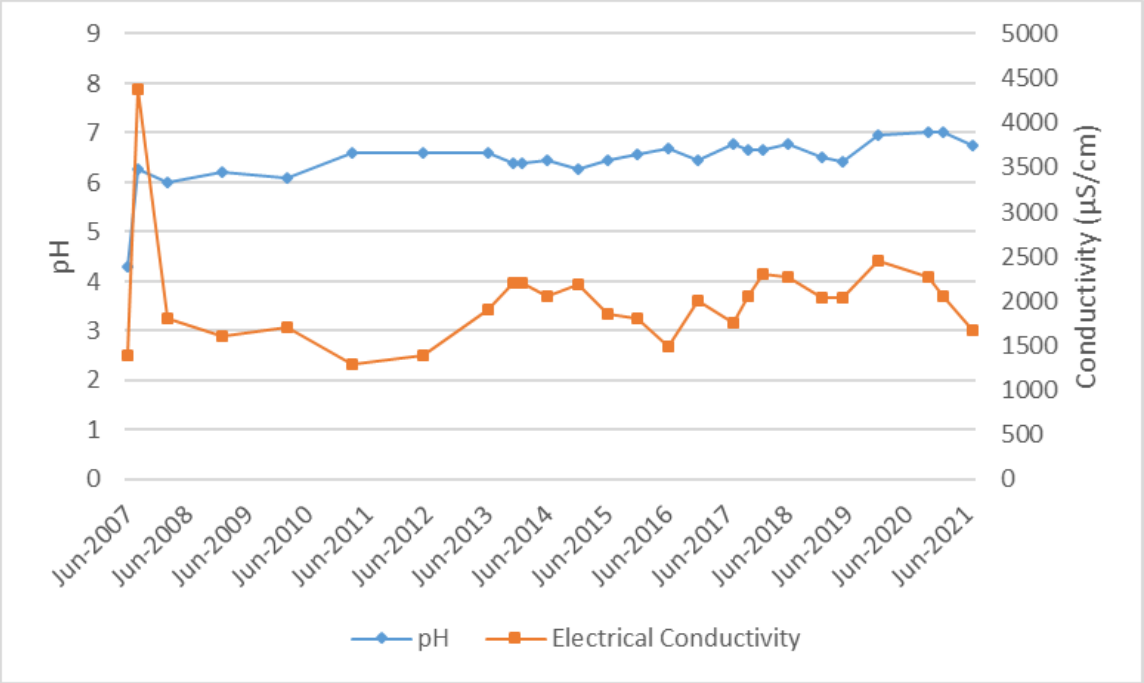


Figure 41.ETP8 pH and conductivity

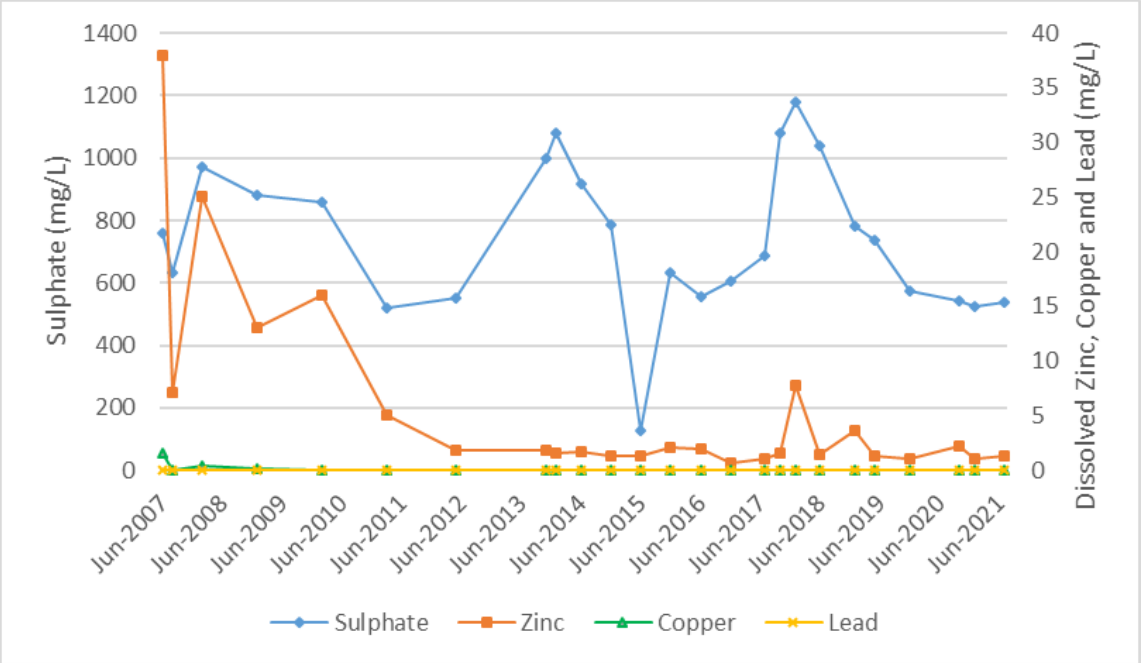


Figure 42. ETP8 Sulphate and metals results

Water quality results in SP11B (Figure 43 and Figure 44) are consistent with background groundwater quality. The fluctuation of results particularly sulphate and zinc is not of concern as the absolute values are low. The data confirms that there is no leakage from the eastern embankment of TDN.

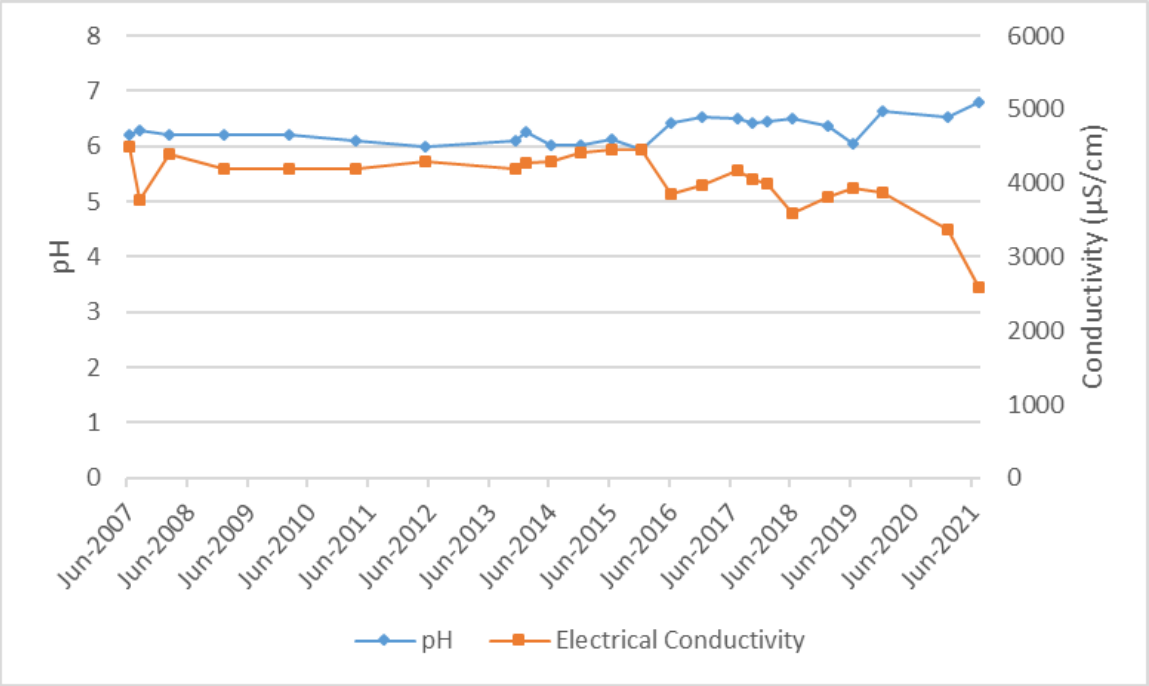


Figure 43. SP11B pH and conductivity

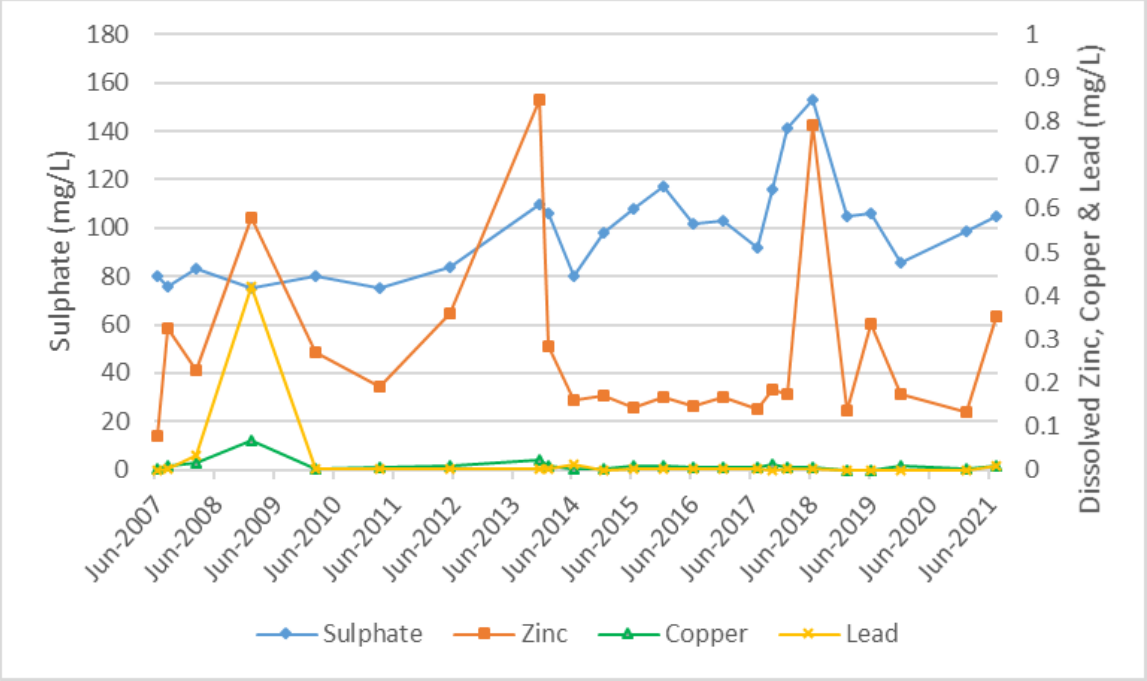


Figure 44. SP11B Sulphate and Metals

6.5.8 Tailings Dam South

Seven piezometers (E3, F1, F7, X1, X2, Y1 and Z1) and two monitoring bores (MB21 and MB22) are available to monitor groundwater quality at the TDS. Standing water levels in all bores fluctuate in response to rainfall but are all generally shallow with a depth to standing water between 1 and 3m. Tailings Dam South is known to be leaking and a collection dam and return pumping system has been installed.

With water in TDS having a long-term pH of around 2.5 and conductivity of 15,000 µS/cm, Sulphate levels of over 19,000 mg/L and very high metal concentrations, the subsurface water quality shown in the following graphs does not indicate that significant subsurface leakage is occurring. There has been a slight increase in sulphate levels over the past 7 years but a recent fluctuation in metal concentration. As mentioned previously, the actual concentrations of metals are extremely low being generally less than 0.1 mg/L.

Monitoring bore E3 is located at the base of the Tailings Dam South wall and would detect any subsurface seepage from the dam. As seen in Figure 45, pH has reverted to near longterm average concentrations and conductivity has dropped slightly to 5410 µS/cm which is well within background water quality.

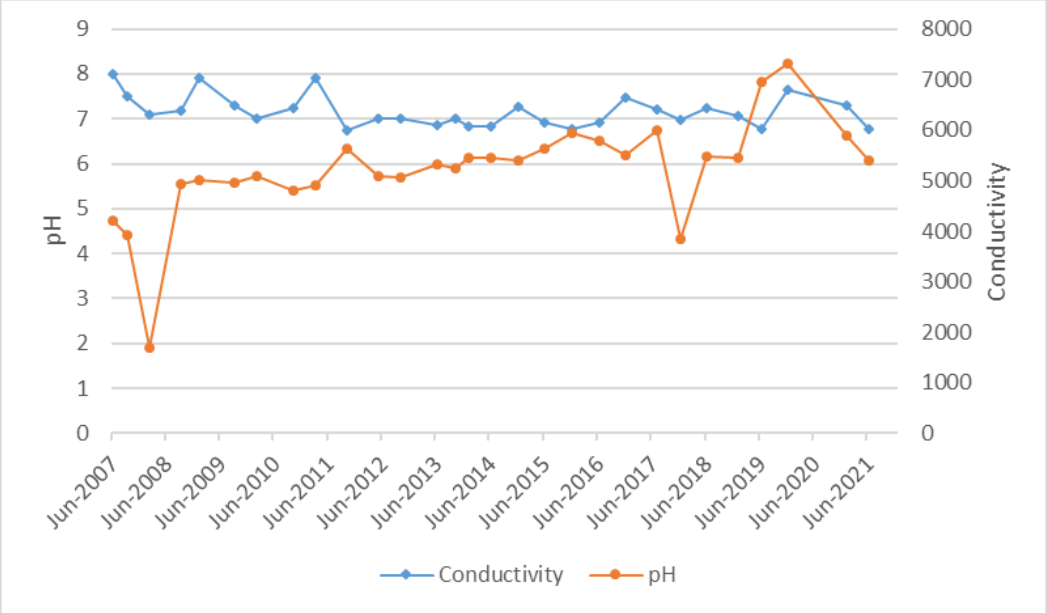


Figure 45. E3 - pH and conductivity

Metal concentrations in E3 are low however sulphate levels are elevated, often reaching levels close to 3000mg/L, which indicates the potential for some influence on groundwater quality (Figure 46).

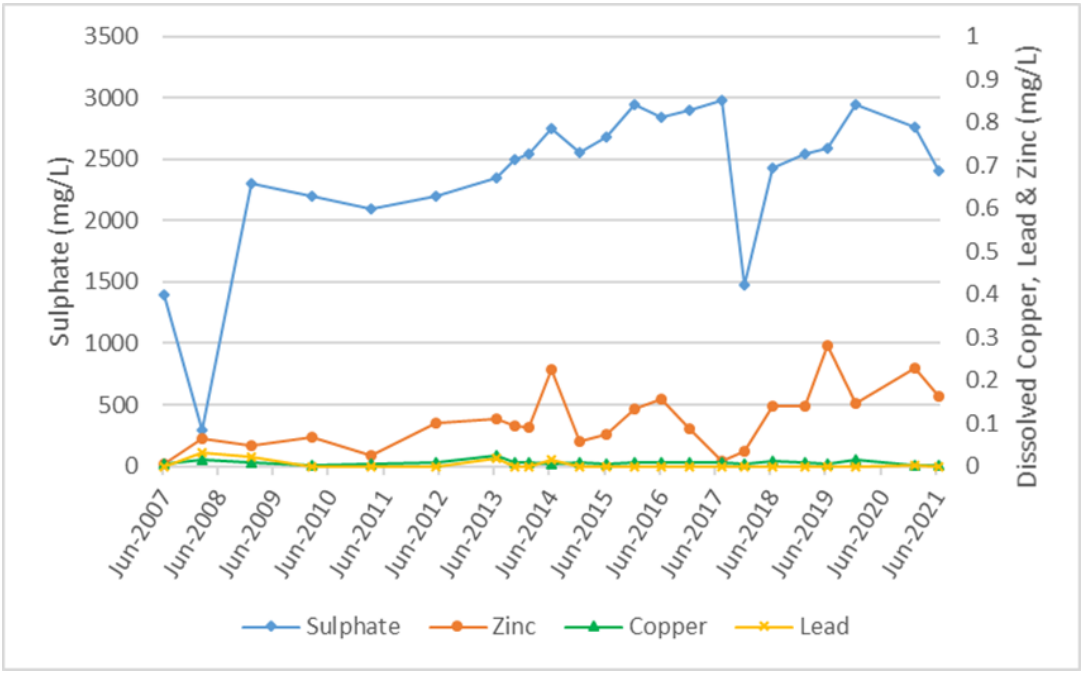


Figure 46. E3 sulphate and metals

Error! Reference source not found. and Figure 48 show the results for Piezometer Z1, which is also located at the base of the TDS wall. The piezometers don't measure groundwater movement or flow, just water quality. Piezometer Z1 (Figure 47) showed a slight decrease in conductivity which is commensurate with the decrease in conductivity in the STD dam water. The decrease is attributed to the high rainfall received on site during the reporting period and the transfer of stormwater from around site into TDS. The transfer of the relatively clean stormwater is diluting the concentration of salts and metals.

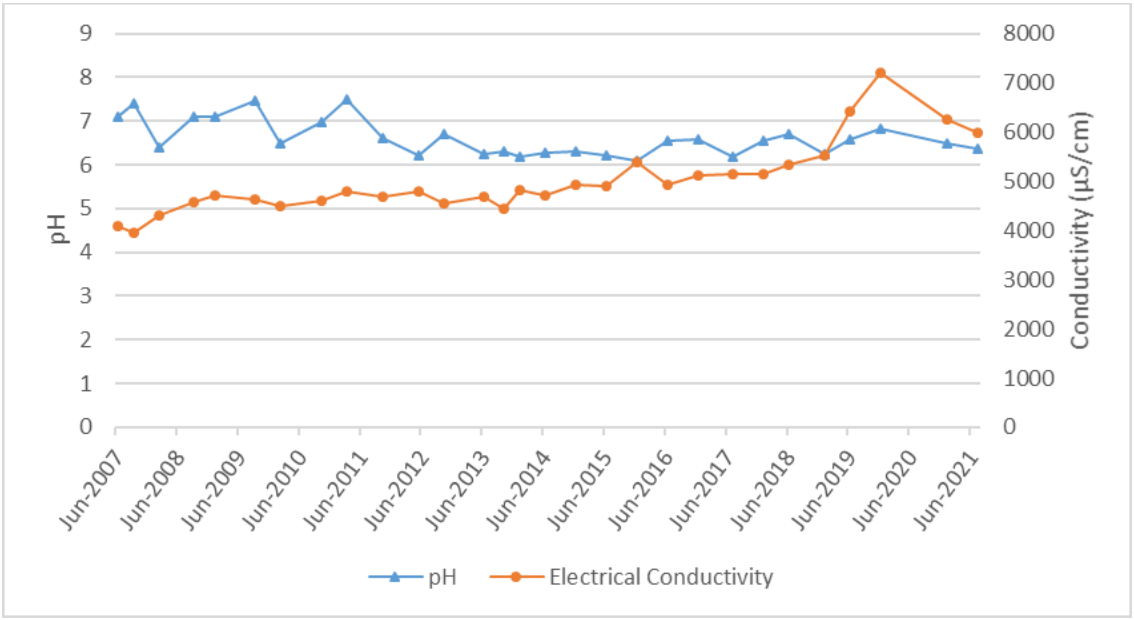


Figure 47. Z1 - pH and conductivity

The results for Z1 are similar to Piezometer E3 with slightly acidic, elevated sulphate but relatively low metal concentrations. Zinc levels however have been on an upward trend particularly since the removal of the water in TDS to allow for reprocessing during the tailings reclaim operation. As yet, the addition of stormwater to TDS has not resulted in a change in water quality in the downstream piezometer Z1. .

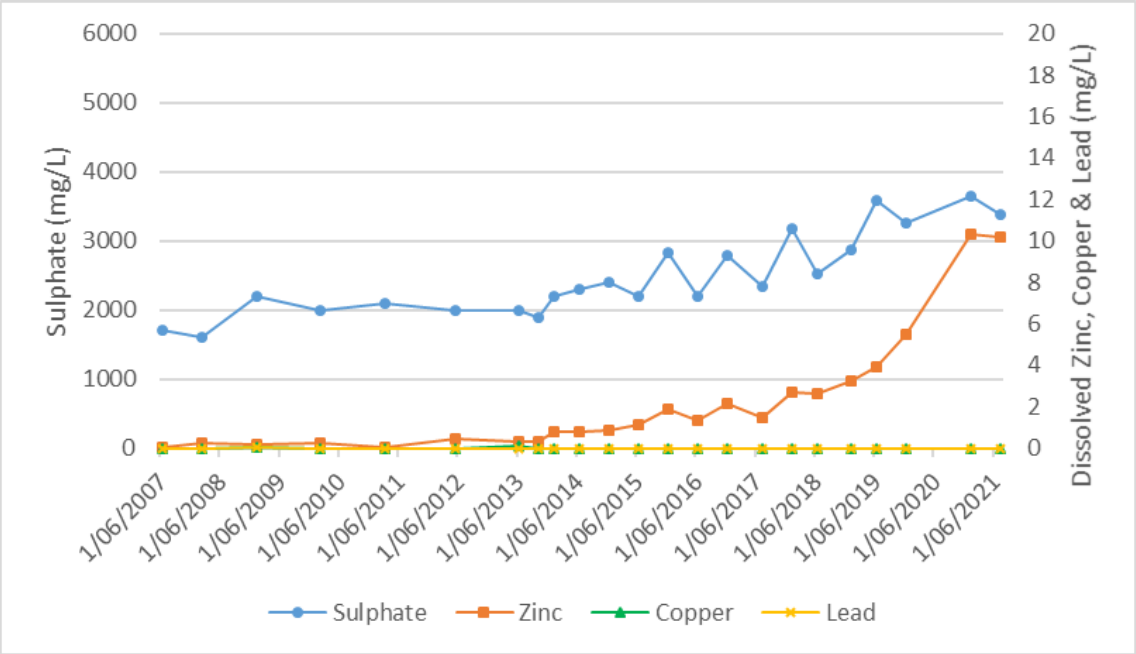


Figure 48. Z1 Sulphate and metals

Piezometer F1 is located below the southern embankment of TDS. The results for F1 are provided in Figure 49 and Figure 50.

The pH level of F1 is near neutral, and the salt concentration dropped back to historic levels of 1500µs/cm over the past two years. Sulphate levels and metals have fluctuated but the actual concentration is very low and also well within background levels. There was a slight increase in zinc level over the previous reporting period, but the concentration returned to average background level. Overall the size of the increase was consistent with previous spikes.

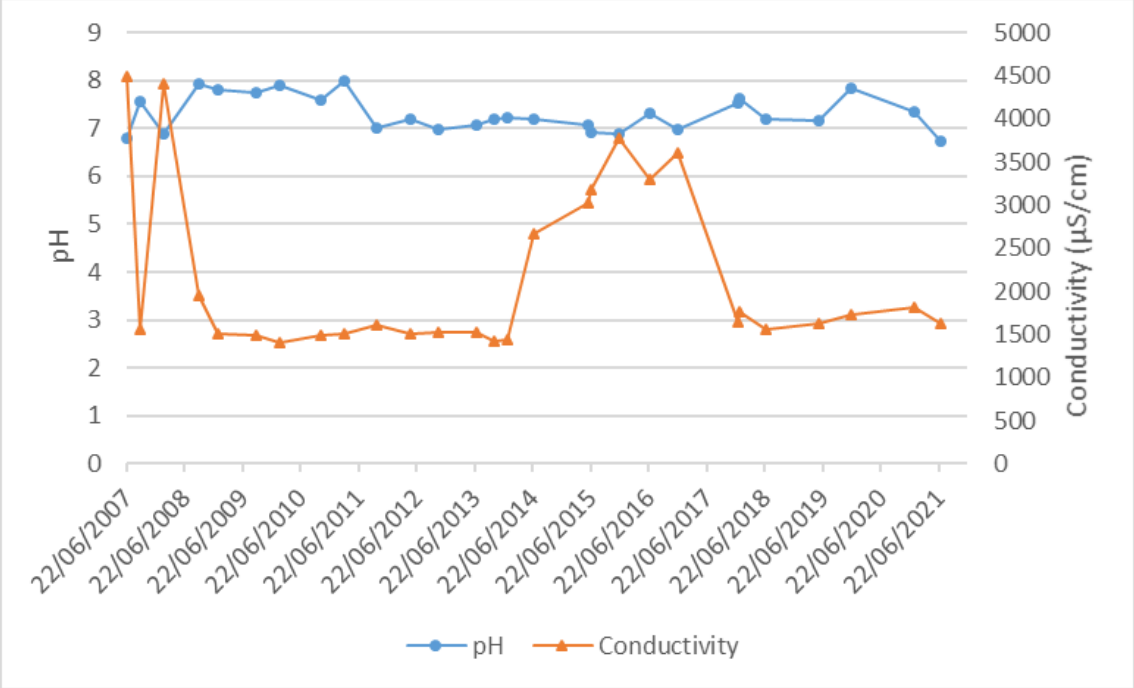


Figure 49. F1 pH and conductivity

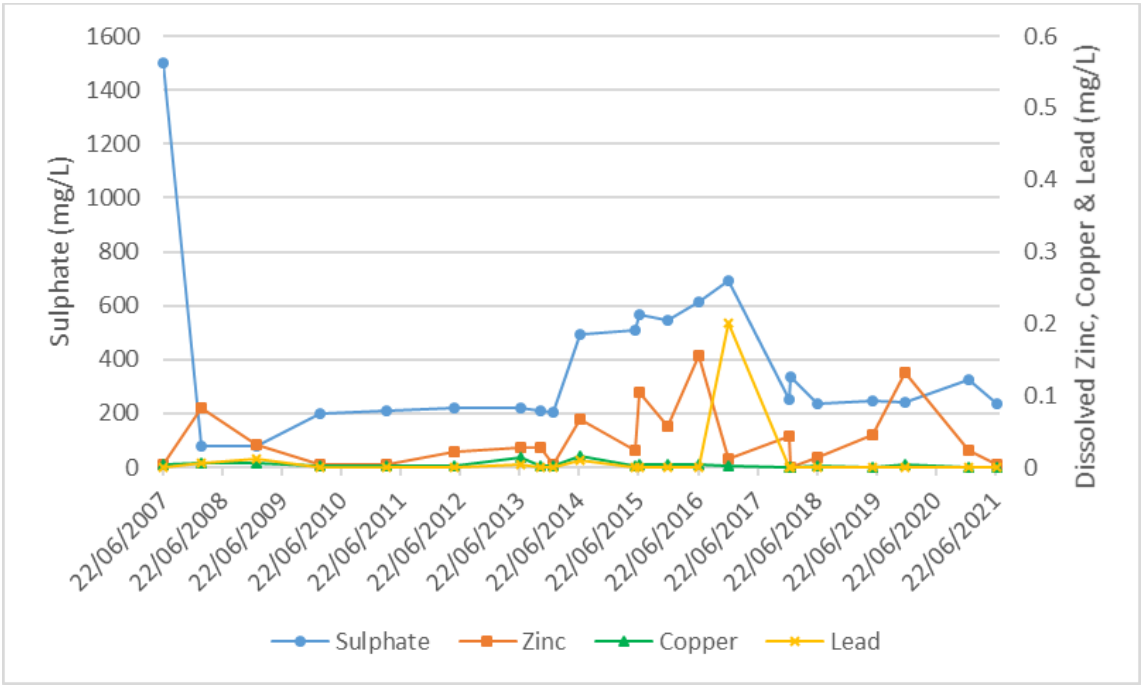


Figure 50. F1 Sulphate and Metals

Water quality results in MB21 (Figure 51 and Figure 52) are consistent with the previous reporting period with pH at an average level of 6.59. Conductivity is consistent with the previous reporting period, remaining very low at an average of 831µS/cm. Metal concentrations have remained relatively constant as have other parameters which are in line with background groundwater quality recorded in MB3 (Figure 21 and Figure 22). There is no indication of contamination in this area.

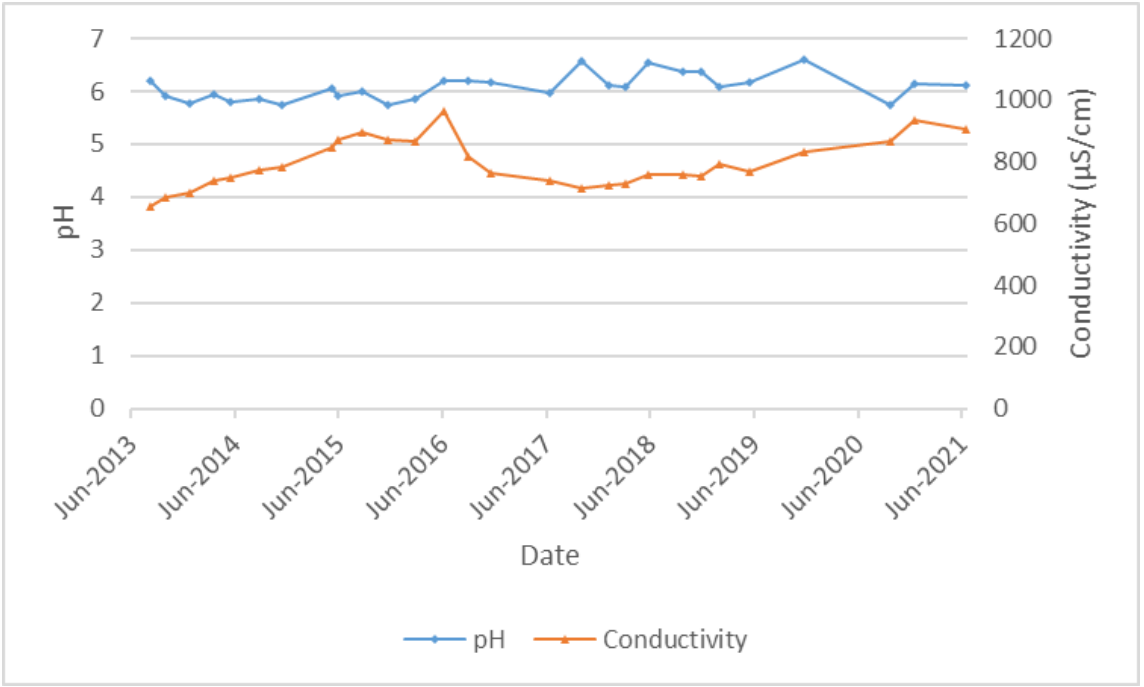


Figure 51. MB21 pH & conductivity

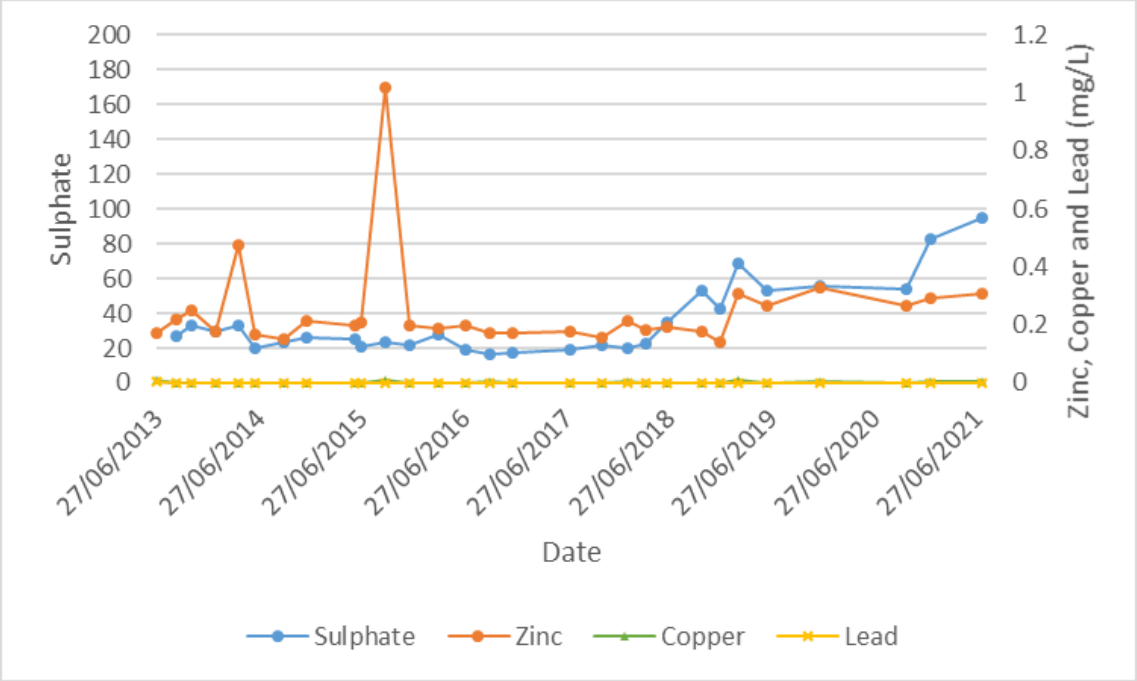


Figure 52. MB 21 Sulphate and Metals

Water quality results in MB22 (Figure 53 and Figure 54) are consistent with the previous reporting period which indicates slightly acidic water. Conductivity remains consistent with the historical trends of the last decade averaging 1637 µS/cm and 1600 µS/cm in this reporting period. Although sulphate and metal concentrations appear to fluctuate significantly, the absolute values are very low and the variability is considered natural. This bore has similar levels of pH, conductivity, sulphate, copper, lead and zinc to background groundwater quality recorded in MB3 (Figure 21 and Figure 22).

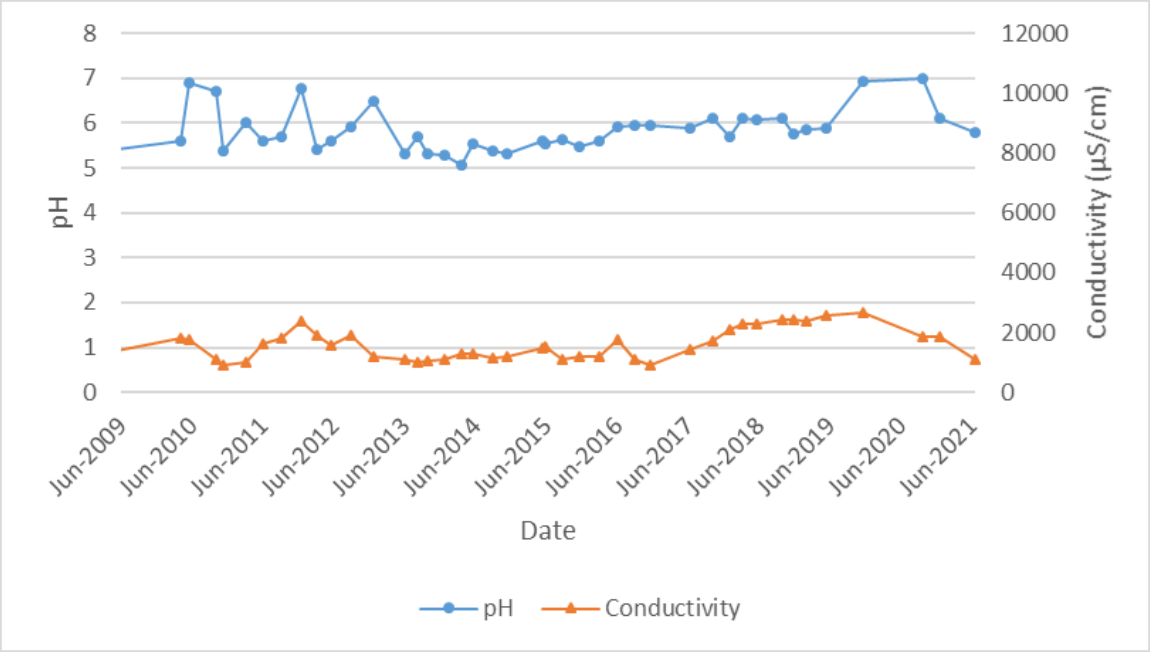


Figure 53. MB22 pH and conductivity

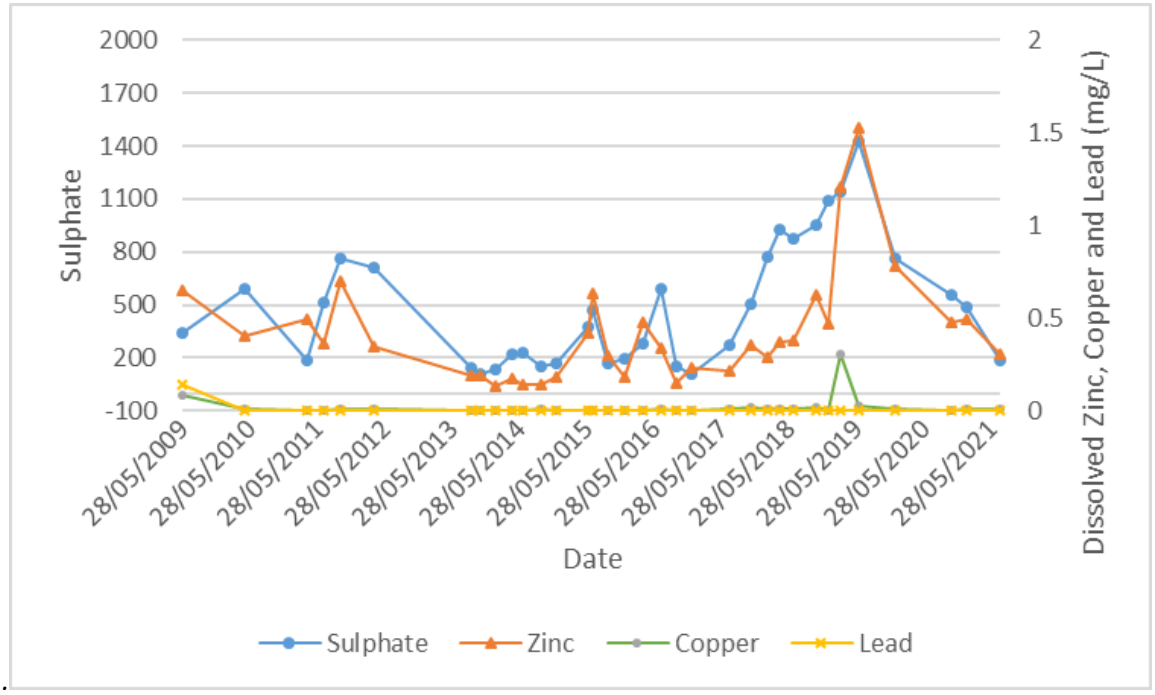


Figure 54. MB22 Sulphate and metals

6.5.9 Other Groundwater Wells

There are three additional monitoring bores which are relevant to the mining operation. MB4 is located to the east of the mine void and upslope of the processing area while MB 8 is located on Collector Road downstream of the proposed processing site. Both these sites will represent monitoring bores for the ongoing processing and materials handling site. MB 6 is located adjacent to the new mine entry on the western side of the void near the dolerite stockpile area. Since construction of the box cut mine entrance MB6 has tended to be dry reflecting a change to the total catchment area suppling the bore.

The monitoring results for MB 4 are provided in Figure 55 and Figure 56. There has been periodic fluctuations in pH in MB4 over many years. The recent spike indicates the pH is nearing 8.0. Apart from higher than average rainfall there is no other geotechnical explanation for the increase. The spike in zinc this reporting period is so small in relative terms as to only be attributable to background fluctuations. Other metals and water quality parameters are consistent with historical trends.

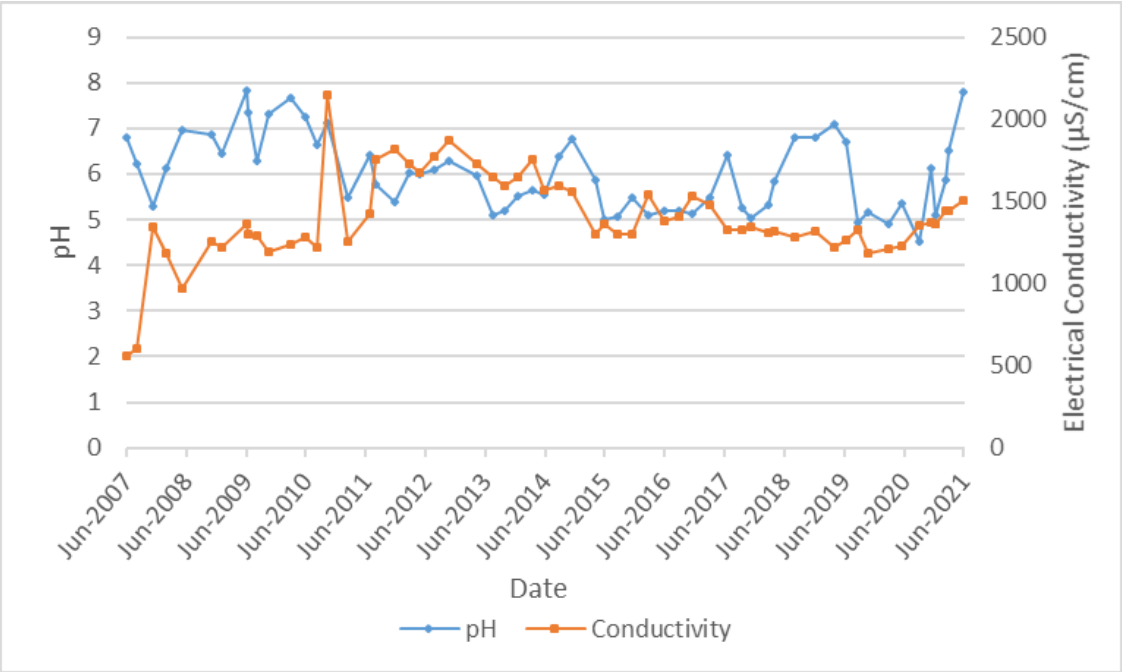


Figure 55. MB4 pH and conductivity

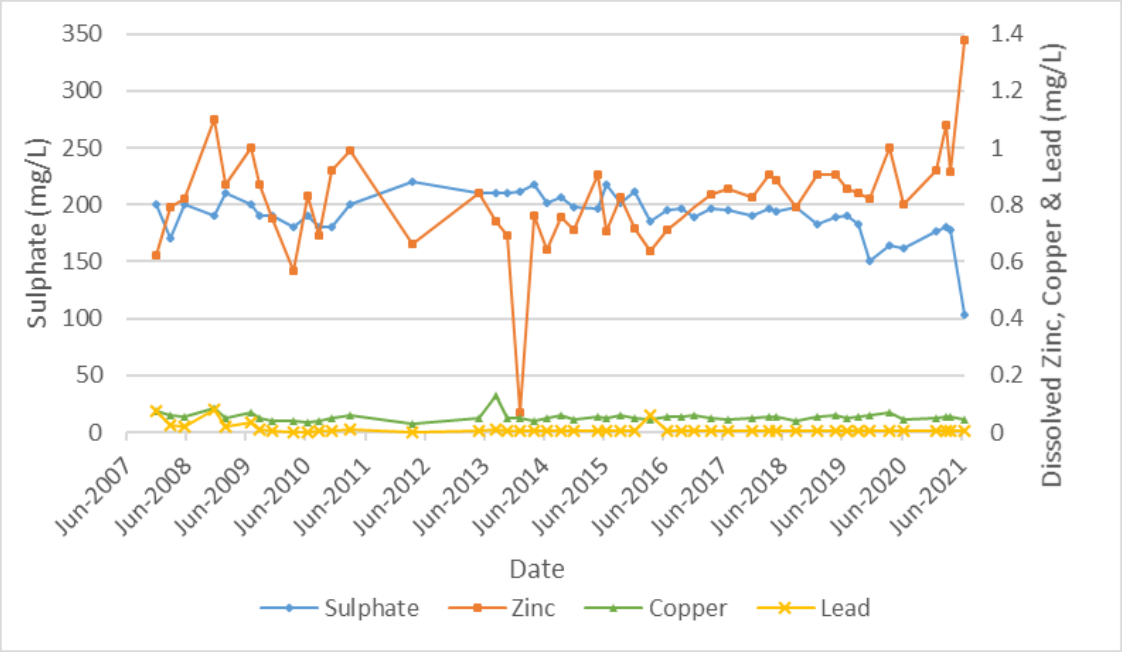


Figure 56. MB4 Sulphate and metals

MB 8 (Figure 57 and Figure 58) is located adjacent to Collector Road to the northeast of the site and downstream of the processing plant site. The pH is relatively stable with an average of 7.7 over the reporting period and also similar to the long-term average value at 7.14 (results since 2004). Conductivity trends declined slightly back to near average levels of 3,784 µS/cm (results since 2004).

Sulphate levels in MB8 decreased slightly in during the reporting period. The levels of sulphate are still considered low while metals have been consistently at trace levels. This site represents an ideal location to determine long-term impacts from both the historic operation as well as the new processing plant site. The site provides water quality from hosted sedimentary rock and not influenced by the sulphide ore body. MB8 is used as an ongoing verification of the performance of the new tailings Dam TSF4.

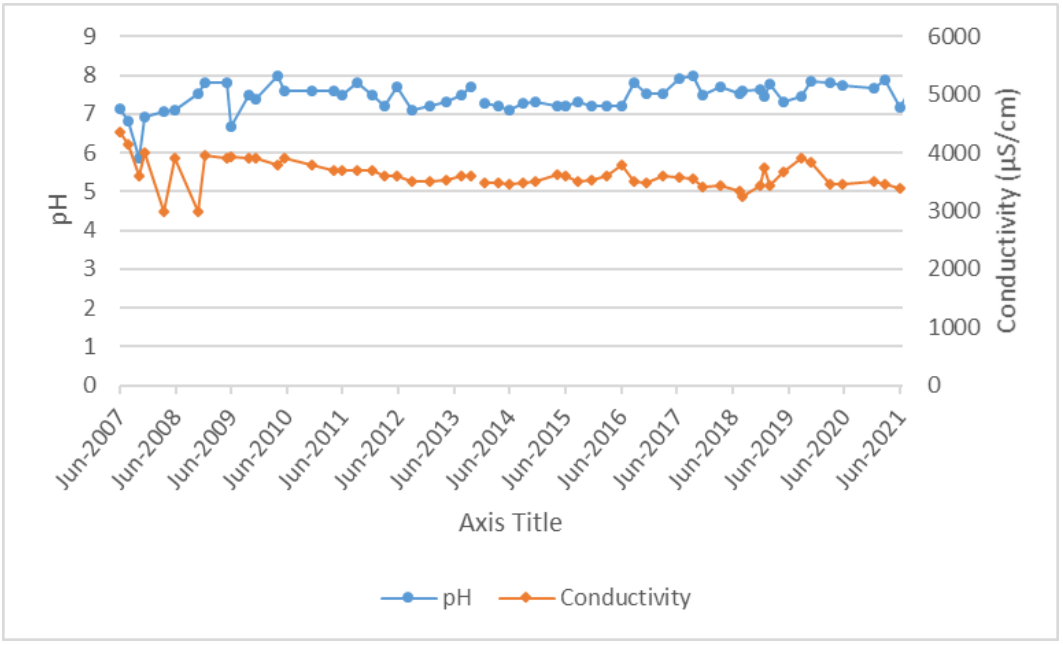


Figure 57. MB8 - pH and conductivity

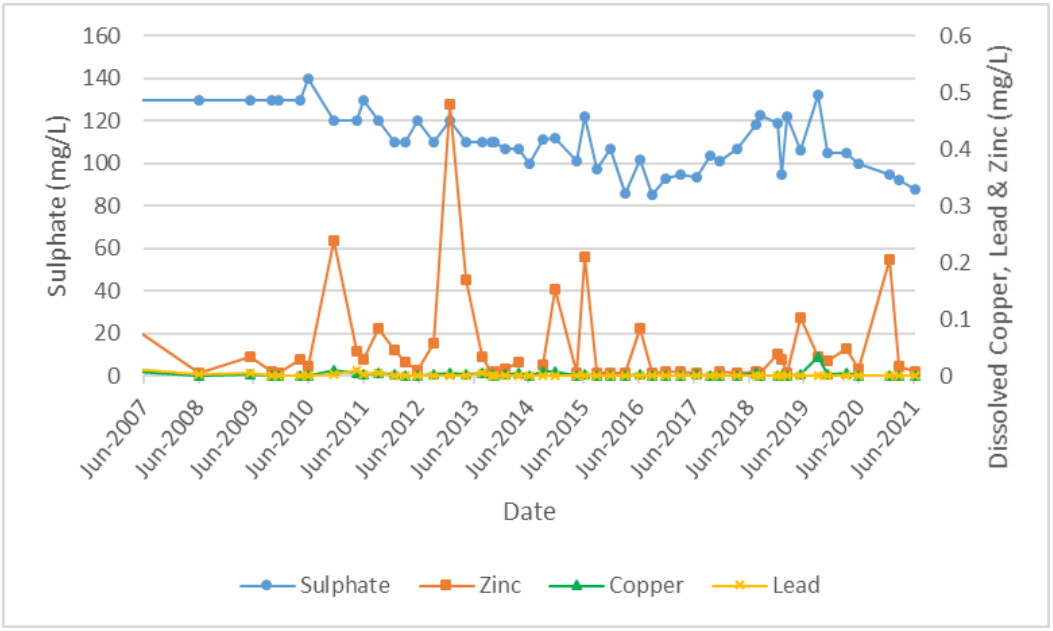


Figure 58. MB8 Sulphate and Metals

MB 6 (Figure 59 and Figure 60) is located to the west of the mine void, east of ED3 and adjacent to the new mine entry. The results show some influence from the underlying ore body with pH being slightly acidic with an average of 6.22. Concentrations of conductivity, zinc and sulphate have been gradually declining since construction of the box cut entry.. This particular bore is solely influenced by underlying geology and not leakage from any storage facility being screened above both the Bioreactor and ED3 dam complex. It is likely that the reduction in conductivity, sulphate and zinc is associated with the mining operation and recharge from ground-water.

Since underground operations have commenced the water level in MB6 has decreased and indeed the bore has been dry on a number of occasions. Due to the tendency of MB6 now to be dry, the long term reliability of this bore for monitoring is uncertain. Nevertheless, it will continue to be monitored and samples obtained when possible.

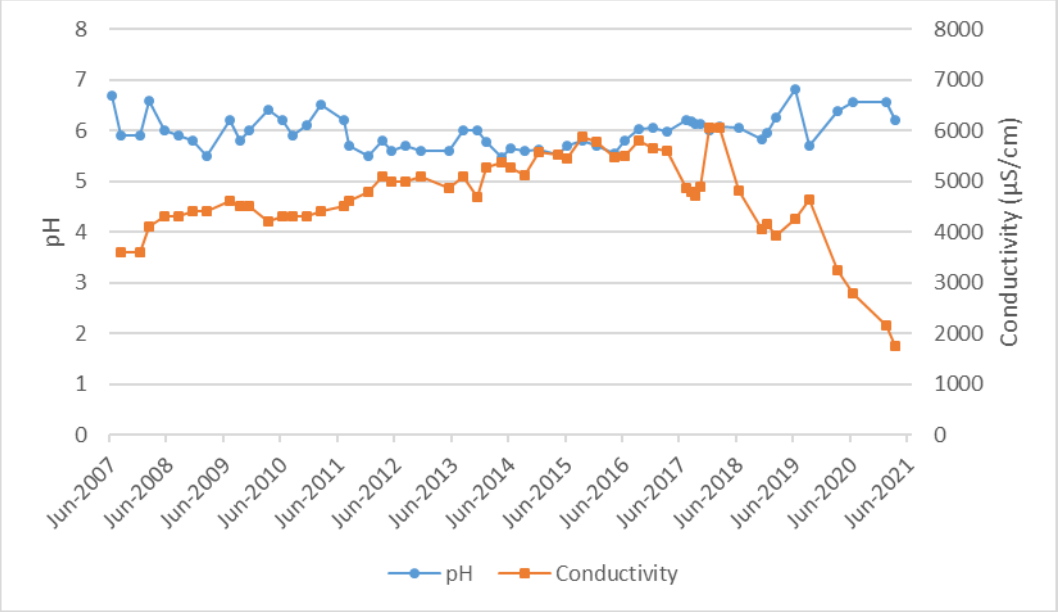


Figure 59. MB6 pH and conductivity

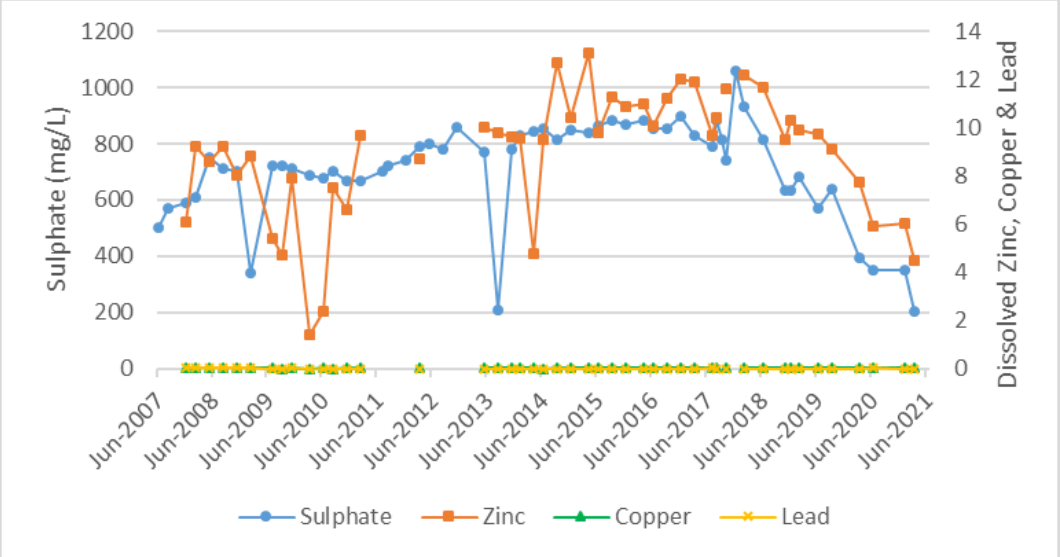


Figure 60. MB6 Sulphate and metals

6.5.10 Groundwater Pollution Monitoring Effectiveness

The Woodlawn mine has an extensive and effective monitoring network which can detect potential contamination of groundwater from disturbed lands, such as the evaporation dams and tailings dams. The current network and monitoring schedule have been discussed at length with various government agencies over many years and is considered effective in determining if the operation is having an impact on the receiving environment. As discussed in previous Annual Reviews, Heron is continually reviewing and evaluating the efficacy of the monitoring program which has several historical issues. Over time it is likely that new monitoring points will be added to replace superseded data and duplications will be removed.

Details of the Trigger Action Response Plan, developed in consultation with DPI-Water is provided in Section 7.2.1. This TARP nominates bores for assessment of the potential impacts of using past fill as well as the protection of private agricultural bores from depressurisation caused by mine dewatering.

6.5.11 Groundwater Pollution Monitoring - Future Improvements

Monitoring and assessment of results has continued throughout C&M in order to meet compliance obligations and to maintain a record of long term groundwater trends and areas that may require further investigation as part of future mining operations. Under the provisions of the Project Approval, additional monitoring bores are required to specifically monitor aspects of the future mining operation. Heron will continue to review the monitoring program to determine the most effective means of establishing a verification and impact prediction process.

6.5.12 Contaminated/Polluted Land

The entire mine site is classed as contaminated with the primary areas being the evaporation dams and tailings dams. The tailings dams are expected to be reprocessed on resumption of operations and rehabilitated as part of the ongoing mining operation. The evaporation dams and other remaining mining areas will remain until final closure for either rehabilitation or incorporated into Veolia's Bioreactor operation.

6.6 Biodiversity

6.6.1 Threatened Flora

The Woodlawn Site is within the South Eastern Highlands Bioregion and is within an area that has experienced extensive clearing, disturbance due to previous land uses and is fragmented. The EA identified no threatened ecological communities in the area disturbed by the mine facilities.

The Project Approval requires Heron to establish at least 71 hectares of the Western Tablelands Dry Forest vegetation community within buffer land surrounding the project site. Planning has commenced in accordance with the approved the Vegetation and Rehabilitation Management Plan for the operation with the establishment of an onsite nursery, potting trials and seed harvesting was carried out during the reporting period. Tube stock was planted to replace dead trees within the visual barrier established in 2018/19 along the Collector Road frontage. Over 90% of the planting has survived despite the severe drought experienced across the region during the reporting period.

Whilst in C&M no planting for the biodiversity offset has been carried out.

6.6.1.1 Effectiveness of Site Strategies

No site disturbance arose during the reporting period due to the Woodlawn mine site being under C&M. No loss or disturbance of threatened biodiversity habitat occurred during the reporting period.

The proposed biodiversity offset area is significant and by far exceeds current best practice. Seed from onsite vegetation has been collected and remains in storage to grow tubestock seedlings to be planted in the off-set area.

A cover crop was planted over the disturbed areas following construction. Due to the severe dry conditions, a second cover crop was sown during in late 2019 to ensure adequate ground cover and restore nutrient cycling in the previously bare areas, prior to the establishment of permanent pasture. The sowing of permanent pasture has been deferred until resumption of operations. Nevertheless, substantial native grass species have established in the previously disturbed borrow area due to favourable conditions.

6.6.1.2 Further Improvements

There has been no improvement activity undertaken during the reporting period due to the mine being in C&M. There remains negligible opportunity to undertake improvement works whilst Woodlawn mine remains in C&M.

6.6.2 Threatened Fauna

With the minimal impact to existing vegetation, the impact on fauna and fauna habitat is equally minimal. A fauna survey was undertaken as part of the EA studies in the 2017/18 reporting period and found that no threatened fauna would be impacted by the operation.

6.6.2.1 Effectiveness of Site Strategies

To minimise the impact on fauna, the Woodlawn Mine Project includes management measures to address:

- ❒ delineation of development envelopes;
- ❒ pre-clearing survey protocols;
- ❒ implementation of sediment control measures as part of the construction program;
- ❒ vegetation clearing protocols, including salvage and relocation of suitable dead logs;
- ❒ protection of waterways, and aquatic and riparian habitats;
- ❒ snake handling training to enable safe relocation of snakes away from operational areas
- ❒ ongoing monitoring of the operations regarding the project site's retained habitats, including water quality; and
- ❒ management of weed invasion.

The resumption of these management measures when operations resume, will ensure the future impact on threatened fauna is considered minimal.

6.6.2.2 Further Improvements

No further improvements to the current strategy are considered necessary at this stage.

6.7 Weeds

The principle weed of concern at Woodlawn is Serrated Tussock which has been treated across site as part of an annual program by local contractors. The Serrated Tussock is presently well controlled across site. Small pockets of blackberry and scotch thistle appear from time to time and will require ongoing treatment to control their establishment on site.

6.7.1 Effectiveness of Site Strategies

Weed control is an ongoing issue with all agricultural land in the district. However, weed control undertaken in the previous 2-3 years across site has minimised the presence of exotic weeds and their seed burden. The mine project will involve establishing a native vegetation offset area which will be targeted to avoid removal of agricultural land but in turn will assist in reducing weed invasion onto surrounding agricultural land. Heron will continue its inspections and resume weed spraying within and adjacent to the lease, in land areas it controls on resumption of operations.

6.7.2 Further Improvements

The site will continuously be monitored for the emergence of weed species in accordance with the Woodlawn Environmental Monitoring Plan and species targeted controls will be implemented should the need arise.

6.8 Pests

Pest species present on site include deer, rabbits, foxes and feral cats. Management of these species is carried out as recommended in the South East Regional Strategic Pest Animal Plan 2018-2023 (NSW South East Local

Land Services). The management of pest species is undertaken in accordance with the Woodlawn Environmental Monitoring Plan.

6.8.1 Effectiveness of Site Strategies

On site pest management strategies are generally effective however improved exclusion fencing is considered necessary to reduce grazing pressure from deer and the large population of eastern grey kangaroos on site.

6.8.2 Further Improvements

Following the recent drought and recent rainfall, native animal grazing pressure continues to contribute to extensive overgrazing and pressure on vegetation around the Site. It is planned to progressively install kangaroo proof fencing around the processing plant site and revegetation areas to exclude access although it will not be possible to implement this strategy until after operations resume.

6.9 Blasting

Blasting ceased following the suspension of operations at Woodlawn in March 2020. No underground blasting has been carried out during the C&M period. When operations resume it is anticipated that underground blasting at various depths will continue for the life of the mine. Vibration monitoring for the Bioreactor is part of an agreement between Veolia and Heron and will continue for the life of the project.

No vibration monitoring was carried out during the reporting period as there were no blasting operations undertaken due to the C&M status of the Woodlawn mine.

6.10 Operational Noise

No noise monitoring was carried out during the reporting period as there were no operational noise emissions from the Woodlawn mine.

During C&M there will continue to be negligible operational noise. When operations resume operational control measures to minimise noise will include:

- Controlling noise at its source by implementing best management practices and utilising suitable technology and
- Managing the transmission of noise through the use of barriers to attenuate noise transmission
- Training of the workforce to ensure best working practices to reduce noise
- Purchasing equipment that meets relevant environmental noise standards
- Maintaining equipment to optimum working order
- Community consultation
- Maintenance of ventilation fans

6.11 Visual and Stray Light

The site is well located from a visual perspective, with the nearest Veolia owned residence being located approximately 3km away and the nearest non-Veolia owned residence being 6km away. The planting of the visual tree screen along Collector Road was undertaken early in 2019. As the trees grow they will provide a

further barrier against visual and stray light being emitted from the site. No further improvements are considered necessary at this stage.

6.12 Aboriginal and European Heritage

Based on previous Aboriginal and Heritage surveys, no areas of Aboriginal or European Heritage have been impacted by the Project or as a result of activities on the Site. A Heritage Management Plan has been prepared and approved by DPE in accordance with the Project Approval which provides appropriate management, conservation and protection of both Aboriginal and non-Aboriginal heritage items identified on the site and should any additional items of significance be discovered. No further improvements are considered necessary at this stage.

6.13 Material Prone to Generating Acid Mine Drainage

During the 2019/2020 reporting period, Revision 6 of the Waste Rock Management Plan (WRMP) was further updated with comments provided by the DPE and the Resources Regulator. The key changes recommended included:

- To develop a plan for a passive treatment system for the waste rock dam in consultation with the resources regulator, and to implement the passive treatment system at the earliest opportunity. MOD3 to be amended accordingly.
- Include surface water and ground water monitoring values
- Ensure the WRMP is in line with the EPL
- TARPS to be revised in consultation with DPIE
- Revise reporting protocols

The WRMP will be further revised prior to the resumption of operations.

6.13.1 Effectiveness of Site Strategies

The C&M management of waste rock is currently working satisfactorily. Any updates to management of waste rock will be reviewed prior to resumption of operations at Woodlawn.

6.13.2 Further Improvements

The control of acid mine drainage is a key environmental issue for the Project. The reprocessing of the tailings will reduce the level of contamination within the tailings dams and the use of final tailings in paste fill underground will in theory significantly reduce the potential for long term acid mine drainage from the site and assist with the long term success of the final rehabilitation program. The ongoing monitoring program and reporting framework will determine if further improvements are necessary. The management of waste rock in practice forms part of the ongoing material handling of the mine. This dictates that unnecessary rehandling of material is an avoidable cost. Management practices will revised prior to resumption of operations at Woodlawn.

6.14 Bushfire

Under the Rural Fires Act 1997, there are a number of obligations that must be met with respect to managing the land. In summary, these include:

- Occupiers of land are to extinguish fires or notify firefighting authorities immediately; and
- It is the duty of the owner or occupier of land to take practicable steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of bush fires on or from that land.

The following measures are employed on site to ensure that these obligations under the Rural Fires Act are met:

- Water storages on site will be available for fighting purposes if required. This will include on site dams and water tanks.
- Firebreaks will be constructed as appropriate.
- The amount of dead timber on site will be kept to a minimum to reduce the fire hazard.
- Fire fighting equipment will be placed at strategic stationary positions.
- Engagement with the local Tarago RFS brigade will resume after resumption of operations.
- A fire truck is maintained on Site which is available for use to respond to on-site and off-site incidents if required. During the reporting period the fire truck was deployed to attend a minor grass fire ignited by a power line fault.
- During C&M manpower resources are limited, but it is envisaged that when operations resume, the fire fighting capability will be restored.

6.15 Mine Subsidence

The Woodlawn Extraction Plan will be amended in accordance with DPIE comments in August 2019 following a review prior to resumption of operations at Woodlawn.

The Extraction Plan outlines an additional subsidence monitoring program covering the main dam structures on site and the Bioreactor. The monitoring sites are shown on Plan 6. Ongoing investigations and monitoring will be continued throughout C&M and reviewed on resumption of operations, to assess and mitigate against potential underground mining impacts as necessary. As described in the Extraction Plan, the use of paste fill in the underground extraction areas will remove the potential for surface subsidence to occur. The plan also provides measures to assess compliance with the following performance measures listed in the Project Approval:

a) there is no measurable subsidence caused by underground mining beneath the Woodlawn Landfill, tailings dams, and evaporations dams on the site;
b) apart from the access decline, no underground mining is undertaken within 200 m of the perimeter of the Woodlawn Landfill;
c) remnant underground voids are long term stable to prevent subsidence; and
d) material used to backfill underground voids is physically and chemically stable and non-polluting.

The monthly subsidence monitoring program with the Bioreactor was set up during the previous reporting period and monitoring data for ED1 is shown in Table 19.

Table 19. Subsidence monitoring results for ED1

Monitoring point ID	Residuals to Previous Observations			Residuals to First Observations 25/03/2020		
ED1M1	-0.005	-0.006	0.002	-0.007	0.012	0.013
ED1M2	0.007	-0.009	-0.013	-0.010	0.005	0.009
ED1M3	0.005	-0.003	-0.014	-0.009	0.005	0.000
ED1M4	0.003	0.004	-0.002	-0.009	0.010	0.019
ED1M5	0.004	-0.004	0.004	-0.009	0.000	0.017
ED1M6	0.004	-0.010	-0.013	-0.008	0.007	0.008
ED1M7	0.004	-0.003	-0.012	-0.012	0.003	0.005
ED1M8	0.000	-0.007	-0.007	-0.006	0.010	0.019
ED1M9	-0.004	-0.014	-0.006	-0.009	0.005	0.016
ED1M10	0.002	-0.012	-0.012	-0.006	0.003	0.006
ED1M11	0.002	-0.007	-0.002	-0.005	0.013	0.019
ED1M12	0.003	-0.006	-0.005	-0.005	0.010	0.008
ED1M13	0.001	-0.011	-0.005	-0.004	0.006	0.010
ED1M14	0.002	-0.003	-0.009	-0.011	0.012	0.000
ED1M15	0.000	-0.002	-0.003	-0.006	-0.002	0.014

6.16 Hydrocarbon Contamination

Above ground fuel tanks are equipped with appropriate bunding and containment facilities to cater for both mining and reprocessing operations. All waste and spent hydrocarbons are disposed offsite using licensed contractors.

All employees and contractors coming to site are trained in spill containment, control and clean-up procedures.

6.17 Public Safety

Warning signs have been erected on the fences and Heron requires all visitors to site to undertake an induction appropriate to the level of work they are doing. Additional controls, such a JSEA and permits to work are used where appropriate. Only authorised vehicles are permitted on site. All visitors to the site are escorted at all times by Heron personnel.

7 WATER MANAGEMENT

7.1 Surface Water Management

Maintaining effective management of water has been a long-standing feature of the mining operations at Woodlawn and remains a key issue in the ongoing operation. Heron has developed its Water Management Plan for the Woodlawn Mine which largely replicates the existing water management system but with some enhancements and integration systems with Veolia's operations.

The Woodlawn site is divided between Heron and Veolia but still operates under a zero discharge condition which requires the on-site management of all waters that come into contact with the orebody, material extracted from the mine and water generated from the Bioreactor. Acid mine drainage potential exists in most areas previously disturbed by mining. A key feature of the Woodlawn Mine Project Approval was the implementation of comprehensive water recycling and reuse system in order to meet the government reduced allocation from the Willeroo Borefield. To meet this objective, the Woodlawn mining operation is required to preferentially use water available on site and only use fresh water from the Willeroo Borefield as a last resort.

In preparation for a potential restart and in view of the substantial rainfall that has impacted site and water storages during the reporting period a comprehensive water balance has been prepared. Restart of operations is expected to be impacted by the excessive volume of surface water stored in dams and will require substantial evaporation systems to be implemented.

The water management system at Woodlawn includes an extensive network of clean water contours diverting water away from disturbed areas. The system is designed with flexibility allowing drainage from disturbed areas to be pumped to either the Evaporation Dams or the tailings dams either directly or via other pollution control dams. The system of water transfers is shown on Plan 5 in Appendix A.

During operations the water from the old underground mine workings was pumped into ED2 amongst six separately HDPE lined cells. Dewatering of mine water has ceased during C&M. It is anticipated dewatering will resume prior to resumption of operations. Mine water will be stored to HDPE lined cells in ED2 and evaporated.

The transfer of water between dams has always been a feature of the Woodlawn site and continues to be necessary to ensure that there are no discharges from the site. A water treatment plant including a reverse osmosis capability was constructed to treat the mine water making it suitable for use in processing and other operational requirements however, it proved ineffective and uneconomical and has been removed. It is anticipated surplus mine water will be controlled by extensive evaporation infrastructure.

It is anticipated the Woodlawn mine will utilise water from other existing water storages on site, to be topped up with raw water from the Willeroo bore field only when insufficient water is available from on-site reserves.

Further revisions to the water balance will be required prior to mining operations resumption at Woodlawn.

The range of waters available for use at Woodlawn mine includes:

- Processing Plant Pollution Control Dam - Moderate salinity, acidic and moderate metals.
- Underground mine water stored in ED2 - Moderate salinity, neutral, metal rich and organics.
- Completed mine voids with paste fill - Moderate salinity, low metals and alkaline.
- Treated leachate from Veolia - Low salinity and metals, neutral and little organics.
- Tailings Dams - Moderate salinity, acidic and metal rich.
- Process Water Dam - low salinity, alkaline with high solids.

- ❒ Sewage Treatment Plant - low salinity with minor organics.
- ❒ Woodlawn Dam (Willeroo Borefield) - Low salinity and metals, neutral pH.
- ❒ ED1 (Veolia) - Highly saline, acidic and metal rich.
- ❒ ED3S (Veolia) – Low salinity and metals, slightly acidic stormwater
- ❒ Pollution Control Dam (Veolia) - Highly saline, acidic and metal rich.

Woodlawn operates under a comprehensive environmental monitoring and inspection program which is undertaken by both Heron and Veolia under separate licensing and project approval conditions. Interagency cooperation allows for the sharing of data and resources.

The site contaminated water inventory is a measure of the volume of contaminated water held in major storage dams and is a key environmental indicator showing the effectiveness of water management strategies over the life of mine. The approved Water Management Plan requires the water balance to be updated on an annual basis and to include water used and generated by Veolia. During C&M the expected water usage will be for periodic maintenance and domestic purposes. The overall use of water over the net reporting period will be minimal.

Table 20 details the capacity and water volumes within onsite storage dams at the commencement and conclusion of the reporting period. This table itemises the dams which cover the operational area for the Woodlawn Mine. It does not include the operational dams covering the Bioreactor such as the ED3 Complex and other internal Bioreactor storages.

Table 20. Water volumes stored - Woodlawn Mine Operational Area

Water Storage	Quality	Water Volumes (ML)		
		June 2020	June 2021	Total Storage Capacity (incl tailings)
Plant Collection Dam (Veolia)	Contaminated	<2	20	**60**
Evaporation Dam 1	Contaminated	170	375	1145
ED1 Coffer Dam	Contaminated	20	80	200
Evaporation Dam 2	Contaminated	400	400	940 in 6 cells
Evaporation Dam 3 South	Contaminated	100	130	130
Woodlawn Dam	Clean	70	70	80
Waste Rock Dam	Contaminated	20	20	40
West Tailings Dam	Contaminated	80	80	**300**
South Tailings Dam	Contaminated	20	600	**1936**
North Tailings Dam	Contaminated	130	130	**430**
Pollution Control Dam	Contaminated	8	8	**38**
TSF4	Contaminated	100	100	**815**
Totals		1,120	2013	**5,984**

Total water held on the mine site increased due mainly to significant rainfall experienced on site during the reporting period.

7.1.1 Summary of Surface Water Quality

The following graphs show a summary of the water quality associated with key water storage facilities. Figure 61 and Figure 62 show the long term pH and conductivity for each of the main surface water storages on site, namely ED1, South Tailings Dam, North Tailings Dam and the Waste Rock Dam.

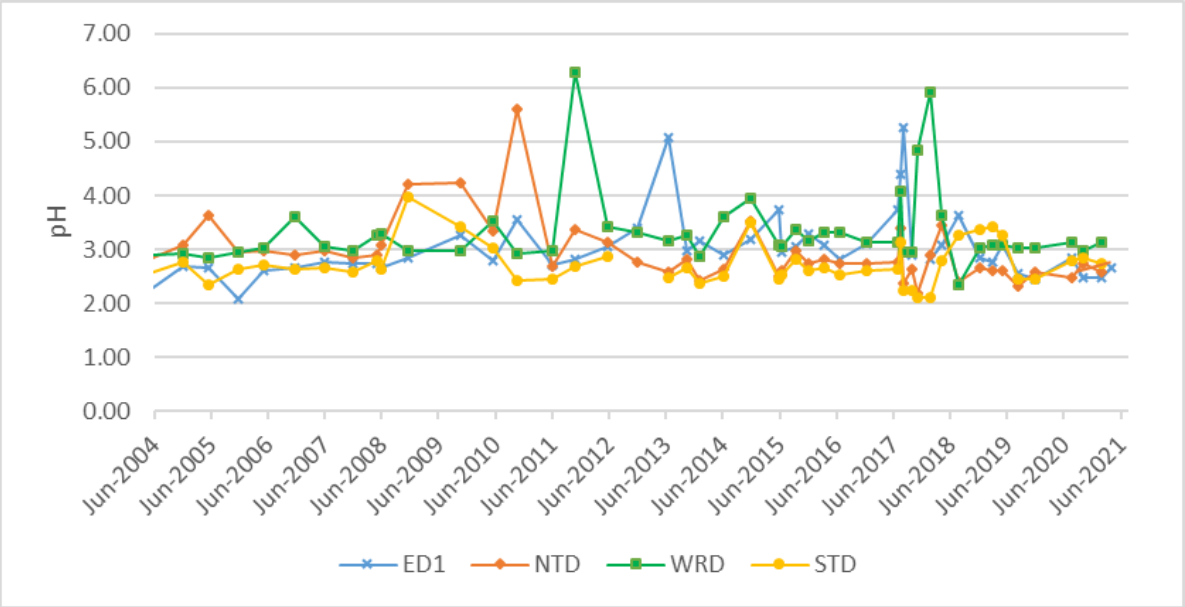


Figure 61. Surface water storage quality pH

The data shows some variability in water quality across the site however there are no trends as yet of any improvement or deterioration in overall water quality (Figure 62). The water quality in ED2 from water pumped from the old underground workings is shown separately in Section 7.3.

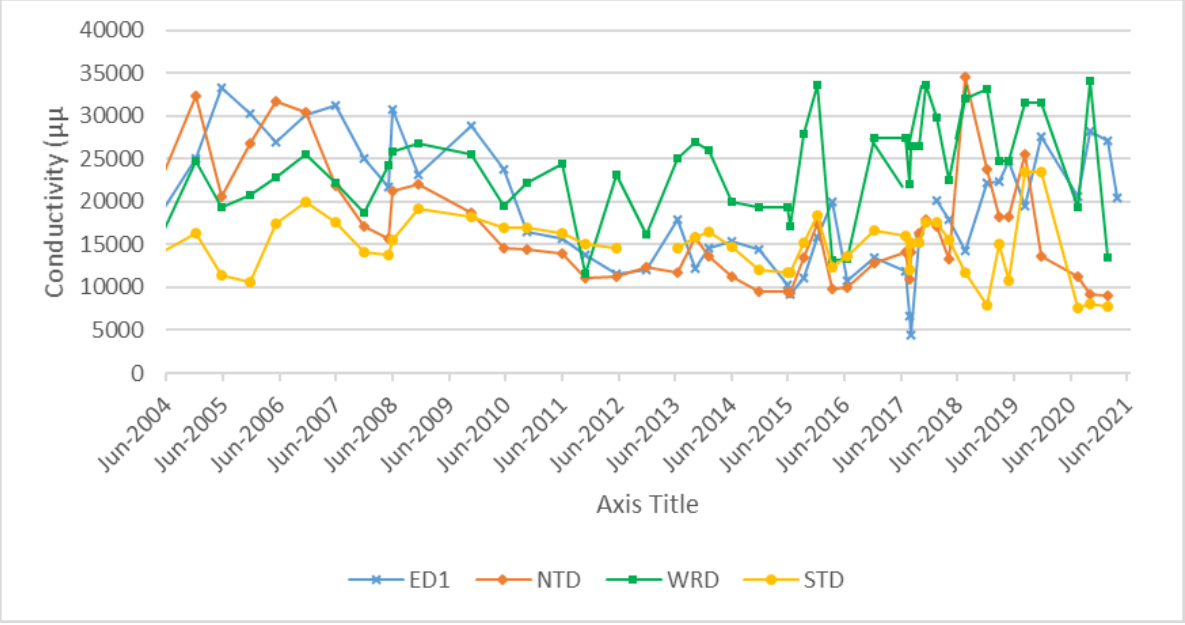


Figure 62. Surface water storage quality – conductivity

7.2 Groundwater Management

The hydrogeological setting at Woodlawn is well documented following 20 years of open cut and underground mining operations. The availability of the historical data provides assurance that there are no adverse impacts on the environment outside the mining lease as a result of the new mining operations. There are known to be localised impacts associated with the evaporation ponds, tailings dams and Waste Rock Dump. The monitoring program results over the 2019/20 period has not indicated any changes in the level of impact caused by the mine.

The Woodlawn mine sources raw water from the Willeroo borefield, approximately 6km to the west of the site utilising the allowance of a water access licence owned by Veolia. As forecast in the 2018/19 Annual Report the borefield water was initially used as a primary water source for the mining operation. It was envisaged that the water treatment plant would treat mine water providing the primary source of process water. Overtime, the operations at the processing plant and tailings reclaim were refined to lower the relatively high consumption of raw water. At the time of suspension of operations the water treatment plant was still in the process of being commissioned. The sources of water use have since been reviewed and it is envisaged that water from existing surface water sources, only to be topped up with raw water when required will fulfil operational water requirements. This is the subject of a water balance review to be conducted during C&M. It is envisaged that when recycling initiatives are fully implemented, the Willeroo borefield will become a secondary source used in addition to the reuse of stored water on-site. Other users of the borefield are unlikely to be impacted due to water extraction as a result of the Project. However, if use of the borefield does result in reduced aquifer yields for surrounding users, Heron will investigate options to restore water supply to these users.

The Willeroo borefield Water Access Licence (WAL) has an allocation 600 MLpa. This allocation lies within the Lachlan Fold belt Groundwater Source and has been historically used by the mining operation for both mine dewatering and water supply allocations. Early in 2018, DPI-Water advised that a portion of the dewatering activities may occur in the adjacent Goulburn Fractured Rock Groundwater Source and therefore an allocation from both sources would be required. A new WAL was granted in December 2018 and a 400 ML allocation was secured on the market. The WAL has a separate works approval attached to allow ongoing dewatering of mine water from the old underground workings. The water removed from the underground workings is now divided between the two groundwater sources.

7.2.1 Groundwater Level TARPs

The current groundwater level TARPs were approved by DPI-Water and listed in Table 21. These TARPs form part of the Works Approval attached to the WAL.

Table 21. Additional Groundwater Level TARPs

Monitoring Bore	Trigger Level	Response Action
MB3	Recorded water level in MB3 is between 5 – 6 mbgl during a quarterly period for 3 consecutive quarterly periods	Response Action 1
	Recorded water level in MB3 is greater than 6 mbgl during the normal monitoring period	Response Action 2
MB8	Recorded water level in MB8 is between 7.5 – 8.5 mbgl during a quarterly period for 3 consecutive quarterly periods	Response Action 1
	Recorded water level in MB8 is greater than 8.5 mbgl during the normal monitoring period	Response Action 2
MB17	Recorded water level in MB17 is between 7 – 8 mbgl during a quarterly period for 3 consecutive quarterly periods	Response Action 1
	Recorded water level in MB17 is greater than 8 mbgl during the normal monitoring period	Response Action 2
MB13	Recorded water level in MB13 is between 6 – 7 mbgl during a quarterly period for 3 consecutive period	Response Action 1

	Recorded water level in MB13 is greater than 7 mbgl during the normal monitoring period	Response Action 2

Abbreviations:

Term	Meaning
Mbgl	metres below ground level
Response Action 1	Investigation and advise Department of Industry - Water and the Natural Resources Access Regulator within 5 business days of detection.
Response Action 2	Investigate and advise Department of Industry - Water and the Natural Resources Access Regulator within 5 business days of trigger exceedance and undertake remedial measures to address impacts from mining operations on groundwater supply for all affected landholders.
Remedial measures	Remedial measures should include but not restricted to the lowering of pumps, reconstruction of existing bores, construction of new bores, monetary compensation for increased pumping costs and/or for securing water from alternative sources.
Normal monitoring period	monthly
Quarterly period	A period of three consecutive months

The purpose of the TARPs is to measure and report on groundwater levels at selected bores that are located between the mine workings and existing licensed groundwater supply bores. The data collected from these bores is proved in Figure 63. It is noted that generally the water level in the monitored bores has risen to above average levels during the reporting period and reflects the wet cycle experienced on site over the past 12 or more months.

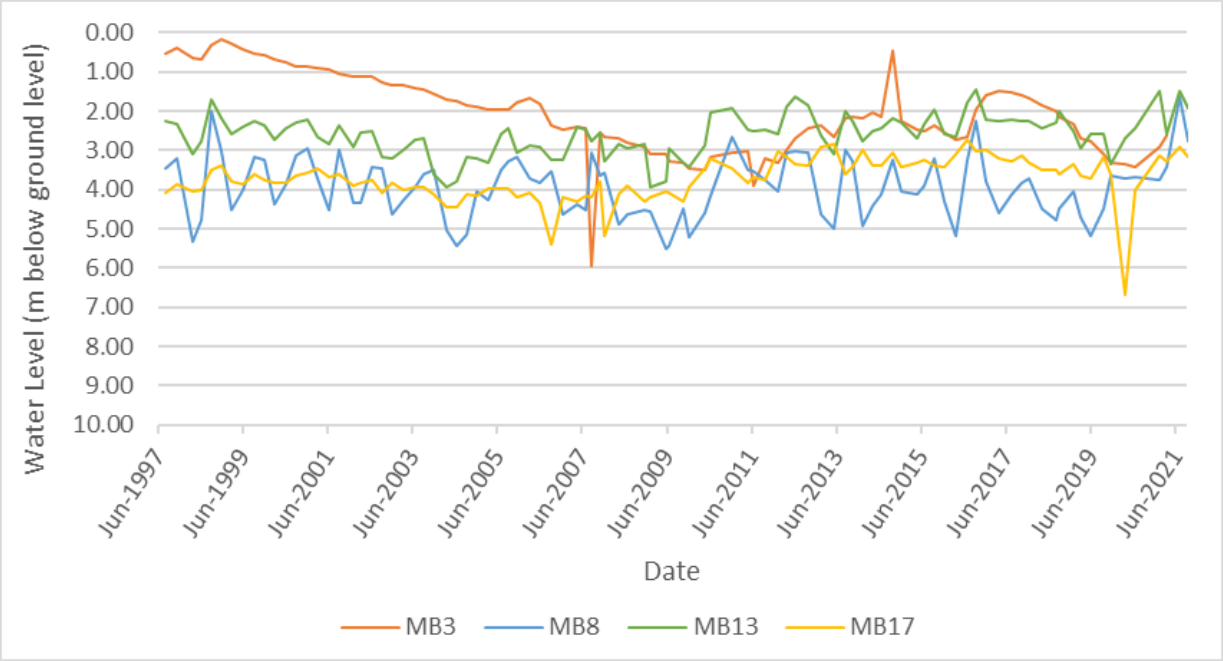


Figure 63. Bore level - metres below ground level

The bore water data in Figure 63 represents a 24 year summary of the water level from the nominated bores. MB3 is located to the north of the site in a separate valley and drainage system. The water level in MB3 shows the most variation over the past 20 years. The remaining bores are located closer to the underground workings which will be progressively dewatered over the life of the underground mine. MB17 is located at the base of the legacy waste rock emplacement and monitors acid drainage. The water level in the bore showed a sharp decrease in early 2020 but has returned to above average levels. The single recorded drop in water level is most likely associated with the severe drought conditions being experienced at the time resulting in the lower than average infiltration through the legacy waste rock emplacement. Overall, the data base provides a good basis to determine if the dewatering activities have an impact on local groundwater supplies and on neighbouring properties.

7.2.2 Water Access Licence Usage

Table 22 shows water taken by the operation, exclusive of Veolia, for the period 1 July 2020 to 30 June 2021.

Table 22. Water access licence usage

Water Licence	Source	Entitlement (ML)	Mine Operation use (ML)	Mine Dewatering (ML)
WAL28983	Lachlan Foldbelt	600	12	0
WAL42034	Goulburn FR	400	0	0

7.3 Dewatering Progress

The Stage 3 ongoing dewatering of the old mine workings commenced on 20th November 2018 and was suspended on 19 June 2020. The dewatering campaign commenced with a number of incremental changes to allow regulatory review of the water quality. Ongoing dewatering was approved by the EPA following the successful completion of Stage 1 and Stages 2a - d as outlined in Table 23 below.

The pump was not operational during the current reporting period and no dewatering occurred.

Table 23. Key dewatering stages and discharge points

Dewatering Stage	Date on	Date off	Pump ID	Discharge point
Stage 1	17/05/2017	20/05/2017	Pump 1	ED2 clay cell
Stage 2a	10/08/2017	11/09/2017	Pump 1	ED2 clay cell
Stage 2b	27/09/2017	1/12/2017	Pump 1	ED2 clay cell
Stage 2c	19/12/2017	12/01/2018	Pump 1	ED2 clay cell
Stage 2d	2/02/2018	26/02/2018	Pump 1	ED2 clay cell
Stage 3	20/11/2018	14/12/2018	Pump 1	Cell 3 HDPE
Stage 3	21/12/2018	4/03/2019	Pump 1 (decommissioned)	Cell 4 HDPE
Stage 3	12/02/2019	24/05/2019	Pump 2	Cell 4 HDPE
Stage 3	24/05/2019	27/5/2019	Pump 2	Cell 6 HDPE
Stage 3	27/05/2019	Delayed	Pump 2	Inoperable
Stage 3	20/11/2019	Ongoing	Pump 2 recommencement	ED2 HDPE cells various
Stage 3	19/06/2020	Dewatering Suspended indefinitely during C&M		

The location and designation of the cells in ED2 is shown in Figure 64 below. Water pumped from the underground workings is stored in individual cells within ED2 for evaporation. The quality of the water held within the workings is anticipated to vary according to extraction depth and may fluctuate significantly during dewatering. The EPA have therefore required a staged approach coupled with ongoing monitoring and reporting. To date, Heron has provided eight progress reports detailing water quality and management options. Additional environmental assessment was also required during dewatering stages 1 and 2 to include odour modelling, potential treatment options and attenuation over time. Reporting will resume after dewatering recommences.

Figure 64. Evaporation Dam 2 - cell layout

8 REHABILITATION PLANNING AND MANAGEMENT

Details of the rehabilitation program and final rehabilitation are provided in the approved 2015 Mining Operations Plan, the 2020 C&M Mining Operations Plan and the Vegetation and Rehabilitation Management Plan. There were no rehabilitation activities undertaken on site during the reporting period to due to Woodlawn being in C&M. A rehabilitation trial on TDN commenced during the reporting period in April 2021. Details of the trial are in section 8.5

Earlier rehabilitation works are subject to regular inspections but maintenance was minimal during the reporting period due to the mine being in C&M.

As described in the MOP, the site has been divided into the following primary Domains:

- Domain 1 - Waste Rock Dump (rehabilitated waste rock dump and associated areas);
- Domain 2 - Tailings dams (TDN, TDS, TDW and TSF4);
- Domain 3 - Evaporation dams (ED2);
- Domain 4 – Hickory's Paddock (covering all facilities built by Heron to support reprocessing and underground operation including new infrastructure and waste rock dump); and
- Domain 5 – Remaining Project Site areas.

Rehabilitation activities proposed for these areas are discussed in the MOP but to date, rehabilitation work has centred on areas disturbed during construction. The first area to be rehabilitated permanently under the MOP is TDS on completion of reprocessing, repair of the dam wall and completion of refilling with fresh tailings. As the tailings reclaim operation has been suspended pending the resolution of the C&M situation at Woodlawn, rehabilitation of TDS will not occur for several years. The MOP does however cover the establishment of a rehabilitation trial over an area on the North Tailings Dam. This trial is to extend over a period of up to 6 years or until such time as TDN is reprocessed and the trial area removed.

8.1 Rehabilitation of Disturbed Land

A primary commitment in the MOP is the rehabilitation of the tailings dams once retreatment has been completed. The rehabilitation plan involves the use of Woodlawn organic output (WOO) generated from Veolia's on-site mechanical biological treatment (MBT) facility. The WOO has been used in on-site potting trials to determine the optimum blend for germination and survivability of a range of native plant species. The EPA granted Veolia a Resource Recovery Exemption to allow the WOO to be used on TDN for the Rehabilitation Trial. Details of the trial are contained in Section 8.5.

As detailed in the MOP the preferred rehabilitation method will involve placing alternating layers of alkaline product, WOO sourced from the MBT, and a final growing media layer over the surface area of the retreated tailings dams. The alkaline material has been sourced through Pelican Head Resources. A Resource Recovery Exemption has been approved for use of the material at Woodlawn for the rehabilitation trial.

8.2 Further Development of the Final Rehabilitation Plan

The approved 2015 MOP provided a final rehabilitation plan to covers the key areas of Heron's rehabilitation responsibility. As tailings retreatment was only just underway prior to Woodlawn entering C&M, no further development of the final rehabilitation plan is possible at this time. The revised C&M MOP submitted to the

Resources Regulator for consideration in July 2020 includes further rehabilitation strategies but also undertakes to obtain expert advice regarding land form establishment post mining at Woodlawn.

8.3 Agreed Post Rehabilitation Land Uses

The approved 2015 Mining Operations Plan sets out the rehabilitation objectives and methodologies to achieve the nominated final land use. Given that there are two other occupiers within SML20 who both have long term land use objectives, it is understood that any future land use will need to be compatible with these objectives. The approved rehabilitation strategy as described in the 2015 MOP involves a mix of agricultural lands with the land capability suitable for grazing and areas of native revegetation that are compatible with surrounding vegetation systems. A revised MOP to cover the period of C&M at Woodlawn has been submitted to the Resources Regulator for approval.

The post rehabilitation land use does not exclude the reuse of infrastructure that may benefit existing or future site occupiers. The 71 ha of the Western Tablelands Dry Forest vegetation community which forms the ecological offset area must remain intact.

8.4 Rehabilitation Liability

The Rehabilitation Bond currently approved for the Woodlawn Mine is $6.07 Million. The bond was assessed and approved by NSW Trade and Investment Resources and Energy in July 2014 as part of the lease transfer. Although work has occurred on site during this time, it has occurred within the existing disturbed footprint. This has included work on the dolerite emplacement and haul road. As no new areas of site disturbance has occurred during the reporting period there are no triggers to revise the bond value at this time.

8.5 Rehabilitation Trials and Research

The MOP outlined options for tailings dam rehabilitation capping trials to be carried out at Woodlawn utilising compost like material produced by Veolia at their onsite Mechanical Biological Treatment (MBT) facility. After final regulatory approvals and exemptions were received for the Woodlawn Organic Output (WOO), it was decided to proceed with the field trial despite Woodlawn mine being in C&M. Veolia are funding the trial together with grant funding obtained from the EPA for the field trial. A third party Pelican Head Resources (PHR) are also involved in the field trial having sourced and supplied an alkaline product to be used to negate acid generation from the tailings.

Whilst awaiting final regulatory approvals, preliminary in-house greenhouse pot trials utilising WOO were carried out in 2019. Initially a pot trial involving the use of MWOO at varying proportions with soil sourced from on-site was undertaken to determine the survivability of *Lomandra longifolia*. Phase 2 of the pot trial involved a germination trial, using seed harvested from on-site and locations near to the mine site.

An extensive 4ha field trial using the WOO and the alkaline product commenced in April 2021. An overview of the respective stages of the field trial is shown in Figure 65. The current field trial is identifiable as the “combined Stage 2 field trial” depicted in Figure 65.

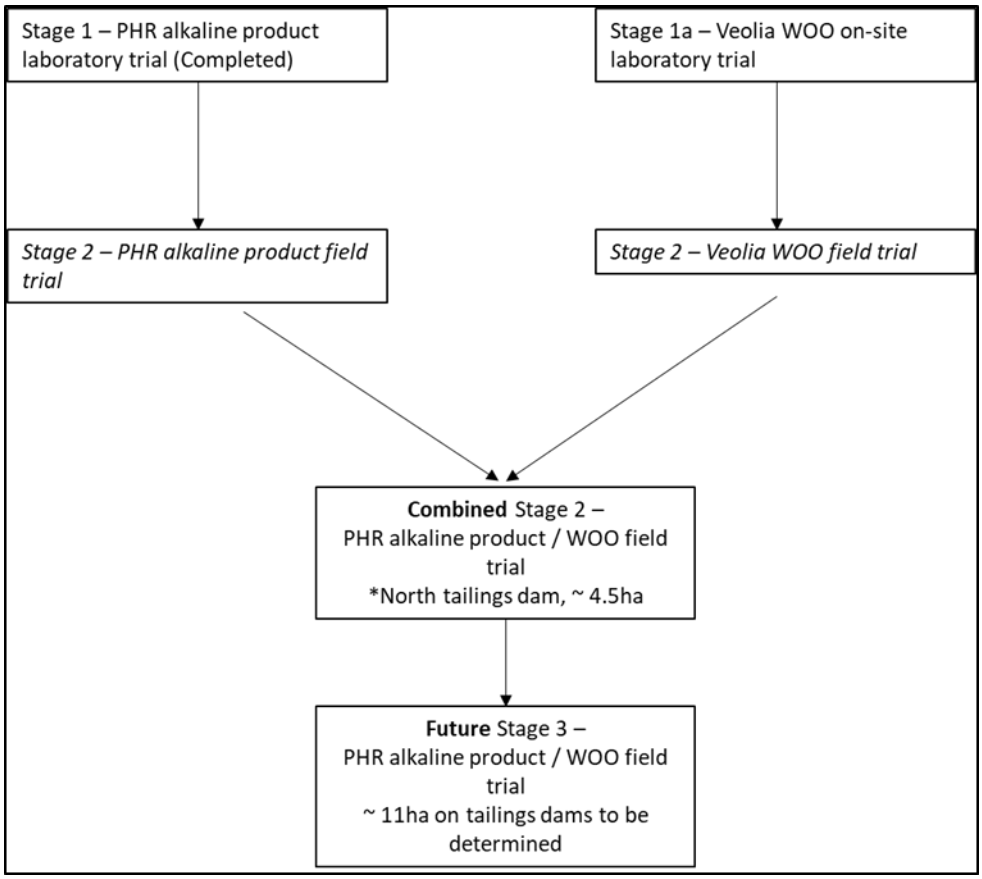


Figure 65. Tailings dam rehab trial stages

The trial entails application of the two products on 4 trial plots (plot IDs 1-4) using different design configurations. The purpose of the different configurations is to identify the optimum material balance in terms of long term sustainability, resource availability and economic feasibility (Figure 66). Plot 5 is the control and plot 6 is the MOP approved alternate cap.

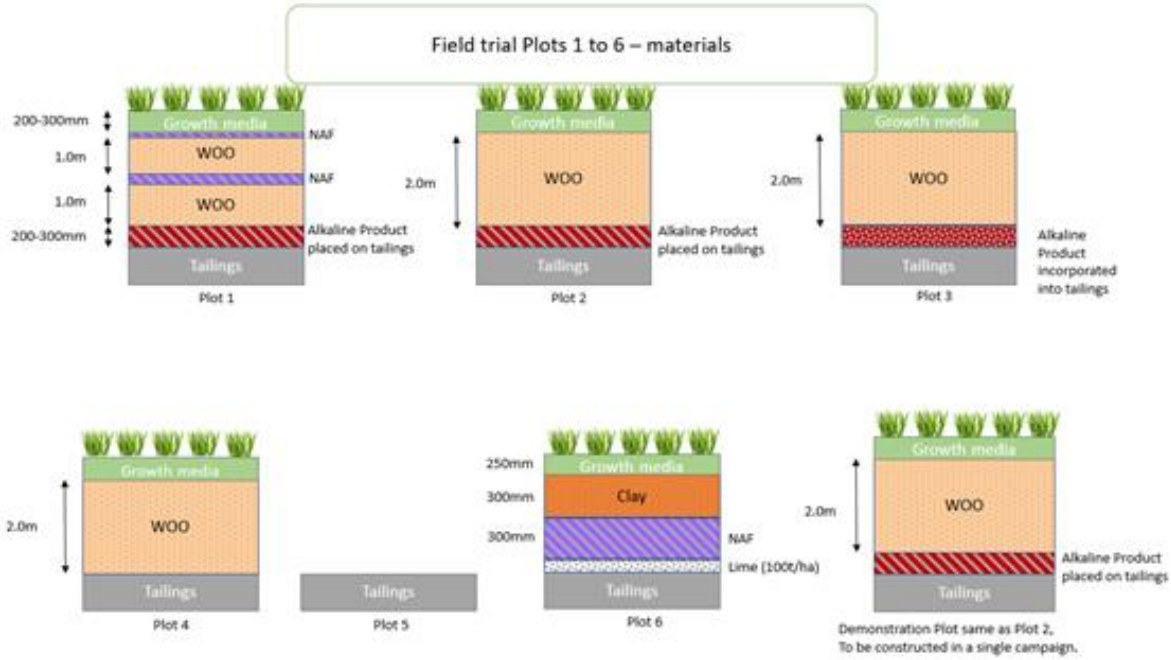


Figure 66. Field trial plot configuration

The planned plot layout and capping profile for each plot is shown in Figure 67.

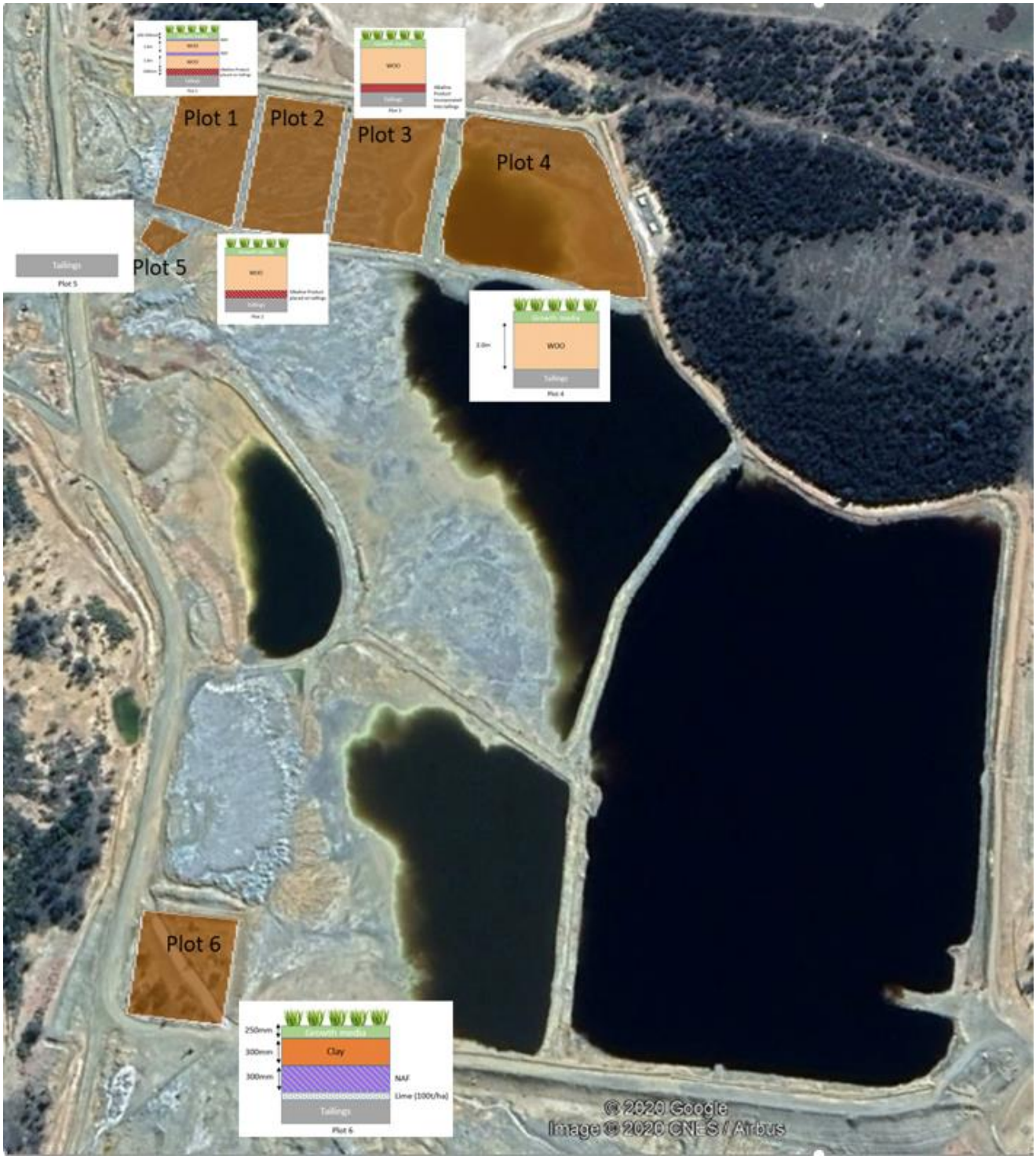


Figure 67. Capping configuration for each plot

At the time of this Annual Report, approximately 5,000 tonnes of WOO had been applied to plot 4, and approximately 10,000 tonnes of alkaline product across much of plots 1-3 (Figure 68). The key learnings to date are associated with the techniques, attributes and constraints of the materials during the placement. There have been considerable delays associated with rainfall and saturation of the materials during this phase.

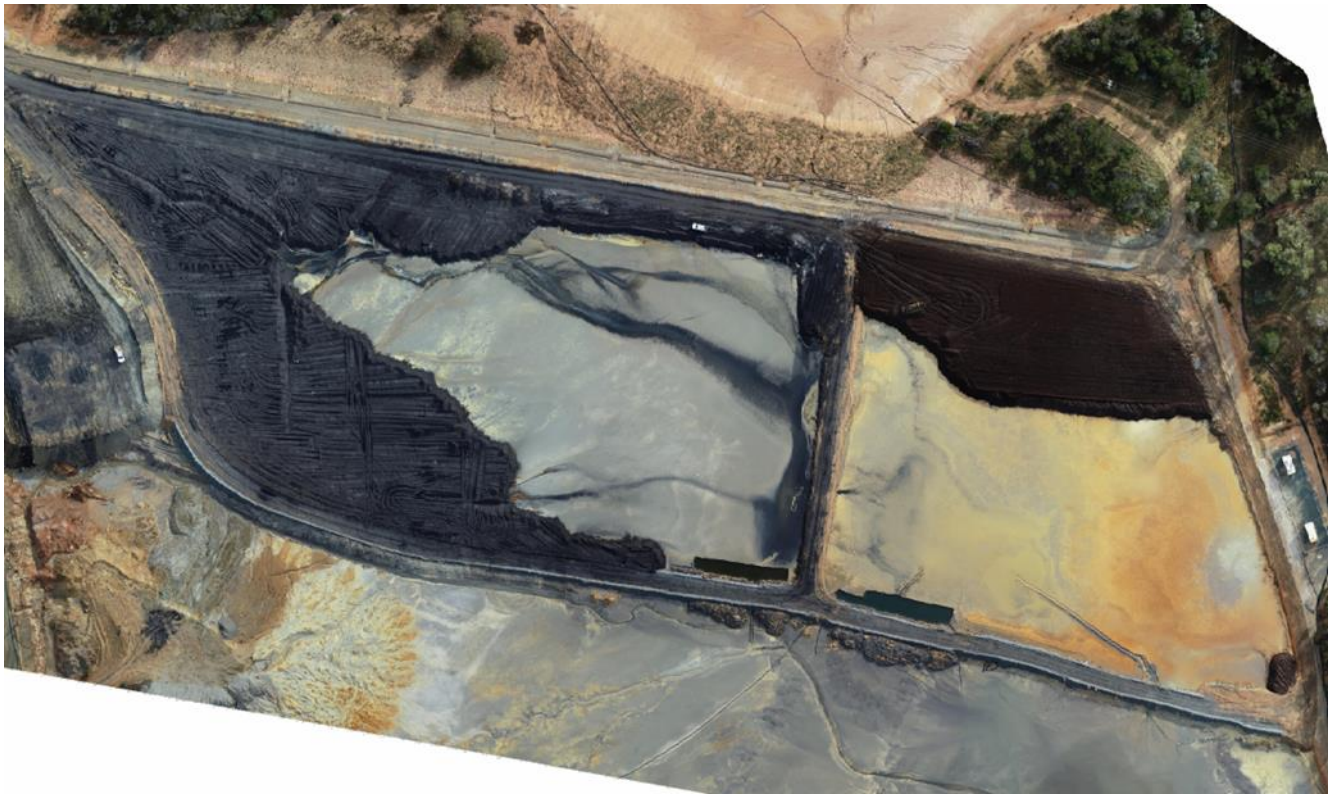


Figure 68. Aerial photo showing progress in spreading WOO (right of picture) and Alkaline product (left of picture)

To expedite installation of monitoring equipment it is planned to form sub-plots within the 4 plots. The sub-plots are expected to be completed late in 2021 allowing installation of the monitoring equipment in Jan/Feb 2022. The remainder of the plots will continue to be completed and utilised for land formation, sustainability and revegetation trials. It is expected preliminary results from the monitoring equipment will be available for the next annual report.

8.6 Exploration Rehabilitation Report

Heron lodged its Annual Exploration Environmental and Rehabilitation Compliance Report on SML20 in December 2020. This report was prepared to meet the conditions of SML 20. Rehabilitation of exploration activities are undertaken as soon as practicable following disturbance.

9 COMMUNITY RELATIONS

Government authority and community consultation has formed an integral component for the re-opening of the mine. Heron is committed to continue this consultation work with key government and community stakeholders as described in Section 2.3.

9.1 Environmental Complaints

A community complaints register is being maintained that identifies actions required to resolve community issues. The main phone line advertised in the white pages is the designated community complaints line and is answered at all times during hours of operation. The complaints register records the following details:

- ❒ Complainant name and contact details.
- ❒ Nature of the complaint (noise, dust, traffic etc).
- ❒ Time and date of the complaint.
- ❒ Specifics of the complaint.
- ❒ Actions taken to resolve the complaint.
- ❒ Confirmation that the complaint has been resolved.

In the event that an issue is unresolved, the register includes details of the outstanding issues and any actions that are required. It is recognised that some issues may not have a simple resolution and have resulted in multiple complaints. These form part of the ongoing environmental improvement program for the operation.

There were no complaints received during the 2020/2021 reporting period.

The complaints register is published on Heron's web page at the following link:
http://www.heronresources.com.au/woodlawn-community.php

The complaints received to date by Heron are summarised in Table 24.

Table 24. Complaint Summary

Period	6/2013	6/2014	6/2015	6/2016	6/2017	6/2018	6/2019	6/20	6/21
Complaints	0	0	0	4	0	1	1	1	0
Resolution	n/a	n/a	n/a	Yes	n/a	Yes	Yes	Yes	n/a

9.2 Community Liaison

A Community Consultative Committee operates for the Woodlawn Mine which consists of an Independent Chair, representative from Goulburn Mulwaree Council and four community members. Invited observers to the meetings can include representatives from Veolia and other community organisations. The committee meets up to four times per year.

During the reporting period CCC meetings were held on 5 August 2020 and 9 December 2020. Minutes of the meetings are published on Heron's web page and can be found at:
https://www.heronresources.com.au/woodlawn-community

10 INCIDENTS AND NON-COMPLIANCES

Internal inspections of the site and operating systems are undertaken on a weekly basis. There was one incident of water discharge from site discussed in section 6.4.5.

Heron received penalty notices from the Department of Planning, Industry and Environment in February 2020 for breaches to section 4.2 of the Environmental Planning and Assessment Act for breaches related to the:

- Waste rock storage area; and
- Box cut and underground mine entry.

The breaches were for development of the above infrastructure that were not in accord with the Consent (Mod 2).

None of the breaches resulted in environmental harm. The MOD3 will be submitted prior to resuming operations at Woodlawn.

The second penalty was presented to Heron regarding a breach of section 6.3 of the Environmental Planning and assessment Act 1979. The breach was for building work carried out without obtaining construction certification for a number of buildings during the construction phase of the Woodlawn mine project. There was no harm to the environment or the safety of personnel arising from the breaches. Heron continues to work with Goulburn Mulwaree Council to finalise the necessary certification of all buildings on Site. Outstanding building certification was finalised during the reporting period.

11 PROPOSED ACTIONS FOR THE NEXT REPORTING PERIOD

11.1 Planned Activities for 2020-21 Reporting Period

The strategic process to find a solution to allow Woodlawn Mine to resume operations is expected to continue into the next reporting period. It is uncertain how much longer Woodlawn will be in a state of C&M. The following activities are expected to continue during the C&M period where resources allow:

- ❒ Continuation of the strategic process to identify a solution for resumption of operations at Woodlawn.
- ❒ Ongoing work related to the rehabilitation trials on Tailings Dam North with the assistance of resources provided by Veolia. The work will include material application, surface preparation profile forming, capping, vegetation and commencement of data collection.
- ❒ Continue subsidence monitoring as described in the Extraction Plan.

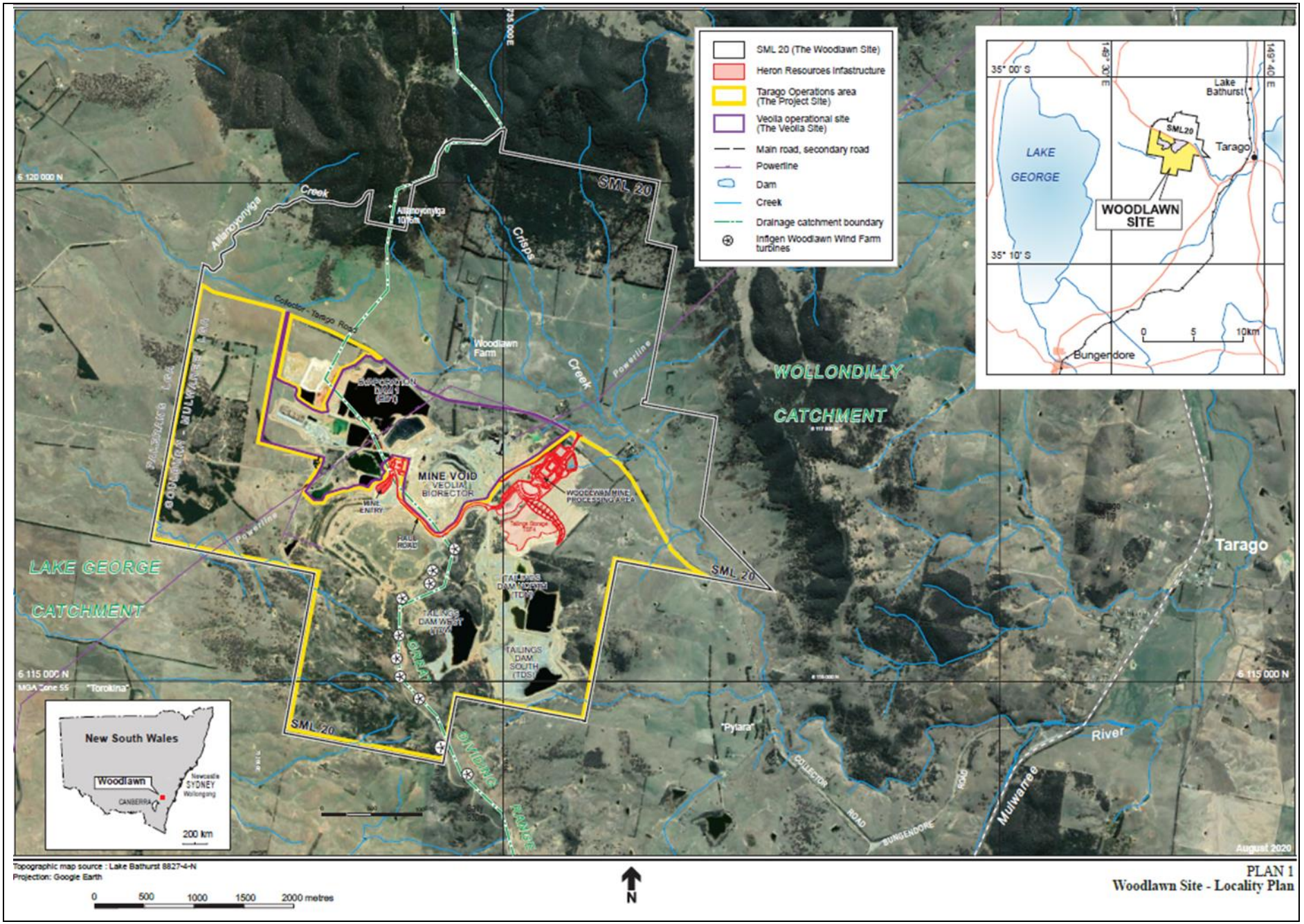
11.2 Stakeholder Consultation

Stakeholder consultation will be ongoing during C&M and will include additional briefings with government agencies and the Community Consultative Committee. CCC meetings will continue during the C&M reporting period.

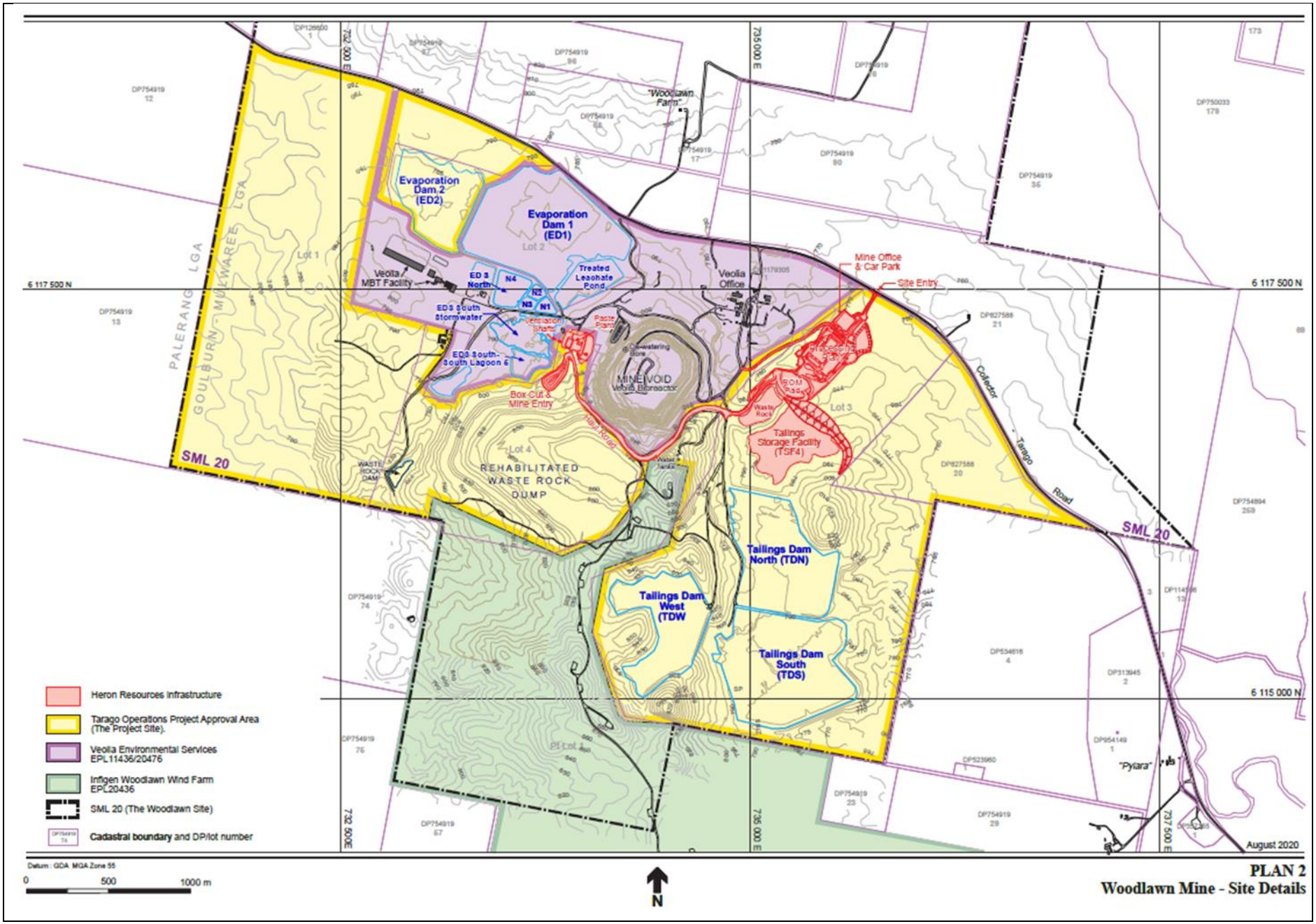
12 APPENDICES

Appendix A – Plans
Appendix B – Rehabilitation Tables
Appendix C – Project Approval
Appendix D – Environment Protection Licence

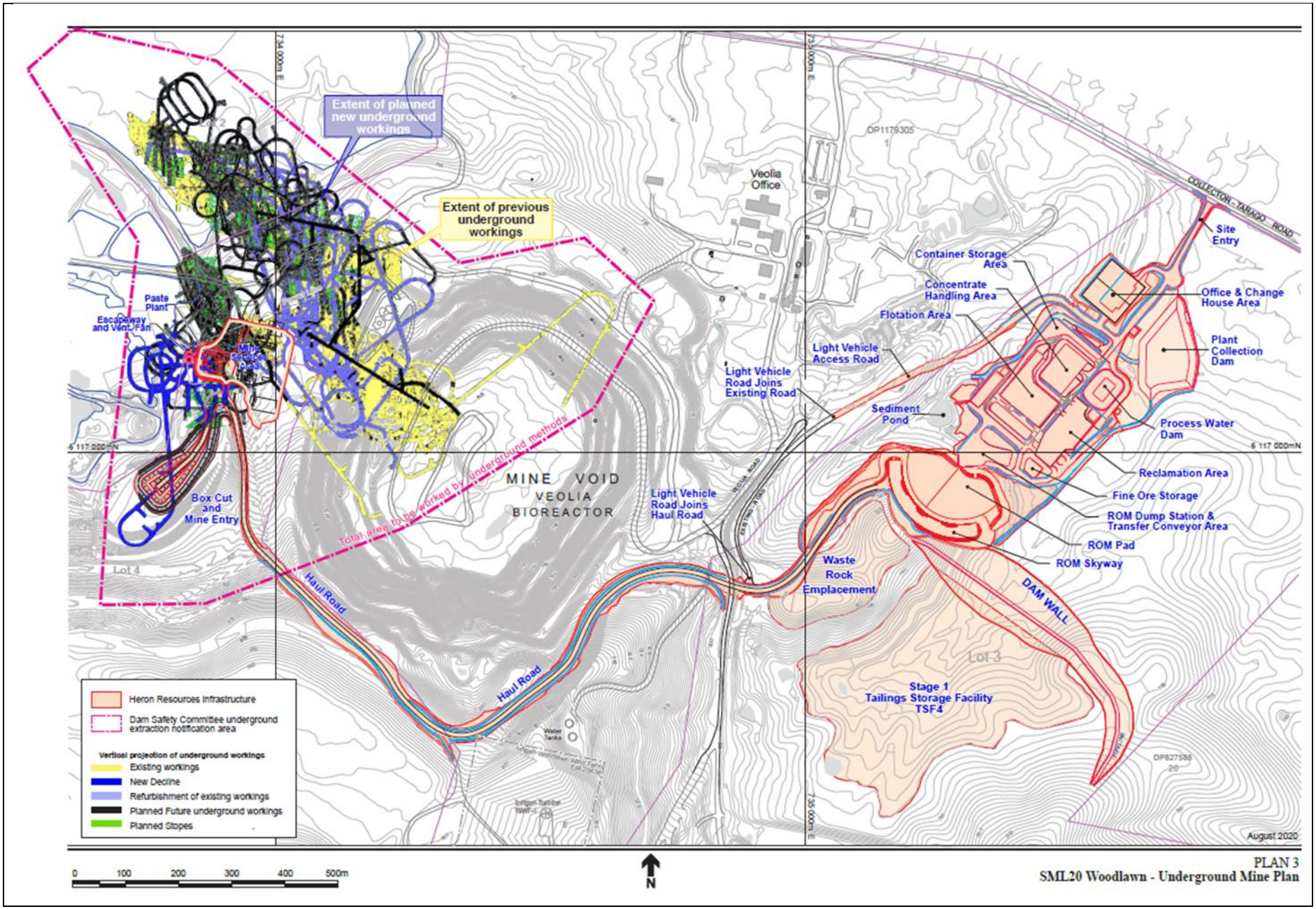
Appendix 1 – Plans

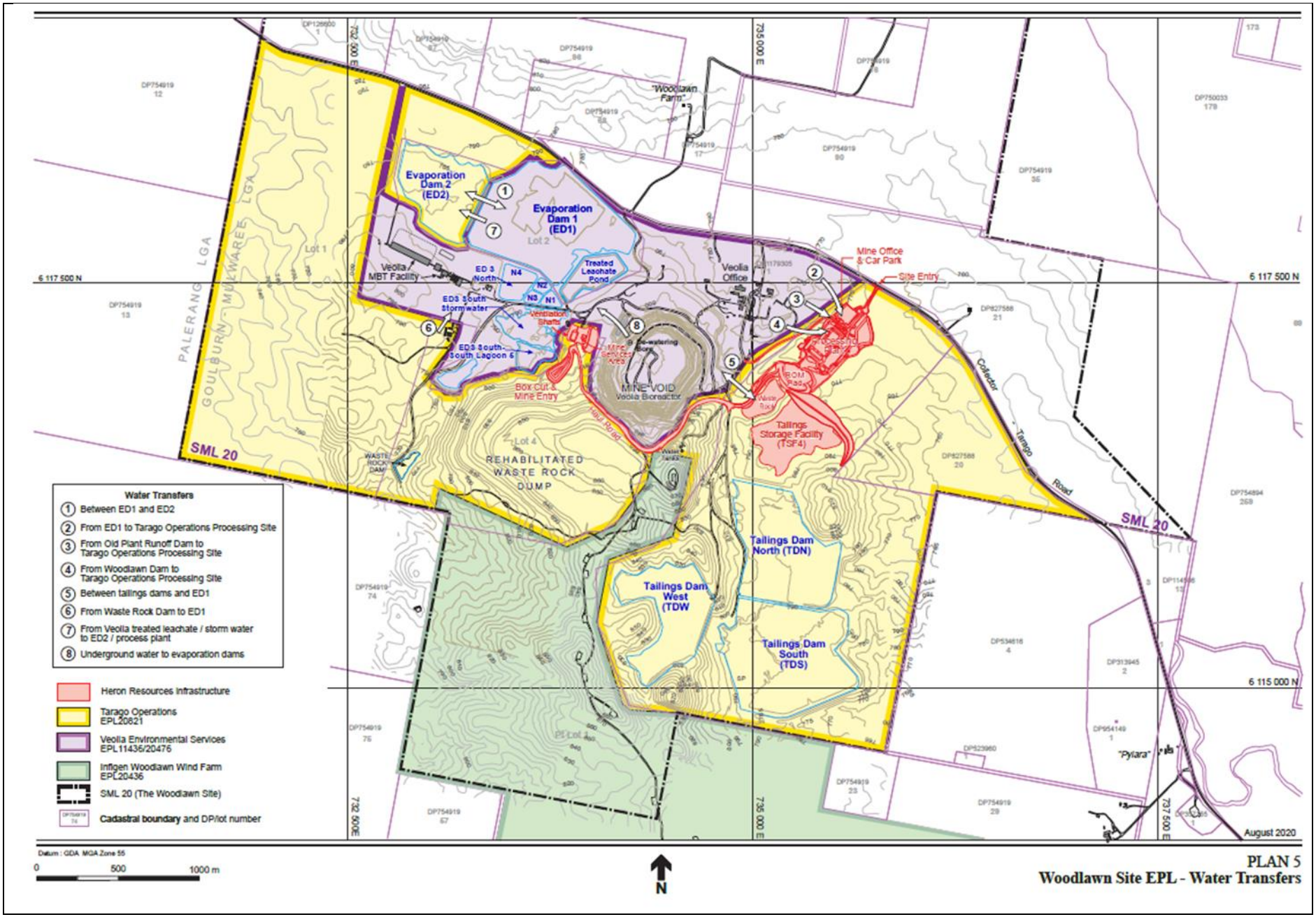


PLAN 1
Woodlawn Site - Locality Plan

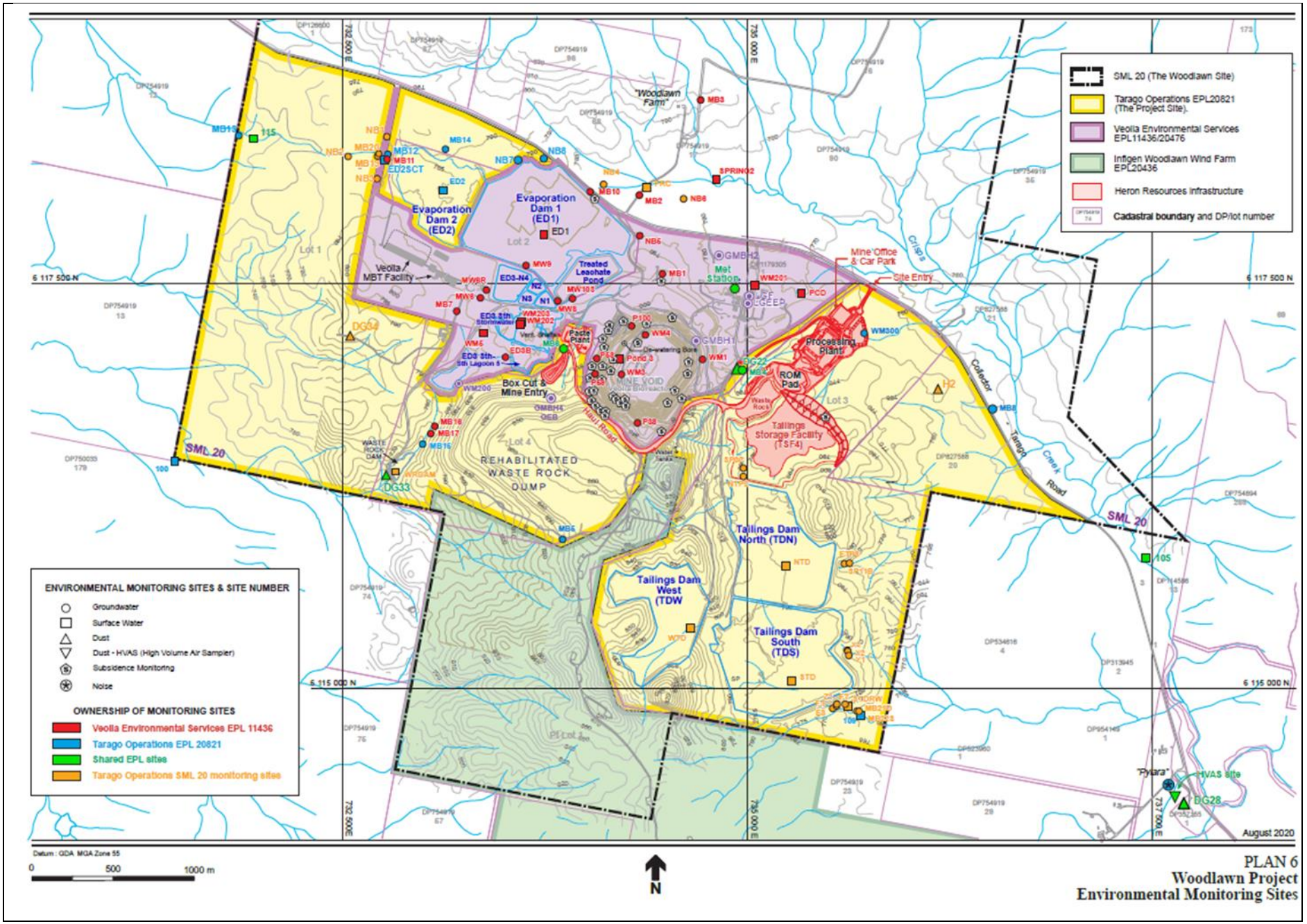


PLAN 2
Woodlawn Mine - Site Details


Extent of planned new underground workings
Extent of previous underground workings
Veolia Office
Site Entry
Container Storage Area
Concentrate Handling Area
Office & Change House Area
Flotation Area
Plant Collection Dam
Light Vehicle Access Road
Light Vehicle Road Joins Existing Road
Sediment Pond
Process Water Dam
Reclamation Area
Fine Ore Storage
ROM Dump Station & Transfer Conveyor Area
ROM Pad
ROM Skyway
Waste Rock Emplacement
DAM WALL
Stage 1 Tailings Storage Facility TSF4
Paste Plant
Escapeway and Vent. Fan
Box Cut and Mine Entry
MINE VOID
VEOLIA
BIOREACTOR
Light Vehicle Road Joins Haul Road
Haul Road
Haul Road
Total area to be worked by underground methods
Lot 4
Lot 3
Heron Resources Infrastructure
Dam Safety Committee underground extraction notification area
Vertical projection of underground workings
Existing workings
New Decline
Refurbishment of existing workings
Planned Future underground workings
Planned Stopes
0 100 200 300 400 500m
N
August 2020
PLAN 3
SML20 Woodlawn - Underground Mine Plan



PLAN 5
Woodlawn Site EPL - Water Transfers



PLAN 6
Woodlawn Project
Environmental Monitoring Sites

Appendix 2 – Rehabilitation Tables

Rehabilitation Summary

	Cumulative Area Affected (Hectares)		
	To Date	Last Report	Next Report (estimated)
A: MINE LEASE AREA			
A1 Mine Lease(s) Area	2,368 ha		
B: DISTURBED AREAS			
B1 Infrastructure Area (other disturbed areas to be rehabilitated at closure including facilities, roads)	78	78	78
B2 Active Mining Area (excluding items B3-B5 below)	Nil	Nil	Nil
B3 Waste Emplacements (active/unshaped/in or out-of-pit)	Nil	Nil	Nil
B4 Tailings Emplacements (active/unshaped/uncapped)	110	110	110
B5 Shaped Waste Emplacement (awaits final vegetation)	Nil	Nil	Nil
ALL DISTURBED AREAS	185	185	188
C: REHABILITATION PROGRESS			
C1 Total Rehabilitated Area (except for maintenance)	92	92	92
D: REHABILITATION ON SLOPES			
D1 10 to 18 degrees	Nil	Nil	Nil
D2 Greater than 18 degrees	Nil	Nil	Nil
E: SURFACE OF REHABILITATED LAND			
E1 Pasture and Grasses	15ha	Nil	Nil
E2 Native Forest/ecosystems	Nil	Nil	Nil
E3 Plantations and Crops	Nil	Nil	Nil
E4 Other (include nonvegetative outcomes)	Nil	Nil	Nil

Maintenance Activities on Rehabilitated Land

	Area Treated (ha)		
	Report Period	Next Period	Comment/control strategies/treatment detail
Additional erosion control works (drains re-contouring, rock protection)	Nil	0.5	
Re-covering (detail – further topsoil, subsoil sealing etc)	Nil	0.5	
Soil Treatment (detail – fertiliser, lime, gypsum etc)	Nil	Nil	
Treatment/Management (detail – grazing, cropping, slashing etc)	Nil	Nil	
Re-seeding/Replanting (detail – species density, season etc)	1.7	1	Vegetation screen species used E. viminalis, E. Maniffera, E pauciflora, E. Rubida, E. Blakelyi, E. dives, E. rossii, C. Littoralis, L continental, L. juniperinum, C pallidus, S. linearifolum, B bulbosa.
Adversely affected by Weeds (detail – type and treatment)	3	2	Ongoing weed eradication program over Hickory's Paddock
Feral animal control (detail – additional fencing, trapping, baiting etc)	Nil	Nil	

Appendix 3 – Project Approval

Appendix 4 – Environmental Protection Licence